



COURT OF JUSTICE
OF THE EUROPEAN UNION

Artificial Intelligence Strategy



This document outlines the Artificial Intelligence Strategy of the Court of Justice of the European Union. It starts with an introduction covering a definition of A.I., typologies and a brief status quo, continues by articulating a vision supported by goals and objectives, states the principles, makes a short readiness assessment, gives an overview of the risks, and concludes with a proposal for the governance and architectural approach.

The AI Strategy was approved by the Administrative Committee of the Court on 30.6.2023.

This document should be understood as capturing the institution's vision at an early stage of AI development, prior to the adoption of the regulatory framework, and to the significant technological and practical advancements observed in recent years.

The considerations set out in this document represent exclusively an institutional perspective and must not be understood as prejudging any judicial assessment.

Executive summary

Artificial Intelligence (A.I.) has been around since the 1950s, but its recent exponential growth can be attributed to two factors: first, the availability of larger datasets for training and second, increased computational power. We can expect further rapid advancements in the future as A.I. continues to evolve. It holds significant potential for the Court of Justice of the European Union (ECJ), on the one hand by enabling automation of simple tasks in both the judicial and administrative areas and, on the other hand, by offering new possibilities in legal research, translation, interpretation, enhancing accessibility and providing a modernised approach to accessing information.

This technology can be leveraged to achieve multiple **goals**, with a primary focus on three key areas: improving the efficiency and effectiveness of our administrative and judicial processes, enhancing the quality and consistency of judicial decisions, and increasing access and transparency for EU citizens.

Automating various tasks can significantly enhance **efficiency and effectiveness**. In the judicial field, several examples include the detection of references in documents, suggesting metadata, proposing subject matters during case logging, and generating transcripts of hearings through speech-to-text algorithms. Besides automation, A.I. could soon be available for more advanced support: search engines that understand context, summaries of large documents proposed by a machine, or anonymisation algorithms. In the administrative realm, we could witness improved support for building operations, automation in financial processes (such as automatic invoice handling), and the integration of virtual assistants into our daily tools. These virtual assistants could assist in scheduling meetings, preparing presentations and documents, and composing response emails, among other tasks.

The quality and consistency of judicial decisions could also be enhanced through this technology by enabling automatic correlation and classification of cases, automating the processing of originating documents, and potentially employing advanced legal research tools as technology evolves. The current capabilities already allow for automatic detection and visual display of related cases. It is worth considering conducting a study to better understand the implications, and particularly the risks, of incorporating predictive A.I., as lawyers outside the ECJ appear to be open to its adoption.

A.I. could bring benefits in **increasing access to justice and transparency vis-à-vis EU citizens**. In the case of people with disabilities, they could benefit, for example, from having automatic subtitles for hearings that are streamed and virtual assistants could support them in satisfying their inquiries with video or audio responses in their own language. Chatbots, virtual assistants, A.I. avatars integrated within our website could also support the general public or legal professionals in their quest for information. It is expected that translation and interpretation tools will evolve in the coming years and therefore these tools will need to be integrated everywhere in order to decrease language barriers. It is expected that soon, effective and affordable tools will be able to perform a sentiment analysis on the reactions of the general public or legal professionals. This type of feedback will help us fine-tune our communication.

The adoption of such technology does not come without risks. It is essential to have a comprehensive understanding of these risks to make informed assessments and develop effective mitigation strategies. Chapter 4 of this paper addresses this topic. One of the **main risks** associated with the adoption of A.I. technology is the possibility that involuntary biases may be introduced during the training of A.I. models, resulting in unintentional discrimination. Another risk pertains to the

potential *disclosure of sensitive data* when using algorithms in the cloud. Additionally, there is concern regarding the generation of *false, inaccurate, or irrelevant information* by generative A.I. algorithms (such as ChatGPT), which can lead to phenomena known as "hallucinations" where A.I. algorithms invent information that sounds plausible but is not factual. *Over-reliance on technology* without the application of critical human thinking can also result in improper usage. The rapid advancement of A.I. algorithms may lead to uncontrolled or excessive usage (*hyper abuse*) without adherence to all the in-house good-practice rules. Unfortunately, A.I. can provide new tools for *sophisticated cyberattacks*, enabling impersonation and data pollution that can be exploited by malicious actors. Understanding and addressing these risks are crucial for responsible and secure use of A.I. technology within the ECJ.

One of the important mitigation strategies is to **adopt an appropriate governance model**, fully integrated into the existing model. The proposal in this paper is to create an *A.I. Management Board*, which will support the Court in this process, via a "risk-based" approach, based on the principles highlighted in Chapter 3. This Board will define the "red lines" (the areas in which this technology should not be used due to the high risk), the areas of special attention (in which the adoption of A.I. algorithms needs to be done with prudence and appropriate controls), and areas that, due to their specificity, present a low risk. It is important to highlight that one of the proposed objectives is the adoption of a governable A.I., which is seen as a continuous process.

At the technical level, it is crucial to adopt or create A.I. algorithms in a controlled manner and with a clear architectural approach to ensure high reusability. This approach ensures that the same type of algorithm is implemented only once and can be reused across different cases where it can bring benefits. The paper presents a clear and comprehensive high-level capabilities map for A.I.

At the resources level, the paper emphasises three key areas. Firstly, it highlights the importance of creating the necessary instruments to upskill and reskill the internal workforce, including IT professionals, managers, and staff. The paper suggests leveraging training provided through an Emerging Technologies Academy, establishing a mobility board, re-evaluating the overall sourcing strategy, and implementing robust change-management capabilities. Secondly, the paper emphasises the ongoing use of the Innovation Lab and existing innovation network as catalysts and central hubs for eliciting, testing, and evaluating innovative initiatives throughout the ECJ. Lastly, the paper proposes analysing the required level of investments based on the level of ambition set by the ECJ. Chapter 5 provides an initial overview of investment considerations in this regard.

With three years of experience in exploring and experimenting with artificial intelligence technology, the ECJ is now ready to **step into an "industrialisation phase."** Besides a thoughtful reflection, this requires the development of a strategy for moving forward, and the implementation of several key steps to establish a strong foundation. The paper outlines these steps in detail throughout its various chapters and provides a summary at the end.

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1. Introduction

Artificial intelligence: definition and typology

A.I. (Artificial Intelligence) can trace its roots back to the 1950s and is based on significant contributions to the field made by pioneers like Alan Turing, John McCarthy, and Marvin Minsky. The term "artificial intelligence" was used for the first time in 1956, at the Dartmouth Conference, by researchers who gathered together to discuss the possibility of creating machines that could exhibit human-like intelligence.

Many definitions of A.I. have been given over the years. Usually these see A.I. as intelligent software that aims to create intelligent machines or systems capable of simulating human-like intelligence and behaviour. The EU AI Act defines it in the following way: *"an artificial intelligence system (AI system) means software that is developed with one or more of the techniques and approaches [...] and can, for a given set of human-defined objectives, generate outputs such as content, predictions, recommendations, or decisions influencing the environments they interact with"*.

A.I. can be categorised into two main types: *"Narrow A.I."* (also known as Weak A.I.); and *"General A.I."* (also known as Strong A.I.).

"Narrow A.I." (Weak A.I.) refers to A.I. systems designed to perform specific tasks or functions within a limited domain. This type of A.I. is trained to excel at specific tasks and lacks the ability to generalise their knowledge or apply it to different domains.

Generative A.I. (such as ChatGPT) is a type of narrow A.I. It has the ability to generate new content, such as images, text, music, or even entire simulations, based on patterns and examples from which it has learned. It is trained on large datasets and uses techniques like "deep learning" and "generative models" to create new and original content. It can be quite impressive in its ability to create realistic and novel outputs, but does not possess the ability to reason, understand context, or perform a wide range of intellectual tasks across different domains.

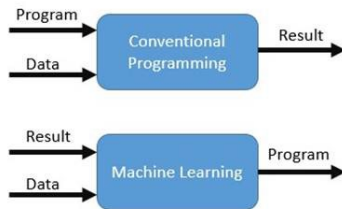
"General A.I." (Strong A.I.) is a theoretical concept and it refers to A.I. systems that possess human-like intelligence and can understand, learn, and apply knowledge across various domains. These systems would have the ability to perform any intellectual task that a human can do.

In addition to these broad categories, there are also subfields and specialised branches within A.I., such as machine learning, natural language processing (NLP), computer vision, robotics, expert systems, and more.

A.I. has evolved considerably in the last few years due to two main factors: the availability of larger datasets that are needed for training; and an increase in computational power. Further evolutions are expected in the future, most probably at a rapid pace.

How does it work?

A.I. and machine learning are very different from classical programming. In classical programming, the IT engineer writes the whole code and a set of input data is transformed into output based on that code. The code is available for inspection at any moment, by any person with access to it.



In the case of A.I., a code is written simply as a framework for the future A.I. algorithm, but not for the application itself (i.e. where the result is processed). A.I. and machine-learning is based on neural network models, which are trained with different datasets. In the training process, the neural network calculates probabilities for each data that will pass through the network and will generate an output, an A.I. model.

To ensure the accuracy and lack of biases of the output model, it is crucial to have an ample volume of data that is of high quality and representative. Neglecting any of these three elements can result in inaccuracies or biases within the model's predictions.

If the machine is programmed to learn continuously, the model continuously changes depending on the data that is fed into it. It is interesting to note that the learning mechanism can be separated from the "running machine" (which is the model itself). This means that, for example, a machine may learn in the cloud but can be used locally.

As a result of this mechanism, compared with classical programming, what can be directly inspected in an A.I. case is: the initial framework code; the setup of the neural network; and the data set used for training. The A.I. model or the output logic itself can only be understood by using rather complex (but not impossible) explainability mechanisms; this area is called Explainable A.I.

Benefits and risks of this emergent technology

Artificial intelligence brings immense potential to the Court of Justice of the European Union. By incorporating this technology into its operations, the Court can improve its efficiency, reduce its workload, and make better use of its resources. This can ultimately lead to a more transparent, effective and efficient judicial system, benefiting both the Court and the people it serves. The chapters below describe the many areas in which artificial intelligence will bring benefits.

However, using this new technology is not without risks. We can distinguish two types of risks: the risk of using it ourselves and the risk of it being used by others. In both cases, understanding these risks and taking proactive actions to mitigate them are essential.

Amongst the risks, we can distinguish, for example:

Biases that can be introduced accidentally within the training data of an algorithm and which can lead to a model that will involuntarily create discrimination.

Disclosure of sensitive data when using algorithms in the cloud, by providing prompts that contain sensitive or personally identifiable information.

False or inaccurate (or irrelevant) information. This can occur for example in algorithms that have been trained with insufficient or low-quality data. Furthermore, in the case of generative A.I., it has already been noticed that results are often wrong or inaccurate. Some specialists refer to this phenomenon as “hallucinations”, in which a generative A.I. algorithm invents information and makes it sound real.

Over-relying on technology. The results given by A.I. algorithms have to be continuously verified and human critical thinking has to be applied. Failure to do this risks over-reliance on the results given by a machine, without a proper human filter. In case of errors, the machine has to be retrained or corrected. Moreover, if the algorithm is unavailable, staff still have to be able to take over from the machine and perform those tasks manually and thus their skills and expertise need to be preserved as a resilience mechanism.

Hyper abuse. The rapid advancement of A.I. algorithms may lead to an over-excitement in which one is tempted to adopt such solutions too quickly, in an uncontrolled way, thereby disregarding all the in-house rules of good practice (IT architecture, security and data protection). A proper system of governance in analysing and adopting such tools is essential to mitigate such a risk.

Disinformation, censorship and control. In the wrong hands, A.I. algorithms can be used to spread fake information (creating fake videos, images etc.) or to censor the circulation of information.

A.I. will unfortunately also offer new tools for *sophisticated cyberattacks*. This may range from faster data collection and corroboration up to sophisticated ways to impersonate somebody, who then becomes a target for such an attack. As video, voice and the personal style of a person (e.g. vocabulary, accents and preferences) can be artificially recreated by A.I. algorithms, this will make the impersonation much more credible, thus increasing the probability of success. Moreover, on a machine level, A.I. algorithms may detect vulnerabilities in the infrastructure that can be exploited. Human critical thinking, combined with A.I. algorithms to detect such attacks can be an efficient mitigation tool.

Another type of cyberattack can focus on the model itself. If an A.I. model is used while continuing to learn in parallel, and if a hacker injects a large amount of incorrect training data, this will lead to a corrupt A.I. model.

Use of cloud solutions, both for general use or in the context of artificial intelligence algorithms, remains a significant risk. The Court’s judicial activity involves the handling of sensitive information, thus any use of such a solution might compromise data confidentiality. Therefore, the Information Technology Directorate (DTI) has adopted an approach that avoids the use of cloud technologies for any solution that is used in the judicial field, so all solutions need to be installed and used on-premises. However, for information that is considered to be public, the DTI allows the use of such solutions, but with strict verification of security and data protection compliance.

The ECJ's journey in exploring the potential of artificial intelligence

The Court started to explore the possibilities afforded by artificial intelligence algorithms several years ago. In 2019, the Court's **Innovation Lab** was created, aiming to explore emergent technologies and the way in which the Court can leverage them.

Innovation relies on the collective intelligence of our organisation and this can be fostered only by connecting talented minds with different professional backgrounds. Meaningful multidisciplinary initiatives can therefore feed the exploration of the Innovation Lab. Following this principle, the "AI+ Network" was constituted in 2020, gathering together a representative user of each department, the two registries and the chambers of the Court and the General Court. Since its creation three years ago, this group has met regularly and proposed no fewer than 30 innovative initiatives, of which 20 have been tested via proofs of concept.

Our institution also benefits from sharing experiences with the other EU institutions and is the lead institution of the interinstitutional group that explores the potential of artificial intelligence. This group was created in October 2021 and has already produced several concrete outputs such as the creation of a network of Innovation Labs across the EU's institutions, bodies and agencies (EUIBAs), an inventory of all A.I. projects and initiatives across EUIBAs – accessible via a chatbot - and even a concept for an Academy to upskill staff in the field of artificial intelligence.

The concept of "*smart courts*" has started to emerge within the e-Justice domain around the world. This concept refers to the use of technology and data to improve the efficiency, transparency, and accessibility of court proceedings. Smart courts incorporate various emergent technologies such as artificial intelligence, blockchain, virtual conferencing and hearing solutions, and case management systems.

The ECJ, without specifically referring to this concept, has already started its journey towards becoming a *smart court*. Indeed, the ECJ has already taken steps towards digitising its operations and has implemented several technological advancements in recent years. For example, the SIGA case management system is an important step ahead and combining this with artificial intelligence and robotic process automation will support the transformation towards such a goal. Moreover, the Court has made use of modern technologies to digitalise certain processes or, for example, to use videoconferencing technology to conduct hearings remotely.

The ECJ could also explore the use of artificial intelligence to analyse large amounts of legal data, provide insights into cases, improve the efficiency of legal research, or automate administrative activities.

Implementing smart court technologies would help the ECJ to decrease the time of proceedings, increase access to justice, and positively impact the quality of justice. However, it is important to ensure that any new technology is implemented in a manner that preserves the independence and impartiality of the judiciary and respects fundamental rights such as privacy and data protection.

In this context, drafting and adopting an A.I. strategy at the ECJ is of fundamental importance.

2. A.I. vision, goals and objectives

Vision statement

The Court of Justice of the European Union will leverage responsible, equitable, traceable, reliable and governable A.I. capabilities as well as the talents of its own workforce in its journey towards becoming a Smart Court.



FIGURE 1 ARTIFICIAL INTELLIGENCE GOALS

Goal 1: Improve the efficiency and effectiveness of the administrative and judicial processes

By incorporating Artificial Intelligence (A.I.) into its operations, the Court of Justice of the European Union can improve its efficiency, reduce its workload, and make better use of its resources. This can ultimately lead to a more effective and efficient judicial system, benefiting both the Court and the people it serves.

Objective 1.1: Identify and integrate A.I. solutions that improve efficiency and effectiveness

To achieve this objective, several key initiatives are being tested today, and there are others that could be envisaged, such as:

- Within the first version of **SIGA** (the case management system that aims to be the unique platform in which all cases are managed end-to-end, both for the Court and the General Court), a proof of concept using artificial intelligence (developed in-house) will be tested under close user-supervision. This module aims to assist the user in improving the management of the originating documents. For example, by offering automated suggestions on the subject matters or keywords, by detecting

references in the text, or by offering support in the text processing related to open cases for decisions and conclusions. This could save time and reduce errors, allowing ECJ staff to focus on higher-level tasks.

- By using a *speech-to-text machine*, the **hearing transcripts** could be produced automatically, reducing considerably the time required to produce the text as well as the human effort involved in this activity. A machine is currently in training in the lab to test this.
- The next generation of Eureka, the **search engine** for judicial documents, also has the possibility to leverage AI. Not only will accuracy be increased, but semantic search will also be possible. This means that in future the machine could understand the context and meaning behind a user's query, rather than it simply trying to match keywords.
- Through *Natural Language Processing (NLP)*, A.I. can be used to analyse and understand judicial documents, allowing for faster and more accurate analysis. **Automatic summaries** could become possible if a machine is well-trained using sufficient quality data. It is to be noted that automatic summaries could be produced not only for judicial documents, but also for books, research materials and other types of material that could be used as support in an analysis.
- **Administrative tasks** will also benefit from AI. In the future, all staff members could benefit from an **AI-powered virtual assistant**, which could help them with routine tasks such as scheduling, preliminary preparation of documents, letters or presentations (like a very first draft produced by a machine), and taking care of administrative duties. This could reduce the workload and free up time for more important tasks.
- **Smart buildings**: Leveraging possibilities provided by A.I., buildings could become increasingly connected and intelligent, with sensors and other technologies embedded throughout the building to monitor and optimise performance. This could include everything from lighting and temperature control to security systems and energy usage. In the short term, a study should be launched to understand the potential of this and in the mid-term, the initiatives depicted in that study will need to be further developed.

Objective 1.2: Enable data-driven transformation, optimising work-processes and leveraging A.I. benefits

The **digital transformation of the judicial field**, which is today ongoing via SIGA, its main vector, is a transformation in two dimensions. On the one hand, it aims to break the work in silos (done today by different actors of the judicial process) and to follow the natural flow of a case, which is a transversal flow across the organisation. On the other hand, it is a technological transformation, which leverages state of the art “low code technology” (the Pega platform), artificial intelligence algorithms and a completely new architectural design, placing data at the heart of this transformation.

Having the data as a central asset within this digital transformation is key, because without quality and representative data, A.I. algorithms cannot be correctly trained to produce a quality output. Therefore, **data governance** is essential to achieve this objective.

A **data strategy** is also required, in order to set a clear direction on how one of the most important assets of the organisation (the data) will be collected, processed, stored, and disseminated. The judicial process will employ mainly algorithms created and used within the Court, due to the high sensitivity of the data related to cases and data protection requirements. On the other hand, the activities of the Court that involve public information will be able to make use of any algorithm that is made available outside the boundaries of the organisation.

Objective 1.3: Create a transformative ecosystem for future-ready workforce capabilities

People are the most important asset of the organisation. Therefore, in order to fulfil its future mission, the workforce needs to have the possibility to continuously adapt. New skills and competences are already required, not only within the IT area, but also in all the other departments.

Having the right competencies on board, at the right moment, at the right place, will be instrumental. Therefore, there are at least five main key initiatives that could be launched in order to fulfil this objective:

- **Upskill the existent workforce** via the *Emerging Technologies Academy*. This is an initiative launched by the ECJ in June 2022 at the EU interinstitutional level, aiming to prepare all types of staff (IT/technical, colleagues from all professional areas and managers) to employ or lead initiatives using emerging technologies such as AI.
- **Swift allocation of internal human and financial resources** to where it will make a difference will play an important role. Thus, a *"Mobility board"* may be envisaged, to fulfil this need for the human resources layer. This *"Mobility board"* could be seen as an internal platform run by HR to make an intelligent talent match between the areas where skills are in need, and the areas where these skills are in excess.
- Adopt a **sourcing strategy** that allows a flexible increase or decrease of the complementary external workforce, depending on the needs. This could be developed at an organisational level, but with nuances for each area, depending on particularities.
- Put in place a strong **change-management capability** in order to ensure a smooth transition between the different phases of the evolution towards becoming a *"smart court"*.
- **Attract talent**, efficiently recruit staff with newly needed skills. Artificial intelligence could support the HR department in several areas such as finding talent inside or outside the organisation, or automation of administrative tasks.

Objective 1.4: Adopt a governable AI

Adopting a governable A.I. is an important goal and it refers not only to the acquisition and use of A.I. tools, but also to *the continuous updating and supervision of such tools*. As A.I. tools refine themselves over time based on continuous data feeds, it is important that the

governance mechanism put in place ensures the quality of this continuous process. Chapter 6 outlines the governance model that is envisaged.

Goal 2: Enhance the quality and consistency of judicial decisions

Incorporating A.I. in support of decision-making processes will allow the Court's employees to process their tasks more quickly and more efficiently and to have more time to put their skills and talents into higher-value activities, thus improving the quality and overall efficiency. Below is an overview of the ongoing initiatives or those that could be envisaged in the medium-term.

Objective 2.1: Leveraging automation

- Starting with its first versions, we envisage embedding an **automated processing of Decisions and Conclusions** in SIGA. This will automatically extract references and enrich texts ("hypertext links") and automatically generate "Descriptors".
- We also envisage embedding in SIGA an **automated processing of originating documents (Actes introductifs d'instance)**, which will automatically identify metadata (Citations & Act in question, subject matter classification) and generate « Indicators ».
- In the future versions of SIGA, we envisage adding capabilities like **case correlation, summarising, named entity detection** (e.g. parties, names, addresses, and locations), detection and highlighting of different parts of the texts, format error detections.
- Explainability (capability of the machine to offer evidence on how it reached a particular recommendation or to highlight the parts that more likely have influenced the recommendation), is also one of the elements that should be developed further over time.

Objective 2.2: Enhancing legal research

- Besides the evolution of the search engine, A.I. could offer new perspectives for **legal research**. Thus, A.I. could assist judges, legal officers or colleagues in legal research in the Research and Documentation Directorate (DRD), by quickly analysing large amounts of data, identifying relevant cases, and providing recommendations. This could help to streamline the research process and to provide insights that may not be immediately apparent. This needs to be viewed in the perspective of a future interconnection (or at least of a much higher availability) of national databases, leveraging neuronal translation algorithms that might reduce the language barriers. It must be noted that the accuracy for such an algorithm needs to be extremely high (today none of those available achieve the necessary accuracy, but due to rapid evolutions in this technology, this could quickly change).
- A.I. combined with data visualisation can offer a visual search or a **visual representation of cases**, that will facilitate the detection of the degree of connection between cases or the evolution during time for a certain category (for example judgments delivered in the area of human rights in the past few years).

- Lawyers outside the ECJ are looking into how A.I. could be used to **predict case outcomes** based on past cases and legal precedents. In order to understand better what this implies and the associated risks, it could be beneficial to carry out an internal study in this area. Indeed, this practice might be associated with high-risk algorithms and this type of usage needs to be carefully analysed through ethical lenses, in order to prevent the introduction of biases in the thinking process of legal professionals.

Objective 2.3: Leveraging standardisation

- A.I. could help **standardise judicial documents** across different national systems, not by intervening in them, but by applying like a visual filter, simply changing or rearranging the way in which the information is presented. This, combined with a neural translation, could help in avoiding the difficulty introduced by their diversity. If considered useful, A.I. tools could also provide guidelines and templates for judicial documents and decisions.
- A.I. could help with **consistency** and **quality checks** on documents.

Goal 3: Increase access to justice and transparency for EU citizens

By increasing access to legal resources and services, A.I. can help ensure that everyone has equal access to justice. This will be an additional guarantee for a fair and just legal system, benefiting both individuals and society as a whole.

Objective 3.1. Increase accessibility for citizens with disabilities

A.I. has the potential to significantly increase accessibility for persons with disabilities, by providing tailored support and removing barriers to access. It is possible to create more inclusive and equitable societies, where everyone has the opportunity to participate fully and achieve their potential, leveraging the power of A.I.

- **Assistive technologies** such as text-to-speech and speech-to-text software, screen readers, and virtual assistants could provide support to people with visual, hearing, or cognitive disabilities. These technologies could help remove access barriers and enable people with disabilities to engage in learning and interacting with the ECJ.
- **Image and object recognition tools** could assist people with visual impairments by describing images and recognising objects in the Court's physical environment.

Objective 3.2. Increase access to justice and transparency

- In the future, **chatbots** and **virtual assistants** supported by AI could provide an easier way to have access to information provided by the Court, about both its judicial and administrative activities. Via these means, the general public, legal professionals or students will have access to information via the Court's website using more modern means.
- At present, before each hearing of the Grand Chamber, the Court produces a short video briefing. Both the briefing and the hearing itself are available in a limited number of languages due to technical constraints and limited human resources. By using A.I. we could envisage producing the briefings using an **A.I. avatar**. Tests done in the lab with several products show that it is possible to produce such videos based

on a text in a matter of minutes. The gain in both time and resources compared to the effort currently required to produce these videos in 24 languages (video and translation) is substantial. Technology is expected to evolve further in this domain.

- **A.I. avatars** could also be used to deliver internal training, and to produce didactic materials for school or university students interested in the Court's activity or learning about European institutions in general. These types of avatars could be integrated within Curia WebTV's public offering to complement its schedule.
- **Real time subtitling or A.I. synthesised voice interpretation** could support EU citizens in accessing real-time information that would otherwise need human interpretation. This will not be used for professional interpretation (automatic tools do not yet achieve the required accuracy), but for general information.
- **Extended reality**, based on A.I.'s computer vision, could be used to enhance public visitors' experience at the ECJ by providing access to extra information, subtitles, images and sound in the preferred language. This would be aimed principally at a younger public, who are already closer to this technology.

Objective 3.3. Embed multilingualism in every activity (both internally and externally)

- **Translation based on natural language processing (NLP)** already offers the possibility to break language barriers in communications. It is envisaged that this technology will evolve very quickly and it will bring the translation services to a higher level within the Court itself as well as in communication with parties, with national courts and with EU citizens. Internally, this could be directly embedded within tools like SIGA allowing legal officers or staff who do not have a good level of French or English to better integrate into the Court's ecosystem by having additional real-time interactive support. For the external public, this may be offered as additional tools via SIGA, the website interface, or via chatbots.
- **Sentiment analysis** could be a better way to improve communication with our public. Today we disseminate information via different channels, but we do not have proper feedback, and have limited insight into the reaction from the general public or legal professionals. In future this type of bi-directional communication might be created via sentiment analysis tools that could become accurate and affordable.
- **Natural language processing (NLP)** continues to evolve and thus we will soon see evolutions in the following areas:
 - ❖ **multimodal translations** – which will offer the possibility to have translations almost in real-time between different types of media (text, video, pictures, audio) that could be in different EU languages. The languages and the type of media will no longer be a barrier.
 - ❖ **contextual translation** – will consider the surrounding context to produce accurate and culturally appropriate translations.
 - ❖ **conversational A.I.** – humans and computers will be able to develop a natural “conversation”, thus virtual assistants or chatbots will be used even on the largest scale.
 - ❖ **cross-language retrievals** – this will be extremely useful as at present national databases are only available in their own language. When this technology reaches the correct development level, it will be possible to search, for example, in a

Romanian electronic repository with a “prompt” written in French and express a result (a summary for example) in Estonian or Latvian.

Objective 3.4. Engage as an active partner within the e-Justice ecosystem

The e-Justice ecosystem is constantly evolving. The different EU institutions, national courts, academia, and legal professionals are beginning to intensify their collaboration, requiring interoperable solutions. Legal data will start to aggregate, first in small digital databases and slowly evolving towards a legal data lake. In a few years’ time, a European legal space will be shaped and the ECJ will be an active partner within this ecosystem.

In order to reach this objective, the following key initiatives could be continued or launched:

- Continue the fruitful **cooperation with national courts** leveraging the JNEU network.
- Continue the strong **collaboration at EU interinstitutional level**, in all its dimensions: innovation and technology (ICDT – Interinstitutional Committee for Digital Transformation), data and document exchange (Publication Office), communication (EU Communication group) and others.
- Find the right **partners in the academic and research world**, to have access to niche expertise in e-Justice and A.I. matters.

3. A.I. Principles at the Court of Justice of the European Union

Once A.I. solutions, procedures, methods and governance are put in place, staff awareness and knowledge level should ensure that the following principles are respected:

- **Fairness, impartiality and non-discrimination:** Both the data and the algorithms created or adopted should avoid bias and be guided by the principle of fairness and impartiality, in order that all parties receive equal treatment during the judicial or administrative process. An A.I. solution produced or used should not discriminate against any individual or group based on factors such as race, gender, or socio-economic status.
- **Transparency:** The reasoning behind A.I. algorithms should be clear and understandable, both for those created in-house and those acquired.
- **Traceability:** The A.I. solutions have to be auditable and explanatory. There should be clear accountability mechanisms in place to ensure that A.I. systems are operating in accordance with legal and ethical standards.
- **Privacy and Data Protection:** The A.I. solutions created or adopted should respect the privacy and data protection rights of individuals. They need to ensure that personal data is handled in a secure and ethical manner.
- **Human Oversight:** Any A.I. tool should be under close human supervision, on a continuous basis. Human critical thinking is essential and must be continuously developed and encouraged.
- **Continuous Improvement:** Applicable legal and ethical standards are constantly evolving and therefore A.I. solutions should be continuously kept up-to-date, to reflect this evolution.

4. Risks and possible mitigation strategies

There are several risks that are already foreseeable and for which mitigation strategies need to be prepared in advance. The table below describes them.

Risk type	Description	Possible mitigation strategies
Bias and discrimination	If the data with which A.I. is trained is biased or corrupted, then this might lead to discrimination against certain groups of people and undermine the credibility and fairness of the legal system.	<ol style="list-style-type: none"> 1. Ensure a correct level of awareness and training of the staff that selects, creates, tests or implements an A.I. solution. 2. Have a good discrimination/bias test for the training and test data.
Ethical concerns	The use of A.I. in the judicial system could raise ethical concerns about the role of machines in the decision-making process and its impact on people's lives.	<ol style="list-style-type: none"> 1. Ensure the appropriate level of human oversight. 2. Establish the "red lines" at the strategic level as to the type of solutions/proposals/decisions that can be supported by an A.I. solution. 3. Adopt a governable A.I.
Disclosure of sensitive data - Data security and data privacy	Disclosure of sensitive data if Court users are using A.I. algorithms in the cloud (like ChatGPT for example), or algorithms with local prompts but which point to cloud solutions.	<ol style="list-style-type: none"> 1. Ensure the appropriate level of human oversight. 2. Use correctly the A.I. Governance of the Court. 3. Establish the "red lines" at the strategic level as to the type of solutions/proposals/decisions that can be supported by an A.I. solution. Adopt a policy embedding this information and provide guidelines to the end users.
Vulnerability to cyberattacks	A.I. solutions may be vulnerable to cyber-attacks and data breaches, which can compromise sensitive data and threaten the privacy of individuals involved in legal proceedings.	<ol style="list-style-type: none"> 1. A.I. solution has to be embedded in an architecture that is capable of ensuring the correct level of protection. 2. Separation of the "run solution" from the "learning solution", ensures that even if training data is corrupted by an attack, the run solution is not affected.
Explainability	The complexity of A.I. solutions and difficulty in understanding them, make it challenging to determine how decisions/proposals/results are being made. This can lead to a lack of transparency and accountability in the legal system, as it may be unclear how A.I. is affecting outcomes.	<ol style="list-style-type: none"> 1. Adopt only algorithms that have been checked and well-documented 2. Have staff with a sufficient level of training to truly understand the solutions and the data within the whole lifecycle of the A.I. solution, from its construction through to its utilisation.
Resources	Lack of resources (financial or on-board competencies) may have an impact on both the quality and the time of the implementation of such	<ol style="list-style-type: none"> 1. A correct estimation of the required human and financial resources to implement the strategy and a continuous fine-tuning of this estimation.

	solutions.	
Relevance	Lack of quality data for training or an insufficient volume might lead to a weak accuracy of the results. The phenomenon of “hallucination” may occur.	<ol style="list-style-type: none"> 1. Have a good method and sufficient knowledge to test the quality of the data for training and testing. 2. Continuous relevance testing. 3. Ensure end-users are aware.
Resilience	Once A.I. solutions are deployed, the workforce will be highly dependent on them and thus any interruption in having these solutions available will create disruptions.	<ol style="list-style-type: none"> 1. Create the correct resilience within the architecture and provide backup solutions. 2. Separate by design the training and run machines from each other. 3. Once the Edge A.I. and A.I. chips are available, integrate them ASAP, since this will move the resilience to the device level, thus minimising the risk.
Over-relying on technology	The results given by A.I. algorithms have to be continuously verified and human critical-thinking needs to be applied. By not doing so, there is a risk of over-reliance the results given by the machine without a proper human filter.	<ol style="list-style-type: none"> 1. Apply continuous human verification of the A.I. solutions. 2. Encourage critical thinking about A.I. algorithms.
Hyper abuse	Rapid evolution of A.I. technology and the availability of algorithms might lead to an uncontrolled adoption by the end users of such solutions. This will potentially create security, data protection, IT, contractual, IP, and other types of issues.	<ol style="list-style-type: none"> 1. Adopt a high-level capability map for A.I. solutions with a good integration in the IT landscape. 2. Respect the governance in place. 3. Create and communicate the appropriate policies to the end users.

5. Readiness assessment of the ECJ and other partners such as EU institutions

Readiness for adoption and use of artificial intelligence tools should be examined from at least three different angles: technology, human resources, and pooling resources and intellectual cooperation.

5.1. Technology readiness

The Innovation lab produced its first prototypes using the existing IT infrastructure.

Based on the experience gathered so far, it became clear that there is a need to balance the adoption of local solutions (with a required A.I.-specific infrastructure) for judicial activity, with the use of cloud solutions for public information.

Depending on the type of A.I. solutions that we want to adopt, their volume and the timeline, an estimation of investment needed in the infrastructure and staff will be required. At present, and up until 2024, the infrastructure is calibrated to reach maturity for the projects

that are already planned with the AI+ Network and the Innovation Lab. It is clear, however, that the Court would like to have higher ambitions, and therefore a new estimation will be required.

5.2. Human resources readiness

A glance at the current status shows a high interest from all parties in artificial intelligence technology and its potential benefits. This interest is manifested from both the administration, and the registries and chambers. The Court has been investigating and testing artificial intelligence algorithms since 2020, and based on that, it could be said that the organisation is ready to detect areas in which A.I. can bring benefits and to prototype/test it in order to better understand it. However, in order to make use of it at production scale, several steps will need to be taken:

- (a) train IT technical staff to embed this new technology into the IT landscape;
- (b) train managers to understand the approach that is required by this technology;
- (c) train staff in the different departments for adoption and correct usage.

It is to be noted that staff in the different departments will be those who will need to ensure continuous training of the algorithms with pertinent and quality data, respecting the principles laid down in this paper. This will require a dedicated upskill that should be embedded in the training curriculum proposed by HR.

5.3. Possibility for cooperation and pooling resources with academia

This area is not well developed and needs to be explored further. The Innovation Lab should be able to take the necessary steps. Under the umbrella of the ICDT Emerging Technologies group, in June 2022 the institutions contacted the Innovation Hub of Luxembourg, which is able to foster innovation in Luxembourg, involving different actors.

5.4. Possibility for cooperation and/or pooling resources with interinstitutional partners.

In October 2021, the ICDT Emerging Technologies group was created and the Court of Justice took the lead. In June 2022 this group produced the following output:

- A study on the readiness of the EU institutions and agencies for emerging technologies, especially A.I. The study showed that the EU institutions are not investing sufficiently in innovation and also that they lack internal resources in this domain.
- An inventory of all projects, prototypes or initiatives in the domains of artificial intelligence, blockchain, AR/VR. This database (built by the ECJ) aimed to avoid duplication of resources at interinstitutional level and to increase reusability and resource pooling. The database is available to all EU institutions and agencies and can be consulted using a chatbot.
- A proposal to upskill existing resources via an *Emerging Technologies Academy*, with a focus on A.I.

The conclusion is that while there exists a high interest at the interinstitutional level, the institutions are, for the moment, due to other priorities within the institutions themselves, not able to allocate sufficient resources to build up common projects. A priority has to be given in this domain, in order to create a proper ecosystem allowing for synergies.

6. Governance

The Governance model to support the detection, adoption and usage of A.I. tools, fully respecting the current strategy and the principles stated above, will consist of four main building blocks:

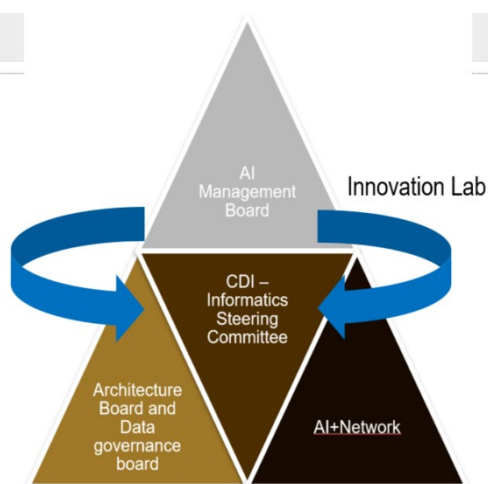


FIGURE 2: AI GOVERNANCE MODEL

I. **A.I. Management Board** – this board will have the mission *to ensure that the acquisition or the creation of any A.I. tool respects the principles stated in this paper (chapter 3), and especially ethics and fundamental rights*. Upon its creation, this board will have to issue an ethics and fundamental rights charter that will be used as a base of assessment for any decision that is taken in the acquisition or creation of any A.I. tool. This board could take a risk-based approach, defining in advance the “red lines”, meaning the types of business areas or A.I. tools for which the risk of adoption is too high and the organisation will thus not envisage using.

- II. **Informatics Steering Committee (CDI)** – this board has already existed for many years at the ECJ. In this current context, the *CDI will align the ambitions with the available resources, making sure to obtain the best return on investment*.
- III. **AI+ Network** – this network was created in February 2020 and is composed of representatives of each department, the two registries and the chambers of the Presidents of the Court and the General Court. Its main objective is *to detect the areas in which A.I. tools will bring benefits to current activities*. This group is also in charge of the *prototypes and/or pilots designed to test the envisaged capabilities and to assess the benefits of its realisation*.
- IV. **Architecture and data governance boards** (existing boards that are ensuring technical consistency and data quality)
 - **Architecture board** – this is an existing technical board, composed of IT specialists only, that takes informed decisions regarding *the adoption and integration of each important technical component within the overall IT architecture*. This board will ensure that *proposals are made in line with the A.I. high-level capabilities map that is described in Chapter 8*.
 - **Data governance board** – this board was created to support SIGA’s implementation, but will continue to exist beyond SIGA’s going live. It is led by the Registrar’s Cabinet

supported by the two registries, the chambers of the Presidents of the Court and the General Court and IT specialists. Its aim is **to ensure the consistency and coherence of data across the institution**. In the context of A.I. tools, this group will be responsible for **ensuring the correctness and the quality of the data that will be used in machine-learning processes**, with a special focus on the representativeness of the **training data set and bias avoidance**. As previously stated, data is an essential component in building A.I. tools, since the algorithm itself is built by the machine, based on the training data set. Biased data will lead to faulty algorithms and can thus wrongly affect the information provided in the decision-making process. At present this group does not have this responsibility, so this will need to be given once the present paper is agreed.

Even if the **Innovation Lab** is not currently part of the A.I. governance model, it is in fact “the glue” that ensures that the different components of the model are fed with the right information in due time and that the mechanism works correctly.

It must also be noted that this governance model needs not only to support the acquisition or adoption of A.I. tools, but also to ensure a continuous process of data quality and verification of results, a continuous update of the “red lines”, ensuring through this “live process” a governable A.I.

7. The role of the Innovation Lab

The **Innovation Lab** was created in 2019 as a transversal capability across the organisation, with the objective to foster innovation, to serve as a platform for exchanging ideas and prototyping. Since its creation, a large number of innovative ideas have been collected via the “AI+ Network”, and the majority have been tested in the Lab.

In the context of artificial intelligence, the Innovation Lab will continue to be the forum in which ideas will be discussed and tested by the “AI+ Network”, in collaboration with the DTI. However, to serve the ambition put forward by this paper, resources analysis (both human and financial resources) will have to be performed and the Lab will need to be provided with the necessary means to achieve these goals.

The Innovation Lab could also issue guidelines and be deeply involved in assessments of the adoption of A.I. tools within the organisation.

At interinstitutional level, the Innovation Lab is benefiting from the knowhow and expertise of the other institutions and agencies, by being part of the network of similar labs within those partners. The aim is to increase the reusability of projects and the pooling of resources within this interinstitutional space.

8. Architecture and High-level A.I. Capabilities map

As mentioned earlier, the rapid advancement of A.I. algorithms may lead to an over-excitement of fast adoption of such solutions, in an uncontrolled way, with a lack of adherence to all the in-house rules.

Indeed, it is essential to avoid the adoption of such tools by individual users without proper control. This might indeed lead to security and data protection issues, using the tools without proper contractual agreements in place, infringement of intellectual property rights and other issues due to the lack of proper integration within the IT architectural landscape.

This risk of “*hyper abuse*” can be mitigated via a proper governance mechanism and via a proper design of A.I. capabilities and their optimal integration within the IT architecture.

In order to embed artificial intelligence technology correctly within the IT landscape, the approach taken by the DTI since 2019 has been to create a **high-level capability map for AI**. By doing so, the Court will integrate, within its architecture, A.I. capabilities that will be created or adopted only once and that will be reused each time a business need is expressed. As an example, in future, the speech-to-text capability might be used not only for transcripts, but also for creating minutes, or assist the legal officers in writing documents using voice transcription.

Based on the business priorities identified within the Court, the A.I. capabilities are clustered in five broad A.I. domains: Natural Language Processing (NLP), Advanced Data Analytics, Chatbot Technologies, Speech Technologies, and Computer Vision.

A schematic view of these capabilities and their integration within the IT architecture of the ECJ is visualised below.

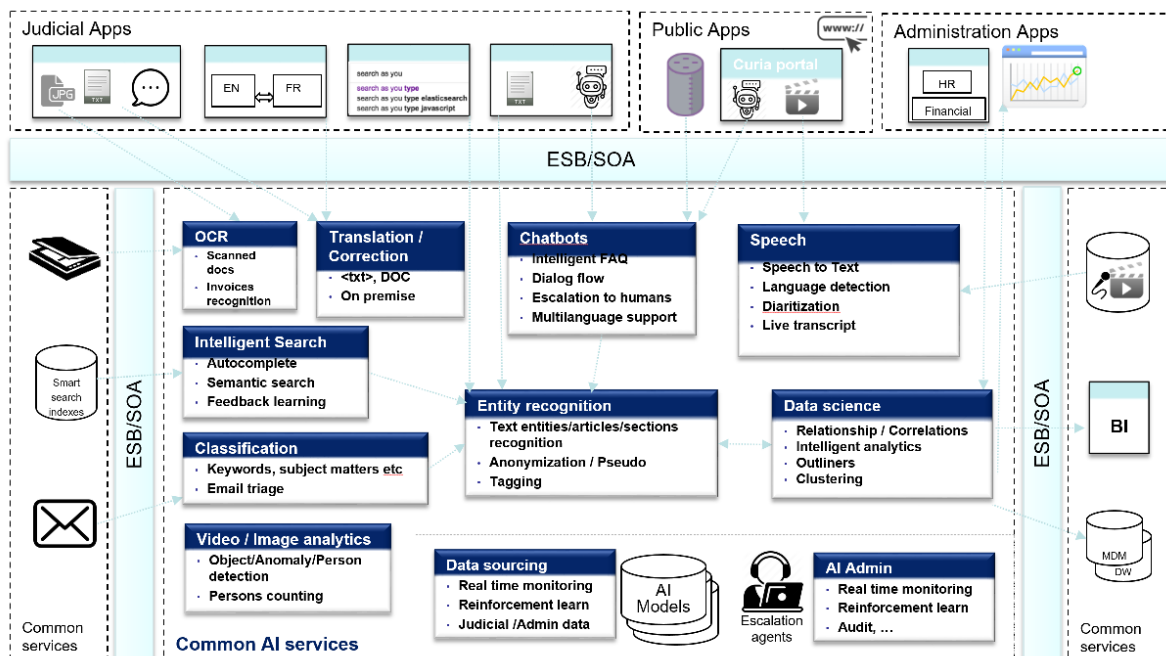


FIGURE 3 AI HIGH-LEVEL CAPABILITIES MODEL

Hereafter you may find a more detailed description of these capabilities. Although multiple A.I. ontologies and taxonomies exist, the following are envisaged at the ECJ:

Natural language processing (NLP) refers to the branch of A.I. which aims to enable computers to process human language and to 'understand' its full meaning, including the writer's intent and sentiment.

Advanced Data Analytics uses statistical and machine-learning techniques to learn patterns and relationships between various data elements, potentially originating from diverse non-linked sources, and to predict the outcomes or trends.

Chatbot Technologies built on NLP by adding capabilities such as dialogue flow (the capability to construct an adaptive, context-aware dialogue that keeps track of previously provided information and of the context the interlocutor is in) and intelligent escalation (the intelligence to escalate to a human when it becomes clear that continuing the conversation would lead to adverse effects).

Speech Technologies enabling the transcription of audio/voice into text and vice versa. This group of technologies can be split in two big groups: text-to-speech and speech-to-text.

These latter technologies may add another layer to chatbots, which will then extend their capabilities from pure text-to-speech.

Computer vision aims to enable computers to process *images or video* and to ‘understand’ their full meaning.

9. Conclusions

The ECJ has already started the journey to embrace artificial intelligence, beginning in 2020. During the past years, the DTI, together with user representatives across the organisation, has looked for areas where this technology may support our institution and has already tested over 20 innovative ideas put forward by the chambers or the different departments. The experience gathered to this point is an added value for the further steps, and will support us in the transition from the “exploration phase” to the “industrialisation phase”.

The lessons learned after these 3 years of an “experimentation phase”, shows us that the foundations are already in place and we have several strengths.

First of all, we could say that we are an innovative organisation with talented people and the “AI+ Network” proved to be capable to efficiently elicit innovative ideas from across the organisation. Indeed, during the last 3 years, over 30 such ideas were collected, from which two thirds proved to be viable.

Secondly, the Innovation Lab proved to be a good catalyst to create the appetite to think outside the box, and also to test the feasibility of each idea. Being in permanent contact with user representatives and gathering expertise from industry, other EU and UN institutions, the Innovation Lab was able to create the right bridges to bring in-house the knowledge required to test in practice the ideas that emerged from the AI+ Network.

Thirdly, innovative opportunities are ahead, not only those being brought by the recent advancement of this technology, but also by the modernisation of the IT landscape within our core business area, the judicial system, via the SIGA programme. Practically, the SIGA platform will be the backbone and the main enabler within the judicial area, on which artificial intelligence, blockchain or other emergent technologies will be able to be integrated, in a safe and controlled way, to bring benefits to the judicial system.

In order to make this transition, from “experimental phase” to “industrialisation phase”, the following next steps are to be envisaged:

- adopt a governance structure that allows making smart choices in selecting the right A.I. tools for the right purpose, in a controlled way. This should not be a parallel governance system, but it has to be well connected to the existing governance mechanism. The proposal in Chapter 6 is to

create the “A.I. Management Board” and to integrate it alongside the other existing boards. Together this will create the mechanism which will ensure a governable A.I.;

- balance the benefits with the risks and adopt the policies required to create clear rules and guidelines for a correct adoption of the technology;
- create a mobility mechanism to shift resources to where they will make a difference;
- upskill the staff in all the areas;
- setup a change-management programme to assist in implementing the change (similar to the one used today for SIGA, or better – to reuse it); and
- design and adopt a correct IT architectural posture, with embedded security, data protection and ethics by design.

Investments are still required, not only in the infrastructure, but also in the up-skilling of all categories of staff that will be involved in this technology and in the Innovation Lab.

New opportunities are on the horizon in other areas, for example in the transformation of the Library Directorate into a Knowledge Management Directorate using this technology, and leveraging not only pure library assets but the whole informational asset that is available today within the ECJ ecosystems and systematised via the data governance mechanisms.

Based on the experience gathered so far, the ECJ has firm foundations to step into the next phase of the adoption of artificial intelligence in a structured and responsible way.



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