



Study on the use of innovative technologies in the justice field

Final Report

Corresponding author: TRASYS International, part of the NRB Group

Ms Dijana SPASOJEVIĆ, Head of Business Consulting

Email: dijana.spasojevic@nrb.be

Report prepared by: Ms Miglena VUCHEVA, Ms Margarida ROCHA, Mr Robrecht RENARD, Mr Dimitrios STASINOPOLOUS

Collaborators: Dr Ashwin ITTOO, Dr Leila REBBOUH, Mr Emmanuel de KERCHOVE

Report document details:

Study title	Study on the use of innovative technologies in the justice field – Final Report
Linguistic version	EN
Media/Volume	PDF/Volume_01
Catalogue number	DS-02-20-605-EN-N
ISBN	978-92-76-21347-5
DOI	10.2838/585101

Executive summary document details

Linguistic version EN, FR

Disclaimer: *The information and views set out in this study are those of the author(s) and do not necessarily reflect the official opinion of the Commission. The Commission does not guarantee the accuracy of the data included in this study. Neither the Commission nor any person acting on the Commission's behalf may be held responsible for the use which may be made of the information contained herein.*

The study does not aim to comprehensively take stock and/or explore all relevant use cases, solutions and vendors available at the time of its preparation. This Final report reflects the situation as of 7 April 2020.

EUROPEAN COMMISSION

Directorate-General for Justice and Consumers
Directorate B – Criminal justice
Unit B.3 – E-Justice, IT and document management

Contact: Yoana NIKOLOVA

Email: Yoana.NIKOLOVA@ec.europa.eu

European Commission
B-1049 Brussels

Study on the use of innovative technologies in the justice field

Final Report

September 2020

Europe Direct is a service to help you find answers to your questions about the European Union.

Freephone number (*):

00 800 6 7 8 9 10 11

(*) The information given is free, as are most calls (though some operators, phone boxes or hotels may charge you).

More information on the European Union is available on the internet (<http://europa.eu>).

Luxembourg: Publications Office of the European Union, 2020

PDF	ISBN 978-92-76-21347-5	DOI: 10.2838/585101	DS-02-20-605-EN-N
-----	------------------------	---------------------	-------------------

© European Union, 2020

Reproduction is authorised provided the source is acknowledged.

Contents

1.	INTRODUCTION	25
1.1	Background to the service contract	25
1.2	Purpose and structure of this document.....	25
2.	PROJECT DESCRIPTION	27
2.1.	Project approach and objectives	27
2.2.	Project team	28
	The project organisation is presented in the organisational chart below.	28
3.	METHODOLOGY	29
3.1.	Literature review and desk research.....	29
3.2.	Structured questionnaires	29
3.3.	Interviews	30
4.	LITERATURE REVIEW ON THE USE OF INNOVATIVE TECHNOLOGIES IN THE JUSTICE FIELD	31
4.1.	State of play of the EU and national policy framework on AI.....	31
4.2.	Key points of discussion in the literature and recommendations for a way forward	35
4.3.	Conclusion	47
5.	EU INSTITUTIONS, BODIES, ORGANISATIONS, AND AGENCIES CONSULTATIONS RESULTS	48
5.1.	Activities involving or related to the use of AI:	48
5.2.	Activities involving or related to the use of blockchain/DLT	54
5.3.	Ideas for potential usage of AI and or blockchain/DLT	58
6.	MEMBER STATES CONSULTATION RESULTS	59
6.1.	Selected replies to the questionnaire.....	59
6.1.1.	Country of the organisation.....	59
6.1.2.	Role of the organisation.....	63
6.1.3.	Existing policies and strategies on the use of innovative technologies....	64
6.1.4.	Artificial Intelligence elements in the relevant policies and strategies ..	66
6.1.5.	Blockchain/DLT elements in the relevant policies and strategies	68
6.1.6.	Artificial Intelligence-legal framework.....	69
6.1.7.	Blockchain/DLT-Legal framework	71
6.1.8.	Existing projects using innovative technologies in the justice field	74
6.1.9.	Artificial Intelligence-existing projects	77
6.1.10.	Artificial Intelligence-elaborated projects in this study	79
6.1.11.	Blockchain/DLT-existing projects	81
6.1.12.	Blockchain/DLT – elaborated projects in this study.....	82
6.2.	National strategies and policies	84
6.3.	Overview of projects in the Member States	110
6.4.	Member States authorities – Overview of initiatives and ideas.....	143
7.	LEGAL PROFESSIONAL ORGANISATIONS CONSULTATION RESULTS	148
7.1.	Selected replies to the questionnaire.....	148
7.1.1.	Country of organisation	148
7.1.2.	Role of the organisation.....	150
7.1.3.	Existing policies and strategies on the use of innovative technologies in the justice field.....	151
7.1.4.	Artificial Intelligence elements in the relevant policies and strategies .	153
7.1.5.	Blockchain/DLT elements in the relevant policies and strategies	155
7.1.6.	Artificial Intelligence- a need for legal changes	156
7.1.7.	Blockchain/DLT – a need for legal changes.....	157

7.1.8.	Existing projects using innovative technologies.....	159
7.1.9.	Artificial Intelligence- existing projects	161
7.1.10.	Artificial Intelligence-elaborated projects in this study	161
7.1.11.	Blockchain/DLT – existing projects.....	162
7.1.12.	Blockchain/DLT – elaborated projects in this study.....	163
7.2.	Overview of strategies, policies and analytical papers of the legal professional organisations	165
7.3.	Overview of projects of the legal professional organisations	170
8.	ICT COMPANIES CONSULTATION RESULTS	177
8.1.	Selected replies to the questionnaire.....	177
8.1.1.	Country of organisation	177
8.1.2.	Field of services and products.....	177
8.1.3.	Existence of a policy or ethical framework on the provision of AI products and services.....	179
8.1.4.	Existence of a policy or ethical framework on blockchain/DLT in the justice field	180
8.1.5.	Artificial Intelligence-existing projects	181
8.1.6.	Blockchain/DLT-existing projects	182
8.2.	Overview of strategies and policies of the ICT companies.....	183
8.3.	An overview of ICT organisations’ products/services and related projects/use cases	185
9.	ASSESSMENT OF EXPLORED PROJECTS IN TERMS OF BUSINESS PROBLEM CATEGORIES AND BUSINESS SOLUTIONS	193
9.1.	Overview of projects of the Member State authorities and the judiciary per business problem and solution category	194
9.1.1.	Business problem category: Processing high volume of data	219
9.1.2.	Business problem category: Processing high volume of video, audio and images	222
9.1.3.	Business problem category: Linking information across different sources	223
9.1.4.	Business problem category: Access to justice/public services	225
9.1.5.	Business problem category: Administrative/Facilities management	226
9.1.6.	Business problem category: Data protection compliance	227
9.1.7.	Business problem category: Preparing high volumes of data	228
9.1.8.	Business problem category: Lack of authenticity and/or traceability ...	230
9.2.	Overview of projects of the legal professional organisations per business problem and solution category.....	232
9.2.1.	Business problem category: Processing high volume of data	237
9.2.2.	Business problem category: Processing high volume of video, audio and images	238
9.2.3.	Business problem category: Linking information across different sources	238
9.2.4.	Business problem category: Access to justice/public services	238
9.2.5.	Business problem category: Administrative/Facilities management	238
9.2.6.	Business problem category: Data protection compliance	239
9.2.7.	Business problem category: Preparing high volume of data.....	239
9.2.8.	Business problem category: Lack of authenticity and traceability	240
10.	WAY FORWARD	241
11.	LIST OF ANNEXES.....	242

Abstract (EN)

In the **White Paper on Artificial Intelligence (AI)**¹, the EU recognises the need to step up actions aiming to build an ecosystem of excellence supporting the development and acceptance of AI across the EU economy and public administration.

The e-Justice Strategy and Action Plan 2019-2023 identify as priority areas the use of AI and blockchain/DLT in the justice field. In this context, the present study explores the existing policies and strategies at European and national level, as well as the state-of-play of the use of innovative technologies in justice.

Following comprehensive consultations, the study identified 130 projects that use innovative technologies - 93 projects of Member State authorities and the judiciary², 8 – of legal professional organisations³ and 29 - of ICT companies⁴ based on their products and services.

The study identified 8 categories of business problems that the projects aim to solve and mapped these problems to 8 business solution categories.

Completed or **ongoing** projects⁵, which 'exceed' and 'meet' the stakeholders' expectations, are suggested for exchange of **good practices**⁶.

In conclusion, the study suggests **horizontal actions** as a way forward: (a) Coordination at EU level of the efforts and activities; (b) Collaboration and experience sharing; (c) Strengthening existing partnerships and networks; and (d) Supporting mechanism for legal professional organisations.

¹ European Commission White Paper on Artificial Intelligence – A European approach to excellence and trust, COM(2020), Brussels, 19.2.2020.

² From these, 25 projects are completed, 55 are ongoing, 12 are planned and one is suspended

³ 1 completed and 7 ongoing

⁴ The ICT companies' use cases/projects have not been attributed a status, as no such information was provided.

⁵ The planned projects are excluded from this analysis, as their maturity level is considered not high enough to perform such assessment.

⁶ In the context of this study, 'good practices' regarding a project may relate to activities of preparation, development and implementation of the project and overcoming challenges encountered, in an optimal way, such as to achieve the project objectives and solve the business problem to an extent that exceeds or meets the expectations.

Résumé (FR)

Dans le **Livre blanc sur l'intelligence artificielle (IA)**⁷, l'UE reconnaît la nécessité d'intensifier les actions visant à construire un écosystème d'excellence soutenant le développement et l'acceptation de l'IA dans l'économie et l'administration publique de l'UE.

La stratégie et le plan d'action e-Justice 2019-2023 ont identifié comme priorités l'utilisation de l'IA et de la blockchain (chaîne de blocs) / DLT (technologie des registres distribués) dans le domaine de la justice. Dans ce contexte, la présente étude explore les politiques et stratégies existantes aux niveaux européen et national, ainsi que l'état d'avancement de l'utilisation des technologies innovantes dans la justice.

À l'issue de consultations approfondies, l'étude a identifié 130 projets utilisant des technologies innovantes - 93 projets émanant des autorités des États membres et du pouvoir judiciaire⁸, 8 – des organisations professionnelles juridiques⁹ et 29 – des entreprises de TIC¹⁰ en fonction de leurs produits et services.

L'étude a identifié 8 catégories de problèmes fonctionnels que les projets visent à résoudre et a mis ces problèmes en correspondance avec 8 catégories de solutions.

Les projets **achevés** ou **en cours**¹¹, qui « dépassent » et « répondent » aux attentes des parties prenantes, sont suggérés pour l'échange de **bonnes pratiques**¹².

En conclusion, l'étude suggère des **actions horizontales** comme moyen d'avancer : (a) Coordination au niveau de l'UE des efforts et des activités ; b) Collaboration et partage d'expériences ; c) Renforcement des partenariats et des réseaux existants ; et d) Mise en place d'un mécanisme d'appui aux organisations professionnelles juridiques.

⁷ Commission Européenne, LIVRE BLANC Intelligence Artificielle : Une approche européenne axée sur l'excellence et la confiance, COM (2020), Bruxelles, 19.2.2020.

⁸ Parmi ceux-ci, 25 projets sont achevés, 55 sont en cours, 12 sont prévus et un est suspendu.

⁹ 1 achevé et 7 en cours

¹⁰ Aucun statut n'a été attribué aux cas d'utilisation / projets des entreprises de TIC, car aucune information n'a été fournie.

¹¹ Les projets prévus sont exclus de cette analyse, car leur niveau de maturité est jugé insuffisant pour effectuer une telle évaluation.

¹² Dans le cadre de cette étude, les « bonnes pratiques » peuvent concerner des activités de préparation, de développement et de mise en œuvre du projet et relèvement des défis rencontrés, de manière optimale, afin d'atteindre les objectifs du projet et résoudre le problème d'affaire pour une mesure qui dépasse ou répond aux attentes.

Executive Summary (EN)

The EU understands the importance of being one of the leading global actors in the use of innovative technologies. This is why, digital transformation, deployment of innovative technologies and big data have been key points on the EU's agenda in recent years. In the **White Paper on Artificial Intelligence (AI)**¹³ the EU recognised the need to step up actions at multiple levels with the aim to build an ecosystem of excellence that can support the development and uptake of AI across the EU economy and public administration. In recent years, a number of actions have been undertaken, and will continue to be undertaken, by different actors at European and national level towards the transition to a sustainable data-centric economy, which guarantees reliable, safe and trustworthy products and services on the digital market.

In April 2018, the European Commission delivered its **Strategy 'Artificial Intelligence for Europe'**¹⁴, which highlights the importance of AI for Europe and describes the steps to be taken towards making Europe highly advanced in AI. The Strategy aims to stimulate investments under the corresponding research and innovation framework programmes. It also advocates the need for data availability for training needs and the notion of 'no one to be left behind' on the "AI wagon", where all potential users, especially small and medium enterprises (SMEs), non-tech companies and public administrations, will have facilitated access to AI services and products, and will be trained to make use of them.

Further to the Strategy on 'Artificial Intelligence for Europe', in December 2018 the Commission adopted a **Coordinated Plan on Artificial Intelligence**¹⁵, which reflects the importance of coordinated actions at European level between the Commission and the Member States to ensure the success of the Strategy.

In the field of justice, a first tangible result of the political commitment to making national and European e-Justice more accessible was the adoption of the first Multiannual e-Justice Action Plan 2009-2013. This first instrument identified a number of priority actions for joint work. Following its completion, a subsequent e-Justice Strategy and Action Plan were adopted for the 2014-2018 period. These ended in 2018, and have in turn been superseded by the e-Justice Strategy and Action Plan for the 2019-2023 period.

In this context, the purpose of the present study is to address two of the areas of priority work under the current Action Plan – use of Artificial Intelligence (AI) and blockchain/Distributed Ledger Technology (DLT) in the justice field, which for the purposes of this document are hereinafter referred to as '**innovative technologies**'.

The Commission contracted TRASYS International, part of the NRB Group, via the ABC IV Framework Contract to carry out a Study on the use of innovative technologies in the justice field (hereinafter: the Innovation Study). The study was carried out in the period from August 2019 to May 2020. The study has the following main objectives:

- Objective 01: Establish the relevant existing EU legal and policy framework and summarise all aspects that need to be taken into account in terms of innovation technologies in the justice field in a coherent and narrative way.
- Objective 02: Take stock of the situation in the European institutions, all EU Member States and specific legal professional organisations with regard to present and planned pilot and in production systems using innovative technologies in the justice field.

¹³ European Commission White Paper on Artificial Intelligence – A European approach to excellence and trust, COM(2020), Brussels, 19.2.2020.

¹⁴ Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions, 'Artificial Intelligence for Europe', 25 April 2018, COM(2018) 237 final (see: Annex I, Ref. No. 13).

¹⁵ Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions, 'Coordinated Plan on Artificial Intelligence', 7 December 2018, COM(2018) 795 final (see Annex I, Ref. No. 9).

- Objective 03: Establish an inventory of the existing relevant use cases in the justice field, where innovative technologies are currently used by the public and private sector or in an academic context, or potential relevant use cases as part of ongoing or already completed exercises.
- Objective 04: Identify the key off-the-shelf software products and/or services, which are being applied or could be applied to the defined use cases in the justice field.
- Objective 05: Identify the areas of possible interest in the justice field.

To meet these objectives, the study applied a three-step approach.

In the first step, **Fact-finding**, the main objective was to gather the existing EU legal and policy framework and academic body of knowledge on the use of innovation technologies in the justice field, and to collect information on existing projects using AI and blockchain/DLT. This step included activities for launching the study i.e. organisation of a kick-off meeting, together with desk research and literature review, and stakeholders' consultations using online, structured questionnaire in the EU Survey¹⁶ tool, and interviews. A total of 117 documents have been reviewed (see Annex I-References), and categorised in terms of high, medium or low relevance for the purposes of this study. Online questionnaires for the Member State public and judicial authorities, legal professional organisations and ICT companies were carried out from November 2019 to January 2020. A total of 100 replies were received from 25 Member States and 2 European institutions, 40 replies from legal professional organisations and 15 replies from ICT companies.

In the second step, **Analysis and Evaluation**, the information collected via the questionnaires and interviews was processed, analysed and evaluated for the preparation of 4 Annexes that, together with this document, serve as the integrated study report. A total of 93 projects and use cases from Member States' public and judicial authorities have been analysed, 8 projects from legal professional organisations and 29 projects/use cases related to products and services offered by 15 ICT companies. The study identified 8 categories of business problems that these projects aim to solve.

In the third step, **Way forward**, the evaluation of the 80 completed and ongoing projects of the Member State authorities and 8 completed and ongoing projects of legal professional organisations is presented, based on the level to which these projects met the stakeholders' expectations of solving the business problem and fulfilling the project objectives.

In the first step of the process, stakeholder consultations were carried out using structured questionnaires and interviews. In collaboration with DG JUST's project team, the contractor prepared three separate structured questionnaires targeting the three different stakeholder groups:

- Member States' public and judicial authorities.
- Legal professional organisations (e.g. bar associations, training institutes, etc.).
- ICT companies providing AI and/or blockchain/DLT products and services.

The surveys were launched in November 2019 and remained open until January 2020. Following closure of the survey, the replies were gathered and presented in a consolidated way in three separate standalone documents.

In the context of this study, the contractor conducted 22 interviews with representatives of the EU institutions, bodies, organisations and agencies. The aim of these interviews was to collect information on the current activities taking place at EU level in terms of policy work and innovative technologies projects related to the justice field. As a follow-up to the questionnaire replies received, the contractor conducted 31 interviews with representatives of the Member States, 9 interviews with legal professional organisations and 10 with

¹⁶ EU Survey: <https://ec.europa.eu/eusurvey/home/welcome>

private companies. For each interview, the contractor prepared interview reports which were validated by the interviewees.

With an objective of grouping the business problems tackled during the implementation of the projects carried out by public authorities and the judiciary in the Member States, and by legal professional organisations, the following eight (8) categories of business problems have been identified:

1. **Processing high volume of data (PCD).** The issue of processing high volumes of structured and unstructured data and documents manually or with simple digital tools, in order to make an analysis based on the content, for tasks such as: finding relevant information for the case, deducting patterns, searching for specific words or cases, classification and categorisation, etc.
2. **Processing high volume of video, audio and images (VAI).** The issue of processing a high volume of video files, audio files and/or images in order to make an analysis of the content, for tasks such as: identification of persons/victims, or monitoring of behaviour, detecting illegal activities, transcription to text, etc.
3. **Linking information across different sources (LKS).** The issues of looking for, extracting and analysing information from multiple sources (such as different databases, registers, systems, etc.), usually because they are not centralised, or connected, and there is no common interface or access point.
4. **Access to justice/public services (ATJ).** The issue of not making judicial information or public services available to the citizens/the general public in a user-friendly and easily accessible way . It includes access to case law, case information, legislation, treatment of citizens' questions, navigation through administrative procedures, etc.
5. **Data protection compliance (DPC).** The issue of making documents (usually court judgments and decisions) compliant with the personal data protection legislation with the aim of making those documents publicly available.
6. **Preparing high volume of data (PPD).** The issue of treating (high volumes of) data manually, or with simple digital tools, in order to obtain a final output e.g. in preparation of court hearings and in conducting court administration tasks, and/or other judicial tasks. This involves tasks such as: translation of documents, typing of protocols in court hearings or interviews, preparation of contracts, judicial decisions and anonymised versions thereof, manually signing documents, etc.
7. **Administrative/facilities management (AFM).** The issue of managing the court administration processes performed by the judicial personnel (clerks, judges, lawyers, etc.), with tasks such as planning of the agendas, court hearings, booking and allocation of court rooms and infrastructure, organising interviews and doing the facility management.
8. **Lack of authenticity and traceability (LAT).** The issue of having an insufficient level of traceability regarding actions to be taken by different actors related to data and documents during their process flows (e.g. invoices, diplomas, proxies etc.), so that the information can be stored and/or transferred with a sufficient level of authenticity, trust and integrity.

As described in detail in Section 9 of this report, a total of 93 projects of the Member States' public administration authorities and judiciary have been evaluated per business category. Given that one project may solve more than one business problem as per the identified business problem categories, out of the 93 completed, ongoing and planned projects, 43 (or 46%) aim to solve a problem in the category of PCD, 17 (or 18%) – in the category of VAI, 24 (or 26%) – in the category of LKS, 14 (or 15%) – in the category of

ATJ, 13 (or 14%) - in the category of DPC, 29 (or 31%) – in the category of PPD, 12 (or 13%) – in the category of AFM and 16 (or 17%) – in the category of LAT.

In addition, the study mapped the business problem categories to 8 business solutions that the projects using AI or blockchain technologies aim to achieve:

- **Anonymisation and pseudonymisation** – A solution to business problems in the categories of PCD, PPD, and DPC, using AI technology to automate the manual identification and removal of personal data (and/or other sensitive data). Such solution is typically used to ensure compliance with the data protection legislation.
- **Data authenticity and traceability** – A solution to business problems primarily in the categories of LAT, PPD, ATJ and LKS¹⁷, typically using blockchain/DLT for digital signatures, smart contracts, registers, etc., to perform data validation and enhance traceability, ensure integrity.
- **Digital assistance** – A solution to business problems in the categories of ATJ, using AI technology, such as chatbots, to improve citizens' access to information and navigate them through administrative processes.
- **Facial and/or object recognition** - A solution to business problems in the category of VAI, typically using AI technology to detect, identify and verify a person or an object from a digital image or video footage based on specific facial or other features. Such solutions, for example, are used in criminal justice to improve victim identification from pictorial material or detect abnormal behaviour of inmates in prisons.
- **Predictive analytics** – A solution to business problems in the categories of LKS, PCD and PPD, using AI technology to analyse current and historical facts to make predictions about the future or and/or identify risks and opportunities. In the justice field, such solutions are typically referred to as "predictive justice" and are used to help the judiciary in the decision-making process.
- **Process automation** - A solution to business problems primarily in the categories of PCD, PPD, LKS and AFM¹⁸, typically using AI technology and robot process automation, to automate processes, such as organisation, planning and facilities management, prioritisation, categorisation and allocation of documents and tasks. In the justice field, process automation is usually used to improve efficiency by automating manual and repetitive tasks such as analysing case-related information (e.g. data collected from house searches), payment of fines by citizens, etc.
- **Search optimisation** – A solution to business problems primarily in the categories of PCD, LKS and ATJ¹⁹, typically using AI technology to expedite and facilitate searches in relevant case law, registers and digital libraries, usually creating semantic links and possibilities for document annotation.
- **Speech/text-to-text/speech solutions** - A solution to business problems in the categories of PPD and VAI, using AI technology, such as voice recognition and machine translation. In the justice field, such a solution is typically used to modernise court rooms and facilitate court hearings by replacing the manual typing of court minutes and other documents or for translations from foreign languages.

¹⁷ The majority of the projects fall under the enumerated business problem categories. However, the "Data authenticity and traceability" solution could solve business problems in other categories, as well.

¹⁸ The majority of the projects fall under the enumerated business problem categories. However, the "Process automation" solution could solve business problems in other categories as shown on the image below.

¹⁹ Idem

Given that one business solution may solve more than one business problem as per the identified business problem categories:

- Anonymisation and pseudonymisation is a solution used in 12 projects of the Member States' authorities (or 13% of all 93 projects)
- Data security and traceability is a solution used in 16 projects (or 17%)
- Digital assistance is a solution used in 4 projects (or 4%)
- Facial and/or object recognition is a solution used in 5 projects (or 5%)
- Predictive analytics is a solution used in 5 projects (or 5 %)
- Process automation is a solution used in 32 projects (or 34 %)
- Search optimisation is a solution used in 10 projects (or 11 %)
- Speech/text-to-text/speech solutions are used in 9 projects (or 10%)

As described in detail in Section 10 of this report, a total of 8 projects of the legal professional organisations have been evaluated per business category. With regards to the fact that one project may solve more than one business problem as per the identified business problem categories, 5 projects (or 65% of all 8 projects) aim to solve a business problem in the PCD category; 1 (or 13%) - in the LKS category, 2 (or 25%) - in the ATJ category; 1 (or 13%) - in the AFM category; 1 (or 13%) - in the DPC category; 3 (or 38%) - in the PPD category; and 2 (or 25%) - in the LAT category. There are no projects falling under the business problem category 'Processing high volume of video, audio and image data'.

Given that one business solution may solve more than one business problem as per the identified business problem categories:

- Data security and traceability is a solution used in 2 projects (or 25%)
- Digital assistance is a solution used in 1 project (or 13%)
- Predictive analytics is a solution used in 1 project (or 13 %)
- Process automation is a solution used in 4 projects (or 50 %)

In addition to the evaluation per business category, the Member States' public authorities and judiciary and the legal professional organisations²⁰ have been asked to what extent the project meets its objectives and the technology solves their business problem(s). In this regard, the stakeholders indicated if the project 'exceeds', 'meets', 'partially meets' or 'does not meet' their expectations. This expectations level assessment only takes into regard the **completed** and the **ongoing projects**²¹ (i.e. 80 projects of the Member States' public authorities and judiciary and 8 projects of the legal professional organisations).

In this context, projects which 'exceed' and 'meet' expectations may serve as basis for exchange of **good practices**²² among stakeholders in other countries. Such projects

²⁰ The ICT companies' projects/use cases are not included in the analysis, because it aims to demonstrate to the extent possible, the objective views, of the project users and/or project in terms of technology solving the business problems and project objectives met.

²¹ The planned projects are excluded from this analysis, as their maturity level is considered not high enough to perform such assessment.

²² In the context of this study, 'good practices' regarding a project may relate to activities of preparation, development and implementation of the project and overcoming challenges encountered, in an optimal way, such as to achieve the project objectives and solve the business problem to an extent that exceeds or meets the expectations.

concern areas such as, *inter alia*, anonymisation of documents (e.g. court decisions); speech-to-text and transcription; introduction of chatbots for strengthening the access to justice and public services, and Robot Process Automation (RPA) for increasing efficiency and minimising errors in repetitive tasks.

Together with suggestions for exchange of good practices on the said projects, the following recommendations are drawn horizontally, cutting across several points observed in this study:

- **Coordination at EU level of efforts and activities.** The study identified a number of projects in the Member States with similar objectives, business problems and technologies used to solve them. Therefore, in order to avoid duplication of effort and to ensure semantic and organisational interoperability, there is a need for coordination of and improved communication on project activities at EU level.
- **Collaboration and experience sharing about projects on a regular basis.** There are a number of ongoing and planned projects, together with initiatives at European and Member State level. Establishment of a mechanism with focus on innovative technologies in the justice field would facilitate experience sharing between the EU institutions, national public authorities, the judiciary and legal professional organisations and compilation of lessons learned.
- **Strengthening existing partnerships and networks.** Existing partnerships between European and MS organisations, such as the AI4EU observatory²³ or EU blockchain observatory and forum²⁴, should be further strengthened with larger involvement of experts in the justice field. This would contribute to raising awareness about the benefits of innovative technologies and better understanding how these can help in solving specific problems.
- **Recommendation for establishing a supporting mechanism for legal professional organisations.** Defining a supporting mechanism for legal professional organisations to facilitate the preparation and implementation of proof of concepts (PoC) as 'quick wins' that would demonstrate added value and benefits of the innovative technologies for the practitioners.

These actions and mechanisms may include creation of network and knowledge sharing platforms to engage the stakeholders from the public and the private sector into dialogue (including with EU institutions, bodies and agencies), to support them in finding information on current projects involving innovative technologies (in their Member State or elsewhere), to assist them throughout the project lifecycle by identifying partners and funding opportunities and preparing proofs of concept (PoC).

²³ <https://www.ai4eu.eu/observatory>

²⁴ <https://www.eublockchainforum.eu/>

Synthèse (FR)

L'UE comprend l'importance d'être l'un des principaux acteurs mondiaux dans l'utilisation des technologies innovantes. C'est pourquoi, la transformation numérique, le déploiement de technologies innovantes et les mégadonnées ont été des points clés de l'agenda de l'UE ces dernières années. Dans le **Livre blanc sur l'intelligence artificielle (IA)**²⁵, l'UE a reconnu la nécessité d'intensifier les actions à plusieurs niveaux dans le but de créer un écosystème d'excellence capable de soutenir le développement et l'adoption de l'IA dans l'économie et l'administration publique de l'UE. Ces dernières années, un certain nombre d'actions ont été entreprises et continueront d'être entreprises par différents acteurs aux niveaux européen et national en vue de la transition vers une économie durable centrée sur les données, qui garantit des produits et services fiables, sûrs et dignes de confiance sur le marché numérique.

En avril 2018, la Commission européenne a présenté sa **Stratégie « L'intelligence artificielle pour l'Europe »**²⁶ qui souligne l'importance de l'IA pour l'Europe et décrit les mesures prises pour faire de l'Europe une union très avancée dans le domaine de l'IA. La stratégie vise à stimuler les investissements dans le cadre du programme-cadre de recherche et d'innovation correspondant, préconise la nécessité de la disponibilité des données pour la formation ainsi que la notion de « ne laisser personne de côté dans le wagon de l'IA » où tous les utilisateurs potentiels, en particulier les petites et moyennes entreprises (PME), les entreprises non technologiques et les administrations publiques auront un accès facilité aux services et produits d'IA et auront la possibilité de se former pour les utiliser.

À la suite de la Stratégie sur "L'intelligence artificielle pour l'Europe", en décembre 2018 la Commission a adopté un **Plan coordonné sur l'intelligence artificielle**²⁷ qui reflète l'importance des actions coordonnées au niveau européen entre la Commission et les États membres pour assurer le succès de la stratégie.

Dans le domaine de la justice, un premier résultat tangible de l'engagement politique visant à rendre la justice électronique nationale et européenne plus accessible a été l'adoption du premier plan d'action pluriannuel pour la justice en ligne pour la période 2009-2013. Ce premier instrument a identifié un certain nombre d'actions prioritaires pour un travail conjoint. Après son achèvement, une stratégie et un plan d'action pour la justice en ligne ont été adoptés pour la période 2014-2018. Celles-ci ont pris fin en 2018 et ont à leur tour été remplacées par la stratégie et le plan d'action e-Justice pour la période 2019-2023.

Dans ce contexte, l'objectif de la présente étude est de traiter deux des domaines de travail prioritaires dans le cadre du plan d'action actuel - l'utilisation d'IA et de blockchain (chaîne de blocks)/ DLT (technologie des registres distribués) dans le domaine de la justice, ci-après dénommés « technologies innovantes » aux fins du présent document.

La Commission européenne a engagé TRASY International, entité du groupe NRB, via le contrat-cadre ABC IV pour réaliser une étude sur l'utilisation de technologies innovantes dans le domaine de la justice (ci-après : l'Étude sur l'innovation). L'étude a été réalisée durant la période d'août 2019 à mai 2020 et a pour objectifs principaux:

²⁵ Commission Européenne, LIVRE BLANC Intelligence Artificielle : Une approche européenne axée sur l'excellence et la confiance, COM (2020), Bruxelles, 19.2.2020

²⁶ Communication de la Commission au Parlement européen, au Conseil européen, au Conseil, au Comité économique et social européen et au Comité des régions, « Intelligence artificielle pour l'Europe », 25 avril 2018, COM (2018) 237 final (voir annexe I, réf.13).

²⁷ Communication de la Commission au Parlement européen, au Conseil européen, au Conseil, au Comité économique et social européen et au Comité des régions, « Plan coordonné sur l'intelligence artificielle », 7 décembre 2018, COM (2018) 795 final (voir annexe I, réf.9).

- Objectif 01 : établir le cadre juridique et politique existant de l'UE et de résumer tous les aspects qui doivent être pris en compte en termes de technologies d'innovation dans le domaine de la justice de manière cohérente et narrative.
- Objectif 02 : faire le point sur la situation dans les institutions européennes, tous les États membres de l'UE et parmi certains organismes professionnels juridiques en ce qui concerne les systèmes pilotes et en production, actuels et planifiés, qui utilisent des technologies innovantes dans le domaine de la justice.
- Objectif 03 : établir un inventaire des cas existants d'utilisation des technologies innovantes par le secteur public et privé ou dans un contexte universitaire, ou des cas d'utilisation dans le cadre d'exercices en cours ou terminés.
- Objectif 04 : identifier les produits et / ou services logiciels clés disponibles sur le marché, qui sont appliqués ou pourraient être appliqués aux cas d'utilisation définis dans le domaine de la justice.
- Objectif 05 : identifier les domaines d'intérêt possible dans le domaine de la justice.

Afin d'atteindre ces objectifs, l'étude a mis en œuvre une approche en trois étapes.

Dans la première étape, **l'Etablissement des faits**, l'objectif principal était de rassembler le cadre juridique et politique existant de l'UE et le corpus académique de connaissances sur l'utilisation des technologies d'innovation dans le domaine de la justice, ainsi que de collecter des informations sur les projets existants utilisant l'IA et la blockchain (chaîne de blocks)/ DLT (technologie des registres distribués). Cette étape comprenait des activités de lancement des projets, à savoir l'organisation d'une réunion de lancement, ainsi qu'une recherche documentaire, une révision de la documentation, et des consultations avec des parties prenantes à l'aide d'un questionnaire structuré en ligne via l'outil d'enquête de l'UE (EU Survey)²⁸ et des entretiens. Au total, 117 documents ont été examinés (voir l'Annexe I-Références) et classés en termes de pertinence élevée, moyenne ou faible pour cette étude. Les enquêtes en ligne pour les autorités publiques et judiciaires des États membres, les organismes professionnels juridiques et les entreprises TIC ont été réalisées entre novembre 2019 et janvier 2020. Au total, 100 réponses ont été reçues de la part de 25 États membres et de 2 institutions européennes, 40 réponses de la part des organismes professionnels juridiques et 15 réponses d'entreprises TIC.

Dans la deuxième étape, **Analyse et évaluation**, les informations collectées via le questionnaire et les entretiens ont été traitées, analysées et évaluées pour la préparation de quatre (4) Annexes qui, dans leur ensemble, font partie intégrale de ce rapport d'étude. Au total, 93 projets / cas d'utilisation des autorités publiques et judiciaires dans les États membres, 8 projets des organismes professionnels juridiques et 29 projets / cas d'utilisation des produits et services offerts par 15 entreprises TIC, ont été analysés. L'étude a identifié 8 catégories de problèmes fonctionnels que ces projets visent à résoudre.

Dans la troisième étape, **La voie à suivre**, y est présenté l'évaluation des 80 projets achevés et en cours des autorités des États membres ainsi que des 8 projets achevés et en cours d'organisations juridiques professionnelles, en fonction du niveau auquel ces projets ont répondu aux attentes des parties prenantes en matière de résolution de problème fonctionnel et la réalisation des objectifs du projet.

Dans la première étape, des consultations avec les parties prenantes ont été menées à l'aide de questionnaires structurés et d'entretiens. En collaboration avec l'équipe de projet de la DG JUST, le contractant a préparé trois questionnaires structurés distincts pour trois groupes de parties prenantes différents :

- Autorités publiques et judiciaires dans les États membres
- Juristes (des organismes professionnels comme par exemple, des barreaux, des instituts de formation, etc.).

²⁸ EU Survey: <https://ec.europa.eu/eusurvey/home/welcome>

- Entreprises TIC fournissant des produits et services d'IA et / ou de blockchain (chaîne de blocks)/ DLT (technologie des registres distribués).

Les enquêtes ont été lancées en novembre 2019 et sont restées ouvertes jusqu'en janvier 2020. Après la clôture de celles-ci, les réponses ont été rassemblées et présentées de manière consolidée dans trois documents autonomes distincts.

Dans le cadre de cette étude, le contractant a réalisé 22 entretiens avec des représentants des institutions, organes, organisations et agences de l'UE. Le but de ces entretiens était de collecter des informations sur les activités en cours au niveau de l'UE en termes de travail politique et de projets de technologies innovantes liés au domaine de la justice. Suite aux réponses reçues via le questionnaire, le contractant a mené 31 entretiens avec des représentants des États membres, 9 entretiens avec des organismes professionnels juridiques et 9 avec des entreprises privées. Pour chaque entretien, le contractant a préparé des rapports d'entretien qui ont été validés par les personnes interrogées.

Dans le but de regrouper les problèmes fonctionnels abordés lors de la mise en œuvre des projets menés par les autorités publiques et judiciaires dans les États membres, ainsi que par les organisations professionnelles juridiques, les huit (8) catégories de problèmes fonctionnels suivantes ont été identifiées:

1. **Traitement d'un grand volume de données (TVD).** Le problème du traitement manuel ou par le biais de simples outils numériques d'un grand volume de données ou de documents structurés et non structurés ou avec de simples outils numériques, afin de faire une analyse basée sur le contenu, pour des tâches telles que: traitement d'informations sur l'affaire juridique, déduction de motifs, recherche de mots ou cas spécifiques, classification et catégorisation, etc.
2. **Traitement d'un grand volume de vidéo, audio et images (VAI).** Le problème du traitement de grands volumes de fichiers vidéo, de fichiers audio et / ou d'images afin de faire une analyse du contenu, pour des tâches telles que: identification des personnes / victimes, ou surveillance de comportement, détection d'activités illégales, détection de parole sur des enregistrements audio-vidéo, etc.
3. **Etablissement de liens entre des sources différentes d'information(LSI).** Les problèmes de recherche, d'extraction et d'analyse d'informations à partir de sources multiples (telles que différentes bases de données, registres, systèmes, etc.) généralement parce qu'elles ne sont pas centralisées, ou connectées, et il n'y a pas d'interface ou de point d'accès commun.
4. **Accès à la justice / aux services publics (AJ).** Le problème de ne pas mettre les informations judiciaires ou les services publics à la disposition des citoyens et du grand public de manière conviviale et facilement accessible. Cela comprend l'accès aux informations personnelles, aux informations sur les affaires juridiques, à la législation, au traitement des questions des citoyens, à la navigation dans les procédures administratives, etc.
5. **Conformité aux règles de protection des données personnelles (PDP).** Le problème de la mise en conformité des documents (généralement des jugements et décisions de justice) avec la législation sur la protection des données personnelles dans le but de rendre ces documents accessibles au public.
6. **Préparation d'un grand volume de données (PVD).** Le problème du traitement manuel (de grands volumes de) données, ou avec de simples outils numériques, afin d'obtenir un résultat final par ex. dans la préparation des audiences du tribunal et dans l'exécution des tâches d'administration des tribunaux et / ou d'autres tâches judiciaires. Cela implique des tâches telles que: traduction de documents, dactylographie de protocoles lors d'audiences judiciaires ou d'entretiens,

préparation de contrats, de décisions judiciaires et de leurs versions anonymisées, signature manuelle de documents, etc.

7. **Gestion administrative et/ou de l'infrastructure (GAI).** Le problème de la gestion des processus d'administration des tribunaux exécutés par le personnel judiciaire (greffiers, juges, avocats, etc.), avec des tâches telles que la planification des ordres du jour, les audiences des tribunaux, la réservation et l'attribution des salles d'audience et des infrastructures, l'organisation des entretiens et la gestion des installations.
8. **Manque d'authenticité et de traçabilité (MAT).** Le problème d'avoir un niveau insuffisant de traçabilité des actions à mener par les différents acteurs liés aux données et documents au cours de leurs flux de processus, afin que les informations puissent être stockées et / ou transférées avec un niveau suffisant d'authenticité, de confiance et d'intégrité.

Comme décrit en détail dans la Section 9 du présent rapport, un total de 93 projets des autorités publiques et judiciaires des États membres ont été évalués par catégorie de problèmes fonctionnels. Étant donné qu'un projet peut résoudre plus qu'un problème fonctionnel au vu des catégories identifiées, sur 93 projets achevés, en cours et planifiés, 43 (soit 46%) visent à résoudre un problème de la catégorie de TVD, 17 (soit 18%) - dans la catégorie de VAI, 24 (soit 26%) - dans la catégorie de LSI, 14 (soit 15%) - dans la catégorie de AJ, 13 (soit 14%) - dans la catégorie de PDP, 29 (soit 31%) - dans la catégorie de PVD, 12 (soit 13%) - dans la catégorie de GAI et 15 (soit 26%) - dans la catégorie de MAT.

En outre, l'étude a mis en correspondance les catégories de problèmes fonctionnels en 8 solutions utilisant IA ou blockchain que les projets visent à atteindre :

- **Anonymisation and pseudonymisation** – Une solution aux problèmes fonctionnels dans les catégories de traitement de grands volumes de données (TVD), de préparation de grands volumes de données (PVD) et de conformité aux règles la protection des données personnelles (PDP) en utilisant la technologie de l'IA pour automatiser l'identification manuelle et la suppression des données personnelles (et / ou autres données sensibles). Une telle solution est généralement utilisée pour garantir le respect de la législation sur la protection des données.
- **Authenticité et traçabilité des données** – Une solution aux problèmes fonctionnels principalement dans les catégories MAT, PVD, AJ et LSI²⁹ utilisant généralement la blockchain (chaîne de blocks)/ DLT (technologie des registres distribués) pour les signatures numériques, les contrats intelligents, les registres, etc., pour effectuer la validation des données, améliorer leur traçabilité et assurer leur intégrité.
- **Assistance numérique** – Une solution aux problèmes fonctionnels dans la catégorie AJ, utilisant la technologie de l'IA, comme les chatbots (assistants virtuels), pour améliorer l'accès des citoyens aux informations et les parcourir à travers les processus administratifs.
- **Reconnaissance faciale et / ou d'objet** - Une solution aux problèmes fonctionnels dans la catégorie VAI, utilisant généralement la technologie de l'IA pour détecter, identifier et vérifier une personne ou un objet à partir d'une image numérique ou d'une séquence vidéo, par des caractéristiques faciales spécifiques ou autres. De telles solutions, par exemple, sont utilisées dans la justice pénale et les forces de l'ordre pour améliorer l'identification des victimes à partir de photo ou détecter les comportements anormaux des détenus dans les prisons.

²⁹ La majorité des projets relèvent des catégories énumérées de problèmes d'affaire. Cependant, la solution «Authenticité et traçabilité des données» pourrait également résoudre des problèmes d'affaire dans d'autres catégories.

- **Analyse prédictive** – Une solution aux problèmes fonctionnels dans les catégories LSI, TVD et PVD, utilisant la technologie de l'IA pour analyser les faits actuels et historiques pour faire des prédictions sur l'avenir ou et / ou identifier les risques et opportunités. Dans le domaine de la justice, ces solutions sont généralement appelées «justice prédictive» et sont utilisées pour aider le pouvoir judiciaire dans le processus décisionnel.
- **Automatisation des processus** - Une solution aux problèmes fonctionnels principalement dans les catégories TVD, PVD, LSI et GAI³⁰, utilisant généralement la technologie de l'IA et l'automatisation des processus robotisés, pour automatiser les processus, tels que l'organisation, la planification et la gestion des installations, la hiérarchisation, la catégorisation et l'attribution des documents et des tâches. Dans le domaine de la justice, l'automatisation des processus est généralement utilisée pour améliorer l'efficacité en automatisant les tâches manuelles et répétitives telles que l'analyse des informations relatives aux affaires (par exemple, les données collectées lors des perquisitions à domicile), le paiement des amendes par les citoyens, etc.
- **Optimisation de la recherche** – Une solution aux problèmes fonctionnels principalement dans les catégories PVD, LSI et AJ³¹, utilisant généralement la technologie de l'IA pour accélérer et faciliter les recherches dans la jurisprudence pertinente, les registres et les bibliothèques numériques, créant généralement des liens sémantiques et des possibilités d'annotation de documents.
- **Solutions de transformation de parole/texte en texte/parole** - Une solution aux problèmes fonctionnels dans les catégories PVD et VAI, utilisant la technologie de l'IA, comme la reconnaissance vocale et la traduction automatique. Dans le domaine de la justice, une telle solution est généralement utilisée pour moderniser les salles d'audience et faciliter les audiences, en remplaçant la saisie manuelle des procès-verbaux et autres documents, ou les interprétations à partir de langues étrangères.

Étant donné qu'une solution peut résoudre des problèmes fonctionnels appartenant à plusieurs catégories de problèmes fonctionnels:

- L'anonymisation et la pseudonymisation sont des solutions utilisées dans 12 projets des autorités des États membres (soit 13% des 93 projets)
- La sécurité et la traçabilité des données sont des solutions utilisées dans 16 projets (soit 17%)
- L'assistance numérique est une solution utilisée dans 4 projets (soit 4%)
- La reconnaissance faciale et / ou d'objets sont des solutions utilisées dans 5 projets (soit 5%)
- L'analyse prédictive est une solution utilisée dans 5 projets (soit 5%)
- L'automatisation des processus est une solution utilisée dans 32 projets (soit 34%)
- L'optimisation de la recherche est une solution utilisée dans 10 projets (soit 11%)

³⁰ Idem

³¹ Idem

- Les solutions de transformation de parole/ texte en texte /parole sont utilisées dans 9 projets (soit 10%)

Comme décrit en détail dans la Section 10 de ce rapport, un total de 8 projets des organisations professionnelles juridiques ont été évalués par catégorie de problèmes fonctionnels. Étant donné qu'un projet peut résoudre des problèmes fonctionnels relevant de plus d'une catégorie, 5 projets (soit 65% des 8 projets) visent à résoudre un problème fonctionnel dans la catégorie TVD; 1 (soit 13%) - dans la catégorie LSI, 2 (soit 25%) - dans la catégorie AJ; 1 (soit 13%) - dans la catégorie GAI; 2 (soit 25%) - dans la catégorie PDP; 3 (soit 38%) - dans la catégorie PVD; et 2 (soit 25%) - dans la catégorie MAT. Aucun projet ne relève de la catégorie de problèmes fonctionnels «Traitement d'un grand volume de données vidéo, audio et image (VAI)».

Étant donné qu'une solution peut résoudre des problèmes appartenant à plusieurs catégories de problèmes fonctionnels:

- L'authenticité et la traçabilité des données sont des solutions utilisées dans 2 projets (soit 25%)
- L'assistance numérique est une solution utilisée dans 1 projet (soit 13%)
- L'analyse prédictive est une solution utilisée dans 1 projet (soit 13%)
- L'automatisation des processus est une solution utilisée dans 4 projets (soit 50%)

Outre l'évaluation par catégorie de problème fonctionnel, les autorités publiques et judiciaires des États membres ainsi que les organisations professionnelles juridiques³² ont été invitées à déterminer dans quelle mesure le projet atteint ses objectifs et la technologie résout leur (s) problème (s) fonctionnel (s). À cet égard, les parties prenantes ont indiqué si le projet «dépasse», «répond», «répond partiellement» ou «ne répond pas» à leurs attentes. Cette évaluation du niveau des attentes ne prend en compte que les projets **achevés** et **en cours**³³ (c'est-à-dire 80 projets des autorités publiques et judiciaires des États membres et 8 projets des organisations professionnelles juridiques).

Dans ce contexte, les projets qui «dépassent» et «répondent» aux attentes peuvent servir de base à l'échange de **bonnes pratiques**³⁴ entre les parties prenantes d'autres États membres. Ces projets concernent des domaines tels que, entre autres, l'anonymisation des documents (par exemple les décisions de justice); parole-texte et transcription; introduction de chatbots pour renforcer l'accès à la justice et aux services publics, et Robot Process Automation (RPA) (Automatisation des processus robotisés) pour accroître l'efficacité et minimiser les erreurs dans les tâches répétitives.

En outre, l'étude suggère les **actions horizontales** suivantes:

- **Coordination au niveau de l'UE des efforts et des activités.** L'étude a identifié un certain nombre de projets dans les États membres ayant des objectifs similaires, des problèmes fonctionnels et des technologies utilisées pour les résoudre. Par conséquent, afin d'éviter la duplication des efforts et d'assurer l'interopérabilité sémantique et organisationnelle, il est nécessaire de coordonner et d'améliorer la communication sur les activités de projets au niveau de l'UE.

³² Les projets / cas d'utilisation des entreprises de TIC ne sont pas inclus dans l'analyse, car elle vise à démontrer dans la mesure du possible les points de vue objectifs des utilisateurs du projet et / ou de l'équipe de projet en termes de technologie résolvant les problèmes commerciaux et répondant aux objectifs du projet.

³³ Les projets planifiés sont exclus de cette analyse, car leur niveau de maturité est jugé insuffisant pour effectuer une telle évaluation.

³⁴ Dans le cadre de cette étude, les „bonnes pratiques” concernant un projet peuvent concerner des activités de préparation, de développement et de mise en œuvre du projet et surmonter les défis rencontrés, de manière optimale, comme atteindre les objectifs du projet et résoudre le problème commercial pour une mesure qui dépasse ou répond aux attentes.

- **Collaboration et partage d'expérience sur les projets sur une base régulière.** Il existe un certain nombre de projets en cours et prévus, ainsi que des initiatives au niveau européen et des États membres. La mise en place d'un mécanisme axé sur les technologies innovantes dans le domaine de la justice faciliterait le partage d'expériences entre les institutions de l'UE, les autorités publiques nationales, les organisations professionnelles judiciaires et juridiques ainsi que la compilation de leçons apprises.
- **Renforcement des partenariats et des réseaux existants.** Les partenariats existants entre les organisations européennes et des États membres, tels que l'observatoire AI4EU³⁵ ou l'observatoire et le forum de la blockchain de l'UE³⁶, devraient être encore renforcés avec une plus grande participation d'experts dans le domaine de la justice. Cela contribuerait à faire prendre conscience des avantages des technologies innovantes et à mieux comprendre comment celles-ci peuvent aider à résoudre des problèmes spécifiques.
- **Mise en place de mécanismes d'appui aux organisations professionnelles juridiques.** Définir un mécanisme d'appui pour les organisations professionnelles juridiques afin de faciliter la préparation et la mise en œuvre de la preuve de concepts (PoC) en tant que « gains rapides » qui démontreraient la valeur ajoutée et les avantages des technologies innovantes pour les praticiens.

Ces actions et mécanismes peuvent inclure la création de réseaux et de plates-formes de partage des connaissances pour impliquer les parties prenantes du secteur public et privé dans un dialogue (y compris avec les institutions, organes, bureaux et agences de l'UE), afin de les aider à trouver des informations sur les projets actuels impliquant des technologies innovantes (dans leur État membre ou ailleurs), et afin de les accompagner tout au long du cycle de vie du projet en identifiant les partenaires et les opportunités de financement et en préparant des preuves de concept (PoC).

³⁵ <https://www.ai4eu.eu/observatory>

³⁶ <https://www.eublockchainforum.eu/>

List of Abbreviations

Abbreviations are listed in alphabetical order.

Abbreviation	Full title
ADM	Automated Decision Making
AI	Artificial Intelligence
CCBE	Council of Bars and Law Societies of Europe
CESOP	Central Electronic System for Online Payments
CJEU	Court of Justice of the European Union
CUP	Customs Union Performance
DG CNECT	Directorate-General for Communications Networks, Content and Technology
DG DIGIT	Directorate-General for Informatics
DG FISMA	Directorate-General for Financial Stability, Financial Services and Capital Markets Union
DG GROW	Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs
DG HOME	Directorate-General for Migration and Home Affairs
DIF	Decentralized Identity Foundation
DG JUST	Directorate-General for Justice and Consumers
DG TAXUD	Directorate-General for Taxation and Customs Union
DEI	Digital Evidence Inventory
DLT	Distributed Ledger Technology
EBSI	European Blockchain Services Infrastructure
EDPS	European Data Protection Supervisor
EUBF	European Bailiffs' Foundation
FCR	Forensics Confidence Rating
FRA	European Union Agency for Fundamental Rights
FRT	Facial Recognition Technology
FRONTEX	European Border and Coast Guard Agency
GDPR	General Data Protection Regulation
ICO	UK Information Commissioner's Office

IoT	Internet of Things
ICS	Import Control System
JRC	Joint Research Centre
LED	Law Enforcement Directive
ML	Machine Learning
NLP	Natural Language Processing
OCR	Optical Character Recognition
ODR	Online Dispute Resolution
OLAF	European Anti-Fraud Office
PHRP	Police and Human Right Programme (PHRP) of Amnesty International
OPEU	Publications Office of the European Union
PoC	Proof of concept
RTBF	Right to be forgotten
SRL	Self-Represented Litigant
SSI	Self-Sovereign Identity
UC	Use Case
UEHJ	European Union of Judicial Officers

1. INTRODUCTION

1.1 Background to the service contract

Since 2008, the European Commission and the Council of the EU have been working closely together towards establishing a number of cross-border digital initiatives in the area of justice.

A first tangible result of the political commitment to making access to national and European e-Justice easier and more accessible was the adoption of the first Multiannual e-Justice Action Plan 2009-2013. This first instrument identified a number of priority actions for joint work. Following its completion, a subsequent e-Justice Strategy and Action Plan were adopted for the 2014-2018 period. These ended in 2018, and have in turn been superseded by the e-Justice Strategy and Action Plan for the 2019-2023 period.

In 2018, the Commission's services carried out a detailed study of the outcomes of the 2014-2018 e-Justice Action Plan. The study also contained a forward-looking dimension and sought Member State experts' views with respect to the use of innovative technologies, such as AI and the blockchain, in the justice field.

According to the study results, as of 2018, the level of use of AI technologies in the justice field was still relatively low, with only 7% of respondents indicating that some form of AI technologies was in use in their organisation. At the same time, the future use of these technologies was identified as an area of major interest, with 82% of the respondents indicating that AI technologies should be used in the justice domain, or that its possibilities should be at least explored. Innovative technologies would have a catalysing horizontal role by enhancing data security, exchanges of data, as well as improving access to information and facilitating its processing.

Against this background, the purpose of the present study is to address two of the areas of priority work under the current Action Plan – use of Artificial Intelligence (AI) and blockchain/Distributed Ledger Technology (DLT) in the justice field, which for the purpose of this document are hereafter referred to as "innovative technologies".

In this context, the Commission contracted TRASYS International, part of the NRB Group, via the ABC IV Framework Contract to carry out a study on the use of innovative technologies in the justice field (hereinafter: the Innovation Study). The study was carried out in the period August 2019-May 2020.

1.2 Purpose and structure of this document

The main purpose of this document is to present the outcomes of the study and to recommend areas for possible future activities in the justice field.

This report is organised into the following sections:

Section 1: The current section – aims to provide the reader with the required context to follow the document.

Section 2: Project description – describes the project approach and objectives together with the project team and the involved stakeholders.

Section 3: Methodology – elaborates the techniques and solutions used for conducting the stakeholder consultations process.

Section 4: Literature review – summarises the references identified as of high relevance to this study. See *Annex I – List of References*.

Section 5: European institutions, bodies, organisations and agencies' consultation results – describes the key points derived from the interviews carried out

Section 6: Member States consultation results – presents the outputs of the stakeholder consultations with national authorities and the judiciary, conducted using a structured online questionnaire and interviews. It contains an overview of the existing projects³⁷ in the Member States, complemented by initiatives³⁸ and ideas³⁹.

Section 7: Legal professional organisations consultation results – depicts the outputs of the consultations conducted with legal professional and law practice organisations using a structured online questionnaire and interviews.

Section 8: ICT companies consultation results – presents the outputs of the consultations conducted with ICT companies using a structured online questionnaire and interviews.

Section 9: Assessment of explored projects in terms of business problem and solution categories – contains an overview of projects and description of the business problems categories they fall in, the business solution categories aiming to solve these problems, and a number of projects in each category. See *Annex II – Explored projects and use cases of the Member States' authorities* and *Annex III – Explored projects and use cases of legal professional organisations*.

Section 10: Way forward – recommending use cases in the field of innovative technologies in certain business areas as matured and proven in view of bringing added value to users.

³⁷ **A project** is defined as 'a piece of planned work or an activity which is done over a period of time and intended to achieve a particular purpose'. In the context of our study, a project would have a defined budget, timeframe, an assigned project team, specific deliverables and also include proof of concept (POC), business case, etc.

³⁸ **An initiative** is defined as 'a new plan or action to improve something or solve a problem'. In the context of our study, it would mean a well-thought-out action, with steps undertaken towards materialising it into a project, however, without a specific budget assigned and/or timeframe for its implementation.

³⁹ **An idea** is defined as 'a suggestion or plan for doing something'. In the context of our study, it would include thoughts, concepts and/or beliefs on the possible ways to use innovative technologies to solve specific business problems. However, an idea is not yet mature enough to be materialised into an initiative or a project.

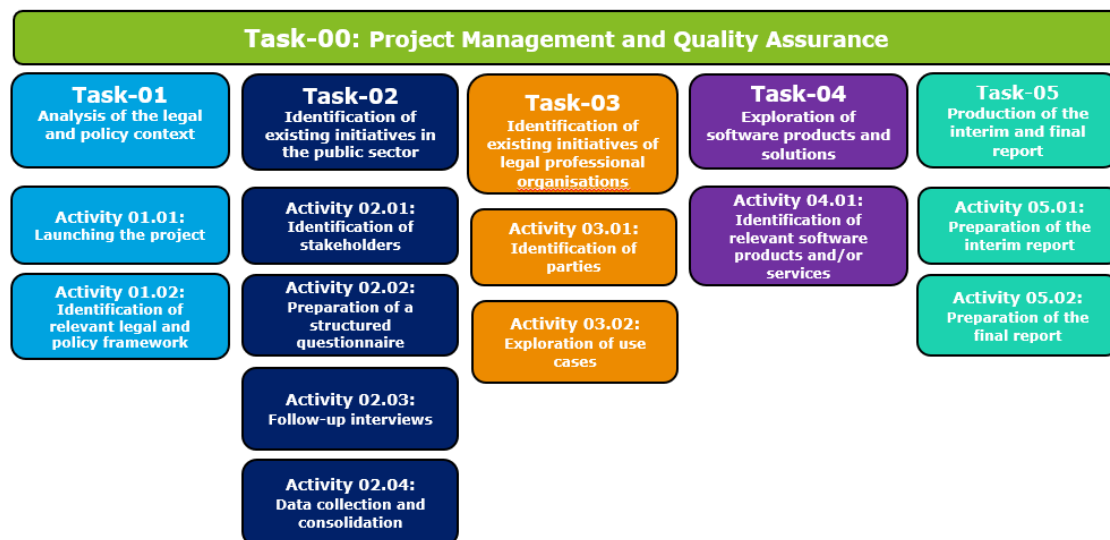
2. PROJECT DESCRIPTION

2.1. Project approach and objectives

The project was organised around the following five tasks with project management as a horizontal task as illustrated in Figure 1 below:

- Task-01: Analysis of the legal and policy context
- Task-02: Identification of existing projects and initiatives in the public sector at the European and the Member States’ levels
- Task-03: Identification of existing projects and initiatives of legal professional organisations
- Task-04: Exploration of software products and solutions
- Task-05: Production of the interim and final reports.

Figure 1: Project tasks



The objectives of the study are as follows:

- Objective 01: Establish the relevant existing EU legal and policy framework and summarise all aspects that need to be taken into account in terms of innovation technologies in the justice field in a coherent and narrative way.
- Objective 02: Take stock of the situation in the European institutions, all EU Member States and specific legal professional organisations with regard to present and planned pilot and in production systems using innovative technologies in the justice field.
- Objective 03: Establish an inventory of the existing relevant use cases in the justice field, where innovative technologies are currently used by the public and private sector or in an academic context, or potential relevant use cases as part of ongoing or already completed exercises.
- Objective 04: Identify the key off-the-shelf software products and/or services, which are being applied or could be applied to the defined use cases in the justice field.
- Objective 05: Identify the areas of possible interest in the justice field.

2.2. Project team

The project organisation is presented in the organisational chart below.

The project members responsible at the directing level for the contractor and DG JUST side, Project Officers from DG JUST and the Project Manager, a single point of contact from the contractor’s side. The list of stakeholders to be consulted during the course of the project was provided by DG JUST. The list of ICT companies and academia representatives was proposed by the contractor and agreed by DG JUST.

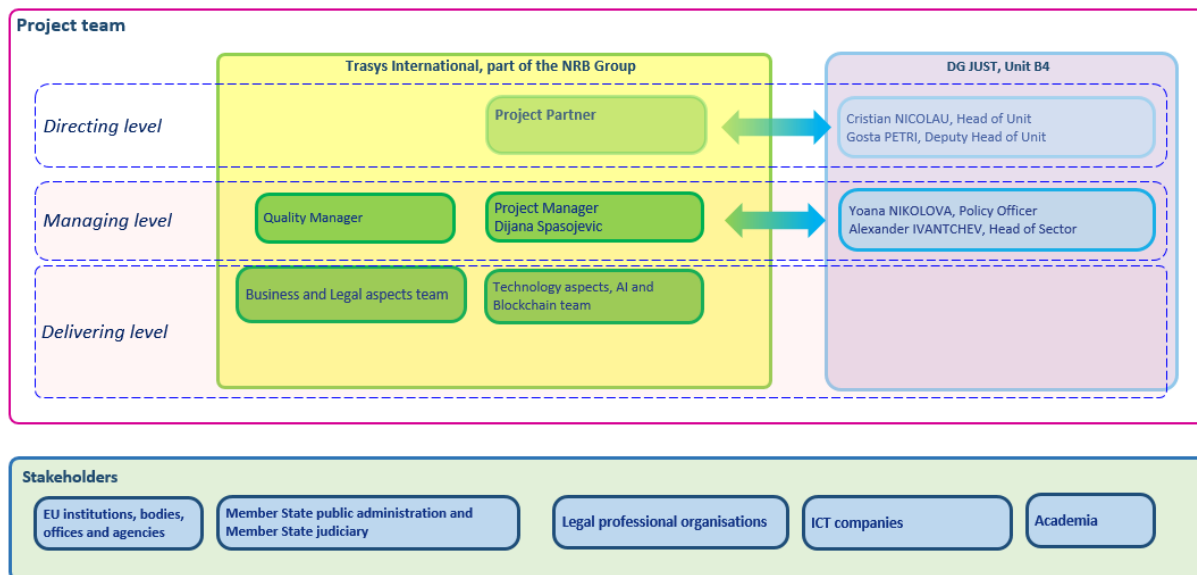


Figure 2: Project organisation

3. METHODOLOGY

3.1. Literature review and desk research

A comprehensive literature review and desk research was conducted during the course of the study (see Annex I-List of References).

A number of documents⁴⁰ published by EU institutions, bodies, offices and agencies, Member State public administrations and judiciary, and academia have been identified, reviewed, summarised and marked as being of high, medium or low relevance to this study. Three levels of relevance are defined as follows:

- The high-level relevance references are part of the legal and/or policy framework of the EU and the Member States, which set horizontal strategic priorities, rules and principles with regard to the use of AI and/or blockchain/DLT. In addition, these references include academic papers and studies conducted by different bodies and organisations which discuss use cases and business problems directly connected to the justice field and/or propose an analysis of the ethical and legal issues arising out of the use of these technologies.
- The medium-level relevance references include academic papers and studies which discuss uses of innovative technologies in other fields. However, due to the applicability of these technologies to multiple fields, they could potentially be used in the justice field, as well.
- The low-level relevance references do not discuss uses of innovative technologies in the justice field or other fields. However, they put forward some important considerations, primarily of a technical nature that could be taken on board by national authorities in their future work on projects and initiatives implementing AI or blockchain/DLT.
- The results of the reviewed references served as input for the preparation of questionnaires for the three groups of stakeholders, i.e. Member States public authorities and judiciary, legal professional organisations and ICT companies as described in the next section of this document. Additionally, the literature review and desk search results were used for the preparation of an analysis of the political and strategic guidances provided by the EU and the Member States, as well as by academia, with regard to the use of innovative technologies in the justice field.

3.2. Structured questionnaires

In collaboration with the project team of DG JUST, the contractor prepared three separate structured questionnaires for three different stakeholder groups:

- Member State public authorities and judiciary;
- Legal professional organisations (e.g. professional organisations, such as bar associations, training institutes, etc.);
- ICT companies providing AI and/or blockchain/DLT products and services.

The main objective of the questionnaires was to attain a good understanding of the existing policies, strategies and projects on the use of innovative technologies, i.e. Artificial Intelligence (AI) and blockchain/Distributed Ledger Technology (DLT), in the justice field. Additionally, the goal was to identify the business challenges, needs and opportunities of

⁴⁰ The term 'reference' is used interchangeably throughout this document.

the public authorities and the judiciary where the use of the innovative technologies in the field of justice should be further explored.

The questionnaires for the Member States authorities, legal professional organisations and ICT companies have a total of 140, 143 and 43 questions respectively. The questionnaires included a set of general questions about the respondent and the existence of projects, together with a set of AI and DLT project -specific questions. The process for preparing the structured questionnaire and launching the survey included the following steps:

First of all, an initial draft of the questionnaires was consulted with the Commission, the Member States and other relevant stakeholders. After finalisation, the structured questionnaire was uploaded into EU Survey online tool. Stakeholders were contacted based on a pre-agreed list and were invited to participate in the study by filling in the questionnaire.

The surveys were launched in November 2019 and remained open until January 2020. Following closure of the surveys, the replies were gathered and consolidated into three separate standalone documents.

3.3. Interviews

For this study, the contractor conducted a total of 72 interviews, out of which 22 are with representatives of the EU institutions, bodies, organisations and agencies.

As a follow-up to the questionnaire replies received, the contractor conducted 31 interviews with representatives of the Member States, 9 interviews with legal professional organisations and 10 with private companies. For each interview, the contractor prepared an interview report validated by the interviewee(s).

The results of the interviews, the desk research results, questionnaire replies and outputs to stakeholder consultations served as input for preparing the present report.

4. LITERATURE REVIEW ON THE USE OF INNOVATIVE TECHNOLOGIES IN THE JUSTICE FIELD

For this study, the contractor **reviewed a total of 117 references**⁴¹ and categorised them as being of high-, medium- or low-level relevance to its scope, as described in Section 3.1 above. This section presents an analysis of the various sources identified as of high relevance.

4.1. State of play of the EU and national policy framework on AI

Digital transformation, deployment of innovative technologies and big data have been key points on the EU agenda in recent years. Understanding the importance of being present and competing on the global scene with other actors who are advanced in their use of innovative technologies, the EU recognised in its **White Paper on Artificial Intelligence (AI)**⁴² the need to step up the actions at multiple levels with the aim of building an ecosystem of excellence that can support the development and uptake of AI across the EU economy and public administrations. In recent years, a number of actions have been undertaken and will continue to be undertaken by different actors at European and national level towards the transition to a sustainable data-centric economy which guarantees reliable, safe and trustworthy products and services in the digital market.

As evident as it may be that innovative technologies bring numerous benefits and efficiencies to business processes across different sectors, their complex and sophisticated nature, positioned in a legal and ethical context, is not always obvious to fully comprehend and may pose a number of questions with regard to their regulation. In order to ensure that innovative technologies are ethically and legally compliant and their use does not infringe fundamental rights and freedoms, as stipulated in the Charter of Fundamental Rights of the European Union⁴³ and in the Convention for the Protection of Human Rights and Fundamental Freedoms⁴⁴ (the ECHR), a number of strategic legislative and policy documents, focusing on AI and big data, have been delivered at EU and Member States level and significant academic work has been prepared to analyse the problematics and propose potential solutions to the decision-makers.

According to Art. 2 of the Treaty of the European Union (TEU)⁴⁵ *'The Union is founded on the values of respect for human dignity, freedom, democracy, equality, the rule of law and respect for human rights, including the rights of persons belonging to minorities. These values are common to the Member States in a society in which pluralism, non-discrimination, tolerance, justice, solidarity and equality between women and men prevail.'* The use of innovative technologies must therefore respect the common values of the EU, as stated in Art. 2 TEU and abide by the principle of effective legal protection laid down in Art. 19(1) TEU.

With the development of technology, digitalisation of products and services and vast amounts of personal data that companies process through their activities, these data have inevitably become an invaluable asset which deserves solid and regulated protection. In this context, the EU adopted the legislative package on personal data protection, in particular the General Data Protection Regulation (GDPR)⁴⁶, which has is applicable since

⁴¹ See Annex I – List of References.

⁴² European Commission White Paper on Artificial Intelligence – A European approach to excellence and trust, COM(2020), Brussels, 19.2.2020. (Annex I, ref. No 15)

⁴³ Charter of Fundamental Rights of the European Union (CFR) [2012], OJ C 326/391, Title III and VI. Annex I, ref. No 2)

⁴⁴ Council of Europe, European Convention for the Protection of Human Rights and Fundamental Freedoms, as amended by Protocols Nos. 11 and 14, 4 November 1950, ETS 5.

⁴⁵ Consolidated Version of the Treaty on European Union (TEU) [2012], OJ C 326/13. Annex I, ref. No 1)

⁴⁶ Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 [2019], OJ L 119/1 (See Annex I, Ref. No. 3).

25 May 2018, the Law Enforcement Directive⁴⁷, the Regulation on protection of natural persons with regard to the processing of personal data by the Union institutions, bodies, offices and agencies and on the free movement of such data⁴⁸, and the Commission Implementing Decision on the adequacy of the protection provided by the EU-U.S. Privacy Shield⁴⁹.

In April 2018, the European Commission delivered its **Strategy 'Artificial Intelligence for Europe'**⁵⁰ which highlights the importance of AI for Europe and describes the steps taken towards making Europe highly advanced in AI. The Strategy aims to stimulate investments under the corresponding research and innovation framework programmes, advocates the need for data availability for training and the notion of 'no one to be left behind' in the digital transformation, including AI, where all potential users, especially small and medium enterprises (SMEs), non-tech companies and public administrations, will have facilitated access to AI services and products and will have opportunities to be trained to make use of them.

Further to the Strategy on 'Artificial Intelligence for Europe', in December 2018, the Commission adopted the **Coordinated Plan on Artificial Intelligence**⁵¹ which reflects the importance of coordinated actions at European level between the Commission and the Member States to ensure the success of the Strategy. The plan sets out the main objectives, such as common efforts of the Member States (e.g. in adopting national strategies); fostering public-private partnerships (PPPs) and providing financing for start-ups and innovation enterprises; promoting best practice and expertise exchange; building up the European data space; and better understanding of the AI security aspects. The setting up of a common European data space is further elaborated in the **Communication of the Commission 'Towards a common European data space'**⁵² which discusses the socio-economic benefits of data-driven innovation, from which new technologies such as AI and the Internet of Things (IoT) are benefiting enormously. Three key areas have been identified: (1) citizens' secure access to and sharing of health data; (2) better data to promote research, disease prevention and personalised healthcare; and (3) digital tools for citizen empowerment and for person-centred care.

Following the Strategy 'AI for Europe', a number of Member States have adopted national strategies on the use of innovative technologies, some of which focus particularly on the use of AI. An overview of these strategies is provided in Section 6.2 of this report.

Innovation takes place at a fast pace, impacting all aspects of people's lives. This inevitably triggers opportunities to test and apply innovative technologies like AI and blockchain/DLT across different business domains. One such domain of application is the justice field, which is the scope of the present study. In the 2019-2023 e-Justice Action Plan⁵³, AI has been identified as one of the major developments in information and communication technologies in recent years, which should be further explored and developed. The Action Plan points out that the implications of AI in the field of e-Justice need to be further defined.

⁴⁷ Directive (EU) 2016/680 of the European Parliament and of the Council of 27 April 2016 [2016], OJ L 119/89 (See Annex I, Ref. No. 4).

⁴⁸ Regulation (EU) 2018/1725 of the European Parliament and of the Council of 23 October 2018 [2018], OJ L 295/39 on the protection of natural persons with regard to the processing of personal data by the Union institutions, bodies, offices and agencies and on the free movement of such data (See: Annex I, Ref. no.5)

⁴⁹ Commission Implementing Decision (EU) 2016/1250 of 12 July 2016 pursuant to Directive 95/46/EC of the European Parliament and of the Council on the adequacy of the protection provided by the EU-U.S. Privacy Shield (see Annex I, Ref. No. 6).

⁵⁰ Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions, 'Artificial Intelligence for Europe', 25 April 2018, COM(2018) 237 final (see Annex I, Ref. No. 12).

⁵¹ Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions, 'Coordinated Plan on Artificial Intelligence', 7 December 2018, COM(2018) 795 final (see. Annex I, Ref. No. 13).

⁵² Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions, 'Towards a common European data space', 25 April 2018, COM(2018) 232 final (see Annex I, Ref. No. 14).

⁵³ 2019-2023 Action Plan European e-Justice, OJ 2019/C 96/05.

What is common understanding, however, for all fields, where AI is applied, is that its use needs to be ethical.

In June 2018, with the objective to support the implementation of the Strategy 'AI for Europe', the Commission set up the High-Level Expert Group on AI (AI HLEG)⁵⁴ comprising representatives from academia, civil society organisations and industry. In the first year of its establishment, the AI HLEG issued the **Ethics Guidelines for Trustworthy AI paper**⁵⁵ which discusses the ethical principles and their correlated values that must be respected in the development, deployment and use of AI systems. A number of guidelines are derived from this framework. The paper highlights that trustworthy AI can be achieved by taking into consideration **seven key requirements that AI systems should meet**, in particular: (1) human agency and oversight, (2) technical robustness and safety, (3) privacy and data governance, (4) transparency, (5) diversity, non-discrimination and fairness, (6) environmental and societal well-being and (7) accountability. These requirements for trustworthy AI are also highlighted in the Communication of the Commission **Building Trust in Human-Centric Artificial Intelligence**⁵⁶.

As a result of several empirical studies and activities, the Organisation for Economic Cooperation and Development (OECD) came up with a **Recommendation on AI**⁵⁷. More specifically, it reflects and includes the 'conducted analytical and measurement work that provides an overview of the AI technical landscape, maps economic and social impacts of AI technologies and their applications, identifies major policy considerations, and describes AI initiatives from governments and other stakeholders at national and international levels'. The recommendation identifies five complementary values-based principles for the responsible stewardship of trustworthy AI:

- inclusive growth, sustainable development and well-being;
- human-centred values and fairness;
- transparency and explainability;
- robustness, security and safety;
- accountability.

The Council of Europe (CoE) and the EU share the same fundamental values – human rights, democracy and the rule of law, thus performing complementary roles in their preservation. The Member States of the CoE have committed themselves to ensuring the rights and freedoms enshrined in the ECHR. In this sense, the CoE underlines that any design, development and ongoing deployment of algorithmic systems occur in compliance with human rights and fundamental freedoms.

In this context, in December 2018 the European Commission for the Efficiency of Justice of the Council of Europe (CEPEJ) adopted the **European Ethical Charter on the Use of Artificial Intelligence in Judicial Systems and their environment**⁵⁸. The Ethical Charter is a fundamental paper for the use of AI in the justice field, as it sets the ethical principles which the use of AI in the judicial systems should abide by and reflects on the approach to be undertaken when deploying certain **categories of uses**⁵⁹ of AI tools. According to CEPEJ, the core principles to be respected in the processing of judicial decisions and data by algorithms:

⁵⁴ <https://ec.europa.eu/digital-single-market/en/high-level-expert-group-artificial-intelligence>

⁵⁵ High-Level Expert Group on AI (AI HLEG), 'Ethics Guidelines for Trustworthy AI', 8 April 2019 (see Annex I, Ref. No .9).

⁵⁶ Communication from the Commission to the European Parliament, the Council, the European Economic and social Committee and the Committee of the regions, 'Building Trust in Human-Centric Artificial Intelligence', 8 April 2019, COM(2019) 168 final (see Annex I, Ref. No. 11).

⁵⁷ OECD, Recommendation of the Council on Artificial Intelligence, OECD/LEGAL/0449 (see Annex I, Ref. No. 10).

⁵⁸ CEPEJ, 'European Ethical Charter on the Use of Artificial Intelligence in Judicial Systems and their environment', adopted at the 31st plenary meeting of the CEPEJ (Strasbourg, 3-4 December 2018).

⁵⁹ Advanced case-law search engines; Online Dispute Resolution (ODR); assistance in drafting deeds; analysis (predictive, scales); categorisation of contracts according to different criteria and detection of divergent or incompatible contractual clauses; and chatbots to inform litigants or support them in their legal proceedings.

- Principle of respect of fundamental rights: ensuring that the design and implementation of artificial intelligence tools and services are compatible with fundamental rights;
- Principle of non-discrimination: specifically preventing the development or intensification of any discrimination between individuals or groups of individuals;
- Principle of quality and security: with regard to the processing of judicial decisions and data, using certified sources and intangible data with models conceived in a multidisciplinary manner, in a secure technological environment;
- Principle of transparency, impartiality and fairness: making data processing methods accessible and understandable, authorising external audits;
- Principle 'under user control': precluding a prescriptive approach and ensuring that users are informed actors and in control of their choices.

It is important to highlight that the Ethical Charter encourages certain uses such as case-law enhancement, access to law (through chatbots using natural language) and the creation of new strategic tools (with the involvement of legal professionals to own these tools and analyse their results). However, other uses require a more cautious approach, like, for example, Online Dispute Resolution (ODR), where the applicant should be informed whether their matter is handled in a fully automated way or involves a mediator in order to make an informed choice. The Charter also argues that some uses could be considered after further scientific research, such as judge profiling and anticipating court decisions. Finally, it points out that uses like individual profiling in criminal matters and quantity-based norms need to be considered with extreme reservation.

On 8 April 2020, the Committee of Ministers of the CoE adopted **Recommendations**⁶⁰ on human rights impacts of algorithmic systems. The CoE recommends, among others:

- revisions by its Member States, of their legislative frameworks, policies and practices with respect to the procurement, design, development and ongoing deployment of algorithmic systems;
- setting up legislative, regulatory and supervisory mechanisms to ensure compliance of the private sector with the applicable laws;
- ensuring enforcement of the applicable laws and regulations, by providing the competent authorities with sufficient authority and resources to investigate, coordinate and oversee compliance;
- engaging in dialogue with all relevant stakeholders;
- focusing on building expertise and engaging individuals in digital literacy education to enable better understanding of algorithmic systems.

The CoE also includes Guidelines on addressing the human rights impacts of algorithmic systems⁶¹ to enable Member States to fulfil their obligations in this regard.

The Guidelines encourage these general principles:

- the **transparency, accountability and inclusiveness** in the processes of drafting, enacting and evaluating policies and legislation or regulation applicable to the design, development and ongoing deployment of algorithmic systems;
- the continuous and regular **human right impact assessments** throughout the entire lifecycle of an algorithmic system;
- **awareness-raising** to ensure the full exercise of human rights and democratic freedoms of the general public and the understanding of the capacity, power and consequential impacts of algorithmic systems;

⁶⁰ Committee of Ministers, Recommendation CM/Rec(2020)1 of the Committee of Ministers to Member States on the human rights impacts of algorithmic systems, Council of Europe, Brussels, 8 April 2020.

⁶¹ Appendix to Recommendation CM/Rec(2020)1.

- identification and/or development of appropriate **institutional and regulatory frameworks and standards**.

The Guidelines go further in providing guidance on specific obligations related to data management, analysis and modelling, transparency, accountability and effective remedies, precautionary measures, research, innovation and public awareness.

In addition to the Member States' obligations, the Guidelines also specify the responsibilities of the private sector with respect to human rights and fundamental freedoms. As an example, regarding data management, the Member States should ensure **informational and data control paths** that allow individuals to be informed about data processing by algorithmic systems and control their data, including through interoperability. They should carefully **assess the datasets and the inherent risks of bias**, and take action to prevent or minimise adverse effects. Last but not least, they should facilitate the development of alternative, safe and secure **infrastructures**. The private sector should ensure that **consent rules** are in place and that individuals affected by their algorithmic system can revoke their consent regarding the use of their data. **Privacy settings** should be presented in a visible, neutral and intelligent manner.

4.2. Key points of discussion in the literature and recommendations for a way forward

In light of the above, and in addition to the horizontal framework which discusses ethical implications and value-based principles for responsible and trustworthy technology, scholars and organisations are also debating on various legal and ethical aspects. These aspects include providing safeguards for fundamental rights and freedoms, such as respect for private life, personal data protection, fair trial, good administration and non-discrimination. Some important papers have been prepared analysing the impact of AI on these rights and debating on whether the existing legal framework is sufficiently adapted and appropriate to address potential issues, and whether it is flexible enough to respond to the complexity and the pace of development of technology.

In the context of this study, the contractor analysed a number of studies, papers and articles⁶² written in recent years, in order to provide a comprehensive picture of the key points of discussion, concerns and proposed future actions, that are being put forward by organisations and academia, on the use and application of AI and blockchain/DLT technology in the justice field.

These key points could be grouped in the following categories:

- GDPR-related issues concerning innovative technologies
- Uses of AI and blockchain/DLT and fundamental rights implications
- Potential uses of innovative technologies and how AI and blockchain/DLT could improve the work of professionals
- Innovative technologies and legal liability/accountability

The reviewed literature reflects on possible 'improvement' of the legal, ethical and regulatory framework to ensure design, development and deployment of explainable, reliable, fair and trustworthy innovative technologies. Where the authors draw conclusions for a way forward to address potential concerns, these conclusions are described at the end of each category.

⁶² See Annex I – List of references.

- **GDPR-related issues concerning innovative technologies**

The right to protection of personal data is a fundamental right of the individual⁶³. With the deployment of innovative technologies which process personal data, either to train their algorithms or otherwise, the question arises of how adapted the GDPR is to provide safeguards for the data subjects' rights, whose data are processed by such technologies. The GDPR sets out important rules on automated individual decision-making, including profiling,⁶⁴ stipulating that *'The data subject shall have the right not to be subject to a decision based solely on automated processing, including profiling, which produces legal effects concerning him or her or similarly significantly affects him or her'*⁶⁵. Although the same Article 22 provides derogations to this general rule in its second paragraph, it also stipulates that a decision which fulfils the requirements of Article 22(2) of the GDPR should *'not be based on special categories of personal data referred to in Article 9(1), unless point (a)⁶⁶ or (g)⁶⁷ of Article 9(2) applies and suitable measures to safeguard the data subject's rights and freedoms and legitimate interests are in place'*.

According to the GDPR, 'profiling'⁶⁸ always refers to automated processing of personal data and is done to analyse or predict the natural person's behaviour, personal preferences, interests, health, economic situation, location, movements, or performance at work. The GDPR allows profiling subject to conditions, as mentioned in the previous paragraph, however, it also guarantees a number of rights to the data subject, in this regard, such as, among others, the right to rectification of their personal data⁶⁹, right to erasure (also called 'right to be forgotten (RTBF)')⁷⁰; the right to object⁷¹, etc.

Some argue that the GDPR is not 'flexible' and fit enough to accommodate and address all complexities and challenges of the technological development. As an example, some authors opine that there are gaps when it comes to clear and comprehensive definitions of what data erasure techniques and methods would fulfil the legal requirements⁷².

Other authors are of the opinion that the GDPR is a modern example of a technology neutral framework,⁷³ whose meaning and relevance changes with the progress of technology. In this sense, the previous claims do not take into account the power of technology-neutral legislation and the power of general laws to be concretised by evolving application practice and jurisprudence.

One of the major discussion points in the literature is whether algorithms discriminate against certain individuals or groups of individuals, because their dataset is constituted on the basis of special categories of personal data, as defined in Article 9 of the GDPR. Most commonly encountered in the literature are analyses of such threats presenting themselves in the areas of criminal justice and the related field of law enforcement, with the so called 'predictive justice' and 'predictive policing' tools. Other articles discuss challenges that innovative technologies are facing with regard to GDPR. For example, these are challenges

⁶³ Article 8 of the Charter of Fundamental Rights of the European Union.

⁶⁴ Article 22 of the GDPR.

⁶⁵ Article 22(1) of the GDPR.

⁶⁶ The data subject has given explicit consent to the processing of those personal data for one or more specified purposes, except where Union or Member State law provide that the prohibition referred to in paragraph 1 may not be lifted by the data subject.

⁶⁷ The processing is necessary for reasons of substantial public interest, on the basis of Union or Member State law which shall be proportionate to the aim pursued, respect the essence of the right to data protection and provide for suitable and specific measures to safeguard the fundamental rights and the interests of the data subject.

⁶⁸ See definition of profiling in Article 4(4) of the GDPR.

⁶⁹ Article 16 of the GDPR.

⁷⁰ Article 17 of the GDPR.

⁷¹ Article 21 of the GDPR.

⁷² See E. F. Villaronga, P. Kieseberg, and T. Li, *'Humans forget, machines remember: Artificial intelligence and the Right to Be Forgotten'*, Computer Law & Security Review, vol. 34, no. 2, pp. 304–313, Apr. 2018 (see: Annex I, Ref. No. 31).

⁷³ See P. Nemitz, *'Constitutional democracy and technology in the age of artificial intelligence'*, vol. 376, Royal Society Publishing, 2018.

concerning the use of blockchain/DLT⁷⁴. In particular, (1) in a blockchain network, a transaction is not only distributed between those involved in it but, due to the mechanics of a blockchain, to all nodes; (2) the period of time in which this data is being processed is not defined, so it will not be deleted after a preset time period; (3) the right to rectification cannot be invoked either since transactions cannot be changed after they have been transmitted. Although these challenges could be overcome, e.g. by 'hashing'⁷⁵, this would not change the nature of the hashed data, which would remain private, since 'hashing' is considered a pseudonymisation technique in light of the GDPR. Regardless of the issues raised, an argument is put forward that in order not to stifle innovation throughout the European Union, a compromise is needed where the legal certainty of data protection in the Union is reconciled with the desired promotion of innovation, and thus also alternative effective means of data protection⁷⁶. This could be achieved through legal interpretation techniques and technological solutions can facilitate at least a partial reconciliation of these (apparently) conflicting rationales.

National regulatory bodies have provided recommendations to overcome the challenges posed by the GDPR in front of AI and blockchain/DLT. According to the UK's Information Commissioner's Office (ICO)⁷⁷ the main GDPR challenge for AI is 'fairness'⁷⁸. The ICO outlines five tendencies: the use of algorithms, the opacity of processing, the tendency to collect 'all the data', the repurposing of data, and the use of new types of data. The ICO's analysis covers concepts such as: fairness; conditions for processing personal data (consent and legitimate interests); purpose limitation; data minimisation; accuracy; accountability and governance. For instance, regarding the principle of 'purpose limitation' under the GDPR, in the ICO's opinion, assessing the compatibility of data 'repurposing' should be based on the fairness of the new purpose. Some academics⁷⁹ are of a different opinion, arguing that this creates uncertainty, as the concept of fairness is rather vague, despite certain guarantees of the data subject's rights in this regard.

According to the ICO, apart from using existing compliance tools and techniques under the GDPR such as data protection impact assessments (DPIAs), anonymisation, privacy notices, and privacy by design and certifications, some ethical approaches and algorithmic transparency, which are not covered by the GDPR, should be applied. For instance, when assessing fairness, organisations should define the benefits of the analytics, use the least risky approach, and respect the interests of stakeholders during processing.

The French CNIL (*Commission nationale de l'informatique et des libertés*)⁸⁰ presents specific solutions to actors who wish to use blockchain technology in the context of personal data processing⁸¹. CNIL provides the conditions under which blockchain network participants can and should be considered as data controllers (or not). It also puts forward recommendations on how to minimise the compliance risk when based on a blockchain and on key measures to ensure security and data integrity on the blockchain.

Other suggestions for the way forward in the literature are:

⁷⁴ See D. Schmelz, G. Fischer, P. Niemeier, L. Zhu, T. Grechenig, 'Towards Using Public Blockchain in Information-Centric Networks: Challenges Imposed by the European Union's General Data Protection Regulation', Proceedings of 2018 1st IEEE International Conference on Hot Information-Centric Networking (HotICN 2018): Aug 15-17, Institute of Electrical and Electronics Engineers. Beijing Section, Beijing da xue. Shenzhen Graduate School and Institute of Electrical and Electronics Engineers, Shenzhen, Guangdong, China, 2018 (See: Annex I, Ref. No. 90); as well as M. Planck, 'Michèle Finck: Blockchains and Data Protection in the EU' (See: Annex I, Ref. No. 85).

⁷⁵ 'Hashing' is the function that produces a result from two inputs, usually, the information at hand, and a cryptographic key or similar. The result can identify the authenticity of the information at hand. Hashing is used to prove the authenticity of data and see if they have been tampered with.

⁷⁶ M. Planck, 'Michèle Finck: Blockchains and Data Protection in the EU'. (See Annex I, Ref. No. 85).

⁷⁷ <https://ico.org.uk/>

⁷⁸ M. Butterworth, 'The ICO and artificial intelligence: The role of fairness in the GDPR framework', Computer Law Security Review, vol. 34, no. 2, pp. 257–268, Apr. 2018. (See: Annex I, Ref. No. 37).

⁷⁹ Ibid

⁸⁰ <https://www.cnil.fr/>

⁸¹ See CNIL, 'Premiers éléments d'analyse de la CNIL BLOCKCHAIN', 2018. (See: Annex I, Ref. No. 86).

- Submitting amendments to the EU data protection framework to make it less ambiguous when it comes to the technical side of the information systems (e.g. with regard to deletion of personal data).
- Implementation of appropriate data protection safeguards by regulators.
- Ensuring by regulators that data sovereignty considerations are incorporated into the software from the onset.
- **Uses of AI and blockchain/DLT and fundamental rights implications**

The main discussion in this category focuses on uses of AI and blockchain/DLT, e.g. for predictive justice and predictive policing, which could have an impact on the individual's fundamental rights, freedoms and legitimate interests. In particular, the papers reviewed discuss the question of automated decision-making and data-driven bias, which may occur when an intelligent system's algorithms are trained or later on in time as a result of the 'ability' of the tool to learn and improve.

In September 2018, CEPEJ produced a paper called '**AI in service of the judiciary**'⁸² which is specifically dedicated to 'predictive justice'. It explores the French experience with predictive justice tools like the Jurinet and Jurica case law databases, administered by the French Supreme Court, and with LegalTechs offering AI services in the justice field in France. The paper finds that the predictive justice tools proposed to date are more or less only limited to the analysis of compensation damages litigations. For the remaining types of litigation cases, in the case law and elsewhere, a statistical approach is preferred. The technological break that would constitute an automated semantic analysis of court decisions capable of restoring its sense and logical articulation has not yet occurred. Moreover, the paper discusses the issues related to the development of predictive justice at the centre of the decision-making process. It states that an efficient tool for predictive justice needs to allow the objectification of concrete case law - understood as the trend emerging from decisions rendered in a given field and / or jurisdiction. The open data of court decisions will give visibility to all the decisions rendered by the courts which will then be processed and used by a plurality of public and private actors with all the capacities offered by data mining. The paper outlines two major effects on justice following this process. First - redistribution or readjustment of the roles of the Supreme Court and the lower courts in the creation of 'vertical' and 'horizontal' case law respectively, and second - a tendency by the judge to harmonise his/her jurisprudence with the jurisprudence of his/her peers based on the predictive justice tool. On the other hand, according to the paper, certain risks are also inherent to the use of predictive tools, the most commonly identified of them being the risk of "performativity". In other words, the judge would make a decision not by exercising his own assessment of the dispute but because the tool gives him back what his peers would mostly do in such a situation. Thus, atypical decisions that normally have a reserved place in case law may not have one anymore. Other risks include the excess of predictability of the decisions and the subversion of quality by quantity. In the first case, although a certain degree of predictability is mandatory, sometimes the objective of the law is to dissuade, especially in fields governed by a strong public order, such as criminal law or tax law. In the second case, the risk of subversion of quality by quantity may occur, if the "horizontal" case law, which is not based on the recurrence of decisions superseding the "vertical" case law, is a result of a detailed analysis of the rules in place. In order to face these technology-related risks, it is essential to preserve the safeguards residing in the fundamental principles which must govern any juridical process. In particular, the balance between harmonisation logic and individualisation logic should be preserved. In addition, predictive justice, which does originate from the analysis of the rule of law but from the recurrence of its application, must be compared with the other data of the dispute and subjected to a contradictory analysis inherent to the judicial process. Last but not least, an atypical decision should be argued by combining a

⁸² CEPEJ, '*L'intelligence artificielle au service du pouvoir judiciaire*', 26 September 2018, Round Table (See : Annex I, Ref. No. 8).

traditional legal motivation and an explanation of the deviation from the average of the decisions rendered in a similar context

One of the most discussed uses of intelligent tools is the automation of some tasks carried out by judges. One of the main arguments against such use cases is that a machine should not be left to 'autonomously decide', thus excluding the human factor. A paper called **Algorithmic justice: Algorithms and big data in criminal justice settings**⁸³ analyses the usage of big data and artificial intelligence in the justice system in order to fight crime, improve predictions in various processes in the judicial proceedings such as bail amount calculation, recidivism risks and others. A number of examples are provided where the results of an assessment made by an intelligent system are biased and not objective. The article puts forward the view that algorithms and their improvement are not the solution to a better judicial system since society itself is biased. The importance to educate judicial authorities in understanding how best to use the intelligent algorithms is also underlined.

However, another study examines some extraneous factors that might 'influence' human discretion when rendering judgments, therefore challenging the view that judges only apply legal reasons to a case in a rational way. A paper called **'Extraneous factors in judicial decisions'**⁸⁴ argues that repeated rulings deplete individuals' executive and mental function, which can have impact on judges' decisions. The article continues with an analysis of the judges' daily routine: number of rulings (14-35 cases per day), breaks taken during the day, etc. The study shows that 64,2% of the sample of parole requests were rejected and that the probability of a favourable ruling for cases of similar legal characteristics increases when the decision is taken at the beginning of the session after the break. Moreover, it hints that the mental exhaustion of the judges is linked more to the act of making decisions than to the duration of the deliberations, as the study also demonstrates that a favourable ruling takes longer than a parole rejection in this case. Thus, cases being ruled later in each session tend to be unfavourable.

In recent years, a number of tools for assessing recidivism risk in criminal cases⁸⁵ have been used by judicial officers in the United States to decide on sentence duration or parole, thus raising the question whether criminal procedures could be partially or fully automated in the United States by relying solely on the machine or data-driven assessment⁸⁶. Although experts use these tools on the request of a judge, they acknowledge their shortcomings and therefore render their expertise with the caveat that human behaviour cannot be scientifically predicted. Concerns are raised in terms of the predictive instruments not assessing information about the individual, but based on group characteristics, thus contradicting the principle of individualised justice. Moreover, they may not be able to differentiate between the severity of offences that might be committed, for example, they do not distinguish between grievous bodily harm and assault occasioning actual bodily harm. Another impediment to the exercise of the right to fair trial is that the algorithmic assessments are protected by intellectual property and therefore remain largely uncontested. This deprives the individual of the opportunity to question the weighing mechanisms applied⁸⁷.

⁸³ Aleš Završnik, 'Algorithmic justice: Algorithms and big data in criminal justice settings'. November 2019 CER.EU European Journal of Criminology 1–20. (See: Annex I, Ref. No. 53).

⁸⁴ Shai Danziger, Jonathan Levav and Liora Avnaim-Pesso, 'Extraneous factors in judicial decisions,' Proc. Natl. Acad. Sci. U. S. A., vol. 108, no. 17, pp. 6889–6892, Apr. 2011 (see: Annex I, Ref. No. 39).

⁸⁵ Examples of such tools are STATIC Risk Factors Actuarial Assessment – Sex Offending (STATIC-99R) for predicting sexual recidivism, Risk of Sexual Violence Protocol RSVP, and Correctional Offender Management Profiling for Alternative Sanctions (COMPAS).

⁸⁶ See Carolyn McKay, 'Predicting risk in criminal procedure: actuarial tools, algorithms, AI and judicial decision-making', The University of Sydney Law School, November 2019. (See: Annex I, Ref. No. 55)

⁸⁷ The article illustrates the bias and the proprietary protection challenges with the US case of *State of Wisconsin v Loomis* 881 N.W.2d 749 (Wis. 2016), where the Correctional Offender Management Profiling for Alternative Sanctions (COMPAS) was used in sentencing procedure.

A solution to improve protection of the defendant's rights is proposed in an analysis⁸⁸ of the interaction between AI and criminal law from the perspective of using AI for law enforcement, specifically for gathering evidence in criminal proceedings. The paper⁸⁹ discusses the question of whether the use of AI applications affects the principle of legality in criminal law and how it interferes with human rights and fundamental freedoms, such as the right to respect private life and family⁹⁰ and the right to a fair trial⁹¹. The thesis put forward in the paper is that AI systems, which will increasingly be used to generate evidence in criminal proceedings, may entail concerns related to transparency, group profiling, loss of confidentiality and more. In this regard, the authors suggest that the guarantee set up in Article 8 ECHR and in Article 6 ECHR should be shifted to Article 6 alone. For instance, it is argued that protecting the 'home' from investigative intrusions through rules and limitations safeguarding the right to privacy (Article 8) is no longer sufficient in the context of the duplicated digital identity that individuals create through technologies in their homes. These rules are no longer effective vis-à-vis the use of AI techniques for evidence gathering (e.g. machine learning), since such use does not necessarily constitute a breach of Article 8(1) ECHR, especially if it is considered a different method for phone-tapping which is consistent with the requirement of 'provision by law'. However, the use of a 'non-validated' AI system⁹² can in some situations amount to a violation of Article 8 ECHR. In any case, the argument is that proving a violation of Article 8 should no longer constitute a necessary condition for assessing a trial's fairness. Article 6(1) of ECHR ensures the right to fair trial. However, the reliability of data gathered and processed in an automated manner cannot be challenged in a 'traditional' way, as the algorithm is hidden and the individual cannot build their defence without having access to it. The use of AI cutting-edge technologies, potentially implies a breach of Article 6(1) ECHR since there is no 'fair balance' between the parties, when the use of AI systems based on neural networks and algorithmic processes prevents one party from having any recourse to any transparency solutions. Therefore, the paper proposes that **an individual, against whom evidence is gathered and processed by using AI techniques, may claim a violation of the right to fair trial under Article 6(1) ECHR, regardless of the eventual unlawfulness of the interference with private life under Article 8.**

Some studies raise, among others, the issue related to the quality of the training data and its significance on the assessment result. In other words, the argument put forward is that the lower the quality of the data, the higher the likelihood of biased results.

A study on facial recognition technology (FRT) by the European Union Agency for Fundamental Rights (FRA)⁹³ examines the factors that may influence the quality of facial images which are used as training data for the FRT for identification purposes. These factors may be background and object occlusion, illumination and light reflection, ergonomics, age, ageing, gender, skin colour and skin conditions. The paper highlights the importance of: knowing which datasets were used to build the FTR; having high quality training data; and checking the quality of the reference data in the watch lists to ensure respect of fundamental rights and avoid discrimination. Apart from the technical aspects, an important factor for deployment of FRT in a specific jurisdiction is the existence of a legal basis for such deployment, which is currently not the case in all Member States⁹⁴.

In a similar light are two other studies by the FRA. The first one⁹⁵ emphasises that data analysis relying on big data does not necessarily mean high-quality data and unbiased results. The quality depends on the medium or the source the data are collected from. For

⁸⁸ U. Pagallo and S. Quattrocchio, 'Research Handbook on the law of Artificial Intelligence', Woodrow Barfield and Ugo Pagallo. Edwar Elgar Publishing Limited 2018. (See: Annex I, Ref. No. 52).

⁸⁹ *Ibid*

⁹⁰ Art. 8, ECHR.

⁹¹ Art. 6, ECHR.

⁹² This is a system whose results are not validated by a human.

⁹³ F. – European Union Agency for Fundamental Rights (FRA), 'Facial recognition technology: fundamental rights considerations in the context of law enforcement', 2019 (See: Annex I, Ref. No. 44).

⁹⁴ According to the study, there is no legal basis in France and Germany currently.

⁹⁵ F. – European Union Agency for Fundamental Rights, 'Data quality and artificial intelligence-mitigating bias and error to protect fundamental rights'. (See: Annex I, Ref. No. 45).

example, data gathered from the internet or social media should not be representative as these sources are not accessed by everyone (e.g. households with low income or elderly population), therefore they are likely to lead to results that do not take into account all individual groups, and are therefore biased. As such, low-quality data could affect the fundamental right of access to a fair trial. In addition, the notion of data quality raises a number of questions related to the completeness, the consistency, the accuracy, the validity, the reliability, the duplication and the provenance of the data. For instance, FRA's study points out that the large data quantity does not necessarily ensure a high level of accuracy. On the contrary, for statistical accuracy, data quantity should always be analysed alongside data quality. In this regard, the paper explains the concepts of 'measurement error' and 'representation error'. The measurement error demonstrates the level of accuracy with which the data used indicate or reflect what is intended to be measured. The representation error shows how well the population is represented in the data – i.e. if the data do not cover well the population, the resulting statistics are likely to be incorrect and biased. In the absence of agreed standards for data quality assessments for machine learning applications at the moment, FRA proposes a number of guiding questions, the answers to which may help identify if there are potential fundamental rights problems with the use of an algorithm due to data quality. To do so, one should determine the provenance of the data, the person responsible for data collection, maintenance and dissemination, the information included in the data and if this information is appropriate for the purpose of the algorithm, the information missing, the individuals represented and under-represented in the dataset, the time frame and geographical coverage of the data collection used for building the application.

The second study⁹⁶ raises problems with the use of data and algorithms in facilitating decisions, and emphasises how low quality, poorly selected and incomplete data can lead to questionable decisions and discrimination. In this context, the paper explores a study on algorithms, that investigated how a risk assessment tool - Correctional Offender Management Profiling for alternative Sanction – COMPAS was racially biased. The tool was used in the the US criminal justice system, in Florida, New York and other jurisdictions. Based on the experience, its algorithms were deemed racially-biased⁹⁷. Finally, the article debates how correcting the algorithm would avoid discrimination in the dataset. Even though it mentions how in some EU Member States e.g. the collection on data on ethnicity is forbidden 'potential bias or discrimination cannot be easily solved by simply excluding information on protected groups'.⁹⁸

An important observation is made in the literature that for some violent recidivism risk assessment tools no sufficient literature exists on their discriminatory results⁹⁹. An exception is COMPAS, which is widely used in the United States, as mentioned in the previous paragraph¹⁰⁰.

The Police and Human Rights Programme (PHRP) Expert Meeting on Predictive Policing¹⁰¹ argues that special care should be given to the data quality of the training set. It should form a pool with the same distribution as the world on which the model is applied. Relying on the police's previous approach and priorities often results in structural bias. Finding the reason for this bias could also help when analysing the causes of crime and address them rather than to choose a law enforcement approach. The algorithmic model is the way the system functions. It is based on statistical correlations, some of which are missing a crucial link and lead to irrelevant predictions of crime. Some features might show a statistical correlation to crime, but are ethically not appropriate for inclusion in the

⁹⁶ F.- European agency for Fundamental Rights, 'Big Data: Discrimination in data-supported decision-making' May 2018 (See: Annex I, Ref. No. 46).

⁹⁷ Similar conclusions were stressed in parallel studies: T Brennan and W Dieterich. 2018. Correctional Offender Management Profiles for Alternative Sanctions (COMPAS). Handbook of Recidivism Risk/Needs Assessment Tools (2018), 49, cited in S. Tolan, M. Miron, E. Gómez, and C. Castillo, 'Why Machine Learning May Lead to Unfairness,' 2019, p. 84.

⁹⁸ P.08

⁹⁹ For example, the 'Structured Assessment of violence Risk in Youth – SAVRY'.

¹⁰⁰ See S. Tolan, M. Miron, E. Gómez, and C. Castillo, 'Why Machine Learning May Lead to Unfairness,' 2019, pp. 83–92. (See Annex I, Ref. No. 38).

¹⁰¹ PHRP Expert meeting, 'PHRP Expert meeting on predictive policing', Police and Human Rights Programme (PHRP), Amnesty International, 20 May 2019. (See: Annex I, Ref. No. 42).

algorithm. Self-learning systems have their additional problems: (1) the system does not always reflect the real world but how the system sees the world. (2) A feedback loop. An area where the police patrols more often also exhibits increased likelihood to have crime identified. Challenges of place-oriented predictive policing: (1) the risk that crime is actually only displaced, but not reduced. (2) It is not proven that predictive crime systems decrease the actual crimes committed in an area. (3) It is difficult to test to what extent predictions are accurate. (4) It is difficult to define what is considered a success of predictive policing. There is a concern that even if the computed risk assessment is accompanied by an explanation of how it came to the result, a high-risk score is still likely to impact decision-making, for example by judges. It is common agreement that it is particularly difficult when it comes to the use of algorithms in decision-making, or even to challenge a decision made by an authority based on such algorithms.

Recommendations put forward:

The reviewed literature provides some ideas and recommendations for a way forward to address the concerns related to biased algorithms and challenges in view of guaranteeing the protection of fundamental rights by innovative technologies. To summarise, these would be:

- Creating regulatory bodies to oversee and audit algorithms and thereby ensure transparency, accountability and procedural justice¹⁰².
- Revisiting the question of proprietary protection of algorithms in order to find the right balance with the principle of open procedural justice and allow defendants, courts and the society to test, contest and scrutinise the validity and reliability of predictive formulae¹⁰³.
- Introducing and applying mechanisms for assessment of data quality when training the dataset¹⁰⁴.
- Performing fundamental rights' impact assessments through consultations with the industry¹⁰⁵.
- Setting a clear and sufficiently detailed legal and regulatory framework in view of using FRT applications in real life¹⁰⁶.
- Close monitoring of facial recognition developments by independent supervisory bodies¹⁰⁷.
- Placing of data protection and non-discrimination requirements by public authorities at the centre of all technical specifications when procuring FRT or commissioning innovative research¹⁰⁸.

¹⁰² See Carolyn McKay, 'Predicting risk in criminal procedure: actuarial tools, algorithms, AI and judicial decision-making', The University of Sydney Law School, November 2019. (See: Annex I, Ref. No. 55). The paper also mentions an example in England and Wales, where a National Register of Algorithmic Systems has been recommended (Law Society 2019). It points out that various scholars argue that where private, commercial organisations are involved in essential public functions, their products should be subject to public, democratic disclosure and freedom of information requirements (Carlson 2017; Keats Citron and Pasquale 2014).

¹⁰³ *Ibid.*

¹⁰⁴ F. – European Union Agency for Fundamental Rights, 'Data quality and artificial intelligence-mitigating bias and error to protect fundamental rights'. (See: Annex I, Ref. No. 45).

¹⁰⁵ *Ibid.*

¹⁰⁶ F. – European Union Agency for Fundamental Rights (FRA), 'Facial recognition technology: fundamental rights considerations in the context of law enforcement', 2019. (See: Annex I, Ref. No. 44).

¹⁰⁷ *Ibid.*

¹⁰⁸ *Ibid.*

- **Potential uses of innovative technologies and how AI and blockchain/DLT could improve the work of professionals**

A number of the reviewed articles focus on a description of specific cases using AI or blockchain/DLT, in order to analyse the state of play and to provide suggestions for further action.

An article published by the Ministry of Interior of France elaborates on promising improvements in new technologies for 'predictive policing'¹⁰⁹ in the fields of crime investigation and assuring public safety in France. Based on the analysis, it concludes that human decision-making should be upgraded as a result of AI and should be used to prepare against criminals who also are taking advantage of AI to extend and improve their criminal activities. Concrete applications in the field of crime analysis are to recognise a known criminal in a specific area and send an email on a personal smartphone; to identify geographical and time hotspot areas of crime; to make a profile of a criminal based on big data, etc. Theoretically, AI can be used in three different cases: to model criminal acts; to model behaviour and criminal way of reasoning; and to model behaviour and the investigator's way of reasoning. "The advantage of an AI solution is to train the model using criminological theory and from real case reports. These kind of applications could be realised to build a class model for specific criminals and victims."

Some other potential use cases are in the field of Online Dispute Resolution (ODR) based on AI technology. Some authors conclude that AI technology for ODR is not currently exploited to its full potential and its use remains at a rudimentary level¹¹⁰. However with a hybrid approach in using a combination of rule-based reasoning, case-based reasoning, Machine Learning and other use of AI technology for ODR may be improved.

Some authors even go further to encourage the use of ODR systems for the immediate benefit of self-represented litigants (SRLs). Such systems provide easily accessible and useful advice and help people in finding solution to their dispute. Additionally, they help in educating SRLs and in facilitating communication with the parties in dispute¹¹¹. However, in this category, again the opinion prevails, that ODR **should not be fully automated but should have rather an assisting role.**

A number of papers discuss use cases of blockchain/DLT in criminal law, such as creation of **weighted forensics digital evidence**¹¹², **storage of criminal records**¹¹³ and **requesting and receiving certificate of criminal records**¹¹⁴. An analysis of implementing blockchain technology to the Argentinian criminal records information system points out the benefits of blockchain, notably:

- **Decentralisation** – applied to the criminal record information system, this can potentially put a replicate of the information available to all the participants of the network.

¹⁰⁹Patrick Perrot, Gendarmerie Nationale, Ministry of Interior, Paris, France 'What about AI in criminal intelligence? From predictive policing to AI perspectives', European Police Science and Research Bulletin, vol 16, summer 2017. (See: Annex I, Ref. No. 54).

¹¹⁰ See D. Carneiro, P. Novais, and J. Neves, 'Artificial Intelligence in Online Dispute Resolution' 2014, pp. 61–96. (See: Annex I, Ref. No. 36), and Zeleznikow, John. 'Can Artificial Intelligence and Online Dispute Resolution Enhance Efficiency and Effectiveness in Courts.' International Journal for Court Administration 8 (2). 2017, International Association for Court Administration: 30–45. doi:10.18352/ijca.223 (See: Annex I, Ref. No. 56).

¹¹¹ Zeleznikow, John. 'Can Artificial Intelligence and Online Dispute Resolution Enhance Efficiency and Effectiveness in Courts.' International Journal for Court Administration 8 (2). 2017, International Association for Court Administration: 30–45. doi:10.18352/ijca.223. (See: Annex I, Ref. No. 56).

¹¹² D. Billard, 'Weighted forensics evidence using blockchain,' in ACM International Conference Proceeding Series, 2018 (See: Annex I, Ref. No. 88).

¹¹³ M. A. Tasnim et al., 'CRAB: Blockchain Based Criminal Record Management System', International Conference on Security, Privacy and Anonymity in Computation, Communication and Storage, pp 294-303, 2018. (See: Annex I, Ref. No. 96).

¹¹⁴ Alejandro Tomás Dini et al., 'Analysis of implementing blockchain technology to the Argentinian criminal records information system', 2018 Congreso Argentino de Ciencias de la Informática y Desarrollos de Investigación (CACIDI), 2018. (See: Annex I, Ref. No. 97).

- **Consensus** - all the participants of this system will **automatically agree** that the information stored in the system is correct as they are participating in the validation of the same with the simple action of attaching one node to the network.
 - **Agility** of the new information and almost **immediate time of response**, which could help justice forces to improve investigation times and crime resolution rates.
 - **Data analysis** – the availability of the information could potentially be used to the generation of statistical information to help improve juridical system, justice actions and internal processes.
 - **Automatisation of processes through smart contracts** which could potentially save a huge amount of resources by translating into executable code the rules, triggers and participants needed for each process.
 - **Selective access** – the use of permissioned blockchain could potentially enable international collaboration with other countries by limiting access to the nodes of the blockchain and at the same time expediting the requests of information.
- **Innovative technologies and legal liability/accountability**

The main discussion in this category focuses on the issue of whether or not innovative technologies should be held legally liable for their actions and if so – under what circumstances.

With regard to AI, in 2016 the European Parliament commissioned a study called 'European Civil Law Rules on Robotics'¹¹⁵ to evaluate and analyse, from a legal and ethical perspective, a number of possible future European civil law rules (resolution) in robotics. From legal perspective, the question of civil liability of robots is analysed and several key considerations are put forward. First, civil liability can only be inherent to a robot if it is assigned a 'legal personality'. However, *'creating a new type of person – an electronic person – sends a strong signal which could not only reignite the fear of artificial beings but also call into question Europe's humanist foundations. Assigning person status to a non-living, non-conscious entity would [therefore] be an error'*. Instead, the study proposes to align the notion of liability for damages caused by autonomous robots with the civil liability law. Thus, it explains who should be held liable under civil law rules in different situation of damages caused by a robot. In particular:

- if the robot **is sold with open source software**, the person liable should, in principle, be the one who programmed the application which led to the robot causing damage;
- if the damage that can be traced back to the **robot's design or production** – such as an error in a robot's algorithm causing injurious behaviour – the designer or producer should be held liable. However, the study clarifies that the type of liability may vary depending on whether the victim bought the robot (contractual liability) or is a third party (non-contractual liability). It therefore highlights that such distinguishment between contractual and non-contractual liability is important to be made in a future legal framework.
- if the robot is **still in use** (e.g. in production) **or is learning** (e.g. in pilot stage) when causing the damage, its user or owner should be held liable. In this regard, the solution may vary depending on whether or not the user is a professional, and whether or not they are the victim. For example, any damage linked to a robot's

¹¹⁵ N. Nevejans. Directorate-General for Internal Policies, Policy Department C: Citizens' Rights and Constitutional Affairs, 'European Civil Law Rules in Robotics', October 2016.

instruction by a professional user and inflicted upon a third-party victim could be governed by the new instrument. It would be an entirely different story if the same damage were caused to a victim who was a professional, salaried user, since this would then be considered an accident at work.

A resolution with European Civil Law Rules on Robotics is further analysed in the paper *A Law on Robotics and Artificial Intelligence in the EU?*¹¹⁶. It is observed that a specific definition or a categorisation of 'smart autonomous robots'. Instead, it is limited to proposing a broad list of criteria, calling for the Commission to come forward with a more specific definition and subcategorisation of the term 'robot'. As a way forward, the author identifies the levels of risk of inappropriate use or development of autonomous artificial agents. This is a crucial point and requires instruments of governance rather than soft guidelines, or codes of conduct. Given the volume of data, interactions and technologies being put into use, the EU must also implement means to exercise the 'right to explanation' of the decision taken by automated systems.

In parallel with the issue of civil liability of artificial agents, criminal liability is also questioned. Most specifically, the discussion turns around the question whether artificial agents should be held criminally liable and if yes – for what actions – intentional, negligent or both. The literature reviewed puts forward the main argument that in order for criminal liability to be established for artificial agents, all the legal elements of the offence should be present from factual (physical) perspective (i.e. concurrence, cause, harm, attendant circumstances) and from mental perspective (i.e. intent).

In a presentation at the Conference on AI and the criminal justice system, organised by the European Law Academy (ERA) in Rome, on 24-25 October 2019, Prof. Dr Sabine Gless, from the Faculty of Law at the University of Basel, Switzerland, presented criminal liability of self-driving cars as a discussion topic also developed in a paper¹¹⁷. In particular, the question is who will be responsible in cases where an autonomously driven vehicle causes an accident, i.e. can criminal liability be inherent to the AI or is it the producer or even the owner of the car who should be held liable. The conclusion was that currently criminal law lacks a conceptual basis to punish 'robots' which cause harm; autonomous car manufacturers theoretically face the risk of being prosecuted for negligence in a similar fashion to product liability law. Prof. Gless' paper argues in favour of limiting the criminal liability of operators to situations where they neglect to undertake reasonable measures to control the risks emanating from robots. A philosophical question is posed, however, whether society is ready to accept such risks inherent to autonomous vehicles for the sake of the overall benefits they may bring or further actions should be undertaken to reduce or eliminate them.

The model of criminal liability is analysed in the book *Liability for Crimes Involving Artificial Intelligence Systems*¹¹⁸. The analysis focuses on the capability of AI technology to fulfil all the requirements of a criminal liability, such as factual elements related to the offence and the offender and the mental element linked to culpability, in order to be held liable of the crime. For instance, with regard to the notion of intent, the author argues that reasonability could be easily applied to AI since it is a matter of calculation that both humans and AI could do. The same goes for the notion of negligence, where the book establishes a common understanding of what constitutes a punishable negligence under criminal law and what society considers as a form of autodidact. The author argues that in this case, AI could be criminally liable if the mental elements and the factual element exist. This applies both to indirect and strict liability. The book goes on further to argue that AI could be capable of evoking as defence *in personam* negative faults such as infancy, loss of self-control, insanity, intoxication, factual mistake, legal mistake, substantive immunity, as well from the *in rem* negative faults such as self-defence, necessity, duress, superior orders, *de minimis* defence, to be punished with imprisonment and to be rehabilitated.

¹¹⁶ Ponce, Aida, *A Law on Robotics and Artificial Intelligence in the EU?* (October 3, 2017). ETUI Research Paper-Foresight Brief #02-September 2017. (See: Annex I, Ref. No. 33).

¹¹⁷ See also S. Gless et al., *If Robots Cause Harm, Who Is to Blame: Self-Driving Cars and Criminal Liability?* (2016) 19 *New Criminal Law Review* 412.

¹¹⁸ See G. Hallevy, *Liability for Crimes Involving Artificial Intelligence Systems*, Springer 2015.

The author argues that it is plausibly possible for AI technology to fulfil these requirements as outlined in the current definitions of criminal liability. He reckons that these definitions have become obsolete when it comes to the new reality of technology. The author concludes that criminal law should adapt to this new reality by redefining criminal liability requirements which could be done through new interpretations of the current definitions in the case law, or where necessary, through legislative amendments.

Other authors engage in the criminal liability debate¹¹⁹ by acknowledging the theory of Gabriel Hallevy above that AI technology 'has the capability of fulfilling the awareness requirements in criminal law'¹²⁰, together with the 'mental element requirements of both intent offences and recklessness offenses'¹²¹ and agreeing that it makes sense to envisage punishment for AI systems similar to the one envisaged for corporations in a number of legal systems, such as restrictions of liberty and fines, since according to some scholars, robots and other artificial agents could be registered, bestowed with capital and have a transparent financial positions. In order to determine whether harmful behaviour of AI should be relevant under criminal law, aside from exploring the *mens rea* (mental element) the material conduct of the system (*actus reus*) should also be explored. In this case, attention should be drawn to how the growing autonomy of some AI systems may introduce a new set of *actus reus* where acts committed by AI with negligence and intentional fault may fall within the corporate criminal liability hypothesis. It is therefore likely that legal systems react by amending their national criminal law regulations which would then be confirmed by an international framework.

In the context of blockchain/DLT and legal liability, one of the key discussion topics is related to the notion of regulation of the blockchain network 'without authority' and the question of attribution of legal liability when no authority exists. An example can be given with regard to the treatment of requests for addition, deletion or modification of personal data and consequently the breach of the right to be forgotten (RTBF), in a network which tends to data permanence and which is decentralised or semi-decentralised as the blockchain network¹²². Whereas it may seem evident that no authority equals no possibility for deletion or liability, some authors are of the opinion that there is a possibility to delete certain data from a blockchain by means of coordinated action/decentralised consensus protocol. Such protocol will make it possible to decide which transaction to keep and which one to delete – while this clearly involves changing the current state of the blockchain. It is finding the consensus within a decentralised network that poses the main challenge and sometimes failing to do so has unintended consequences, in particular from a technical point of view. European citizens can legitimately invoke the RTBF in the event that links of this type are stored in a blockchain and where they allow a large group of users to access inaccurate, inadequate or excessive information. In this specific case, the only possibility to modify or delete the offending data implies agreement and coordinated action of all - or at least a majority - of the active nodes of a blockchain, which would make the necessary modifications in a consistent manner.

Recommendations put forward:

- Explicitly codifying in the law, provisions about AI liability for actions committed negligently or intentionally¹²³. This should be the case, even if it is decided that only a human should be held liable.

¹¹⁹ U. Pagallo and S. Quattrocolo, 'Research Handbook on the law of Artificial Intelligence', Woodrow Barfield and Ugo Pagallo. Edwar Elgar Publishing Limited, 2018.

¹²⁰ *Supra* 73.

¹²¹ *Ibid*, at 99.

¹²² See P. De Filippi and M. Reymond, 'La Blockchain: comment réguler sans autorité', Nitot, T. (dir.) and Cercy N. *Numérique: reprendre le contrôle*: Framabook. 2016, p. 81-96. (See: Annex I, Ref. No. 94).

¹²³ See P. Nemitz, 'Constitutional democracy and technology in the age of artificial intelligence', vol. 376, Royal Society Publishing, 2018.

- Examining the possibility to generalise for AI some regulatory principles found in specific bodies of law. If this is not sufficient, examining whether specific modifications of such principles should be applied to adjust to the AI reality. A parallel could be made with other areas of human-technology interaction, such as pharma law. In pharmaceuticals production there are pre-conditions to enter the market (e.g. testing of the drug, approval procedures) and requirements to examine the effect of application of the drug or the technology on the human being¹²⁴.
- Performing a three-level impact assessment on AI. First, the parliamentary technology impact assessment, **on the level of the legislator**, in order to ascertain whether essential interests are touched on by the technology in question. Based on this assessment, it would be decided what legislation to put in place to guarantee the public interest. Second, **at the level of the developers and users of the technology**, who should be obliged to perform impact assessments not only when AI is processing personal data in the context of automated decision making but with regard to all aspects of democracy, rule of law and fundamental rights. Third, **at the level of the individuals**, who should have a right to an explanation of how AI functions, what logic it follows and how it impacts their interests¹²⁵. This right should be guaranteed in the law.
- Implementation of governance instruments, rather than soft law and codes of conduct on the inappropriate use of autonomous systems. The EU must also implement binding requirements to exercise the “right to explanation” of models and decisions taken by automated systems or artificially intelligent algorithmic systems. With specific regard to workers, regulation should guarantee their right to have the logic, functionality and consequences of automated decision-making systems explained to them, and it should identify when human involvement occurs and when a decision can be contested¹²⁶.

4.3. Conclusion

The policy and academic papers above show that there are a number of issues that evolve around the use of innovative technologies in the justice field. These issues primarily relate to potential risks that the technology may produce biased results during risk assessments, infringe data protection rules and fundamental rights or commit a criminal offence. The current policy framework propose a number of guarantees to reduce these risks, however the literature puts forward additional recommendations, where some authors are of the opinion that further regulation and legislative changes are necessary.

In light of the above, the contractor collected information from EU institutions, bodies, offices and agencies, Member State authorities competent in the justice field, legal professional organisations and ICT companies, with regard to their planned, ongoing and completed projects, initiatives and ideas of use of AI/blockchain/DLT in the justice field. The main objective is to take stock of the innovative activities in the justice field taking place at multiple levels (EU level, public sector and judiciary, private sector and sector of legal professional organisations), in terms of policies and strategies on AI and/or blockchain/DLT, projects exploring these technologies and challenges encountered throughout the project lifecycle. This together with the explored state of play from academic and policy perspective could give grounds for reflexion on further policy actions regarding the use of innovative technologies in the justice field.

¹²⁴ *Ibid.*

¹²⁵ *Ibid.*

¹²⁶ Ponce, Aida, 'A Law on Robotics and Artificial Intelligence in the EU?' (October 3, 2017). ETUI Research Paper-Foresight Brief #02-September 2017. (See: Annex I, Ref. No. 33).

5. EU INSTITUTIONS, BODIES, ORGANISATIONS, AND AGENCIES CONSULTATIONS RESULTS

The contractor conducted a number of interviews with stakeholders from the EU institutions, bodies, organisations and agencies regarding their activities in the field of AI and blockchain/DLT¹²⁷. The key findings from these interviews show various projects and ongoing initiatives at EU level. Some of them are in the justice field. Others, although not directly related to the justice field (e.g. in the field of tax, customs control, etc.), could present potential for reusability in the judicial activities, e.g. because of similarities in the business problems that the technology aims to solve. It is therefore important to document these projects and initiatives and acknowledge that their potential for use in the justice field may be worth further exploration.

This section presents an overview of these projects and initiatives, and also touches upon some concepts and ideas the stakeholders have shared in view of the potential uses of AI and blockchain/DLT in the future.

5.1. Activities involving or related to the use of AI:

Court of Justice of the European Union (CJEU or the Court of Justice)

Strategies and policies related to innovative technologies:

The Court of Justice of the European Union (CJEU) has prepared a target architecture strategy with the main objectives to increase security, quality, and productivity in the CJEU through the use of emerging technologies such as AI, big data, extended reality, blockchain/DLT etc. CJEU has set up an Innovation Lab within its IT department and has established a network with the business teams to ensure close collaboration among business and IT. The institution is looking for stakeholders from the other European institutions and from the Member State in order to share experiences on the use of innovative technologies. One of the goals of the CJEU's IT department is to create a five-year roadmap with identified priority projects and initiatives in response to the business needs and requirements.

During the next two years, the following areas will be explored via different pilots using AI:

- (Re-usable) machine translation – on premises solution
- Text analysis using AI
- Court's documents classification
- Legal text automatic detection
- (Pseudo-)Anonymisation
- Speech-to-text – applicability for the Court's transcripts
- Optical character recognition (OCR) – intelligent solutions for OCR and text processing
- Data visualisation
- Search engines – evolution in documents and text search using semantic search or other methods

¹²⁷ The information on projects and initiatives is documented in this Final Report as presented at the time of conducting the stakeholder consultations. Further developments that may have taken place in between these consultations and the publication of this Final Report are not taken into account. Studies and other documents and developments which were reported as being 'in preparation' or 'in discussion' during the consultations and have in the meantime been made publically available, are indicated as such and links to them are provided in a footnote.

- Chatbot¹²⁸ – in the area of end-user support or large internal public communication

Projects and initiatives:

In terms of initiatives, the CJEU is planning several activities.

There is an initiative to bring on premises **eTranslation**, mainly for confidentiality reasons. eTranslation is an online machine translation service provided by DG CNECT and DG Translation. It is intended for European public administrations, small and medium enterprises and university language faculties, as well as for Connecting Europe Facility projects. Apart from individual users, the machine translation service is also available to EC information systems and online services through an application programming interface (API). The service was officially launched on 15 November 2017 and builds on the previous machine translation service of the European Commission – MT @ EC¹²⁹. The Court is planning to conduct a pilot with the objective of assessing the possibility of ‘packaging’ the tool as a service from DG Translation premises. An indicative timeframe for launching the pilot is mid 2020.

Some of the other initiatives concern **automatic speech recognition (speech-to-text)** in order to automate the transcription during court proceedings; usage of Natural Language Processing (NLP) for **entity recognition and categorisation** of court judgments and relaunching an Optical Character Recognition (OCR) project with the goal of full digitalisation of paper documents. The NLP for entity recognition and categorisation aims at categorising the large number of court decisions by subject matter, field of justice, entities and experts.

The Joint Research Centre (JRC)¹³⁰

Strategies and policies related to innovative technologies:

the European Commission’s Science and Knowledge Service JRC Strategy 2030¹³¹ includes 10 nexuses, among which are digital transformation and innovation. The elements which should be highlighted in relation to the nexus on innovation systems and processes are the transition to open digital science and the need to guarantee research integrity and obstacles to multidisciplinary and interdisciplinary research. This nexus will also look at open innovation, including citizen-driven innovation, the protection, exploitation and trading of intellectual property rights and the characteristics of successful innovation ecosystems. It will seek new ways of engaging citizens as early as possible in debates about new technologies. It will also develop a capacity in Science and Technology Studies.

Projects and initiatives:

JRC is carrying out the AI-Watch project¹³² for DG CNECT. This is a large-scale project with multiple tasks related to definitional and measurement issues, monitoring: (i) AI uptake and investments, (ii) development of robotics and (iii) diffusion of AI in the public sector. The project provides necessary knowledge and evidence to support the Commission and the EU Member States’ policies set out in the Communication ‘Artificial Intelligence for Europe’ (2018) and ‘The Coordinated Plan on AI’ (2018). The Coordinated Plan outlines how EU Member States could coordinate their strategies, efforts and investments to

¹²⁸ According to the glossary of the CEPEJ European Ethical Charter, a ‘chatbot’ is a conversational agent which converses with its user (for example, empathy robots used to help those who are ill, or automated conversation services in customer relations).

¹²⁹ https://ec.europa.eu/info/resources-partners/machine-translation-public-administrations-etranlation_en

¹³⁰ JRC, Unit B.6 - Digital Economy

¹³¹ https://ec.europa.eu/jrc/sites/jrcsh/files/jrc-strategy-2030_en.pdf

¹³² See https://ec.europa.eu/knowledge4policy/ai-watch_en

maximise the benefits of AI for Europe. The objective of the AI-Watch project, among others, is to monitor the investments by Member States targeting AI.

A JRC project is based on AI that can be used in the criminal justice field, in an application for image recognition of tattoos. This application can be used in the fight against child abuse and child pornography to address the challenge that perpetrators often have their face hidden or covered, but have visible tattoos. The software can then help in identifying the tattoos, possibly link them to a person, or link them to a certain school of art or the artist who created the tattoo.

Other AI applications which can be mentioned are, for example: tools related to the fight against fraud and illegal movement of goods, with help of an AI which carries out tracking by using sensors; an AI system for risk assessment and decision-making in the criminal justice field, developed in Spain (not yet in production); the use of AI for copyrights in the music industry using algorithms on intellectual property; and a UNICEF project related to child rights and online protection of children.

Publications Office of the European Union (OPEU)

Strategies and policies related to innovative technologies:

The OPEU is promoting the use of semantic web technologies for knowledge representation, document annotation and Open Data Dissemination. This is a pre-condition for implementing AI in particular for the e-Law and e-Justice domains. This is reflected in the 'Strategic objectives of the OPEU 2017-2025'¹³³.

Projects and initiatives:

The OPEU shared information about their tool **Cellar**¹³⁴. Cellar is the main data repository of the Commission, containing legislation, regulations, procurement, and general publications data. It was conceived to link Open Data services. The Linked Open Data service provided by Cellar is used by an average of 15 000 users per day. Users are able to query Cellar, or access its legal content via EUR-Lex.

Another ongoing project discussed with the OPEU is SeTA – Semantic Text Analysis Tool¹³⁵ developed by JRC experts in data mining to overcome content and semantic level entanglements faced by policy analysts and policy developers.

The SeTA tool combines recent developments in big data, machine learning and natural language processing into a knowledge exploration and recommendation engine that supports policy analysts in understanding concepts, their synonyms and the context in which they have been used in legislation across domains. The user can perform a centralised search in EUR-Lex, the EU Bookshop including all technical reports, CORDIS, JRC PUBSY, EU Open Data Portal, Wikipedia, and find documents by its content similarity. Links to the EU Vocabularies¹³⁶ thesaurus will also be created. The tool therefore processes the entire text, not only the metadata. SeTA has shown positive performance results.

Directorate-General for Migration and Home Affairs (DG HOME)¹³⁷

Strategies and policies related to innovative technologies

¹³³ <https://publications.europa.eu/en/publication-detail/-/publication/d192d7e9-809a-11e7-b5c6-01aa75ed71a1/language-en>

¹³⁴ <https://data.europa.eu/euodp/en/data/dataset/sparql-cellar-of-the-publications-office>

¹³⁵ <https://ec.europa.eu/jrc/en/publication/semantic-text-analysis-tool-seta>

¹³⁶ <https://op.europa.eu/en/web/eu-vocabularies/>

¹³⁷ DG HOME, Unit F.2 – Situational awareness, resilience and data management

DG HOME's agenda includes plans to:

- Formalise an Expert Group on AI (also with participants from the EU and Schengen countries like Switzerland).
- Prepare a strategy¹³⁸ with the outcomes of the use case study **AI in law enforcement** (see below) to underline their importance and to point out the challenges (e.g. related to data protection). It may not be possible to provide an overall approach to tackle these challenges, but a case-by-case data protection analysis for each use case may be necessary.

In the long-term, it is foreseen that Europol would host an Innovation lab¹³⁹, which would also be used by FRONTEX and JRC.

The need to set up such a lab was highlighted in the Europol's Strategy 2020+¹⁴⁰ prepared in December 2018 and is currently under discussion. . Some of the issues that may be subject to further discussion could be focused on how to select a training dataset to avoid possible bias and possibilities and challenges of the use of operational data, while ensuring data protection compliance.

Projects and initiatives

In March 2019, the Directorate-General for Migration and Home Affairs (DG HOME) in cooperation with the Directorate-General for Communications Networks, Content and Technology (DG CNECT), conducted a use case **Study on the use of AI in law enforcement** among 32 countries, i.e. all EU Member States and other countries such as Norway and Switzerland, in order to assess the state of play of AI technologies in the Member States and their approach to such technologies. The main objective of the organised study discussion was to gain a clear overview of the current situation on research and pilot projects using AI technologies, including initiatives and future plans. DG HOME intends to use the information received from the Member States as an inspiration for possible definition of an EU-wide platform for leveraging innovative technologies in justice and home affairs. Furthermore, this is a way to select the stakeholders to be involved, learn about possible implementation paths, and assess the advantages and disadvantages of an in-house implementation compared to an outsourced one.

DG HOME also works on several other planned projects:

- **Research project on AI and security research** (in cooperation with DG CNECT) under the Horizon 2020 framework;
- **Study on AI for immigration and police checks**, with the objective to identify business processes and operations which could be facilitated by AI technology with a planned start in mid-2020;
- **Project on migration forecasting** with the objective of predicting future migration flows to the EU.

¹³⁸ DG HOME background document, 'Artificial intelligence for optimizing security and operational efficiency', (not official), document shared within the stakeholder consultation process (See: Ref. No. 69 in Annex I – List of References).

¹³⁹ https://parleu2020.sabor.hr/sites/default/files/dogadaji/202003/Draft%20Europol%20Multiannual%20Programming%202021-2023%20-%20for%20consultation%20with%20the%20JPSG_0.PDF

¹⁴⁰ [file:///C:/Users/P70153/Downloads/europol_strategy_2020%20\(2\).pdf](file:///C:/Users/P70153/Downloads/europol_strategy_2020%20(2).pdf)

The Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs (DG GROW)¹⁴¹

DG GROW performs sectorial monitoring of the use of advanced technologies in industry and explores critical applications of AI in three strategic value chains – **smart health, CNECTed and autonomous vehicles** and **the Internet of Things (IoT)**. One of the general takeaways DG GROW has drawn so far are that skills for business owners, managers and employees are key to the successful uptake of advanced technologies by businesses. In addition, business owners should know what the ‘pain points’ of their business are, in order to solve them with AI, rather than expecting that AI serves as universal ‘panacea’ for all business issues. A study on ‘Critical AI applications for SMEs in strategic value chains’ completed in 2020¹⁴² aims to elaborate on the specific AI applications that are broadly applicable and able to generate value for society, the economy and the environment¹⁴³. DG GROW believes that the results of this report are likely to be applicable to the justice field as well.

DG GROW has a number of ongoing (or recently finished) projects and initiatives which are aiming at boosting AI and advanced technologies in the EU industry, including SMEs (possibly including notary public offices and law firms). In June 2019, DG GROW completed phase 1 of the ‘**Digital Cities Challenge**’¹⁴⁴ project aiming through AI and knowledge sharing between 41 cities to develop modern ecosystems that catalyse business transformation in a sustainable way, upskill workforce and create new marketplaces for smart products and services. Expressions of interest in participating in phase 2 of the project – ‘**Intelligence Cities Challenge**’ were open in January 2020. This phase will expand the scope to 100 participating cities with a focus on small and medium-sized ones. The project will be running in parallel with an initiative of DG CNECT – ‘**Living in the EU – join, boost and sustain**’¹⁴⁵ – which aims at scaling up digital initiatives in the EU.

Among DG GROW’s other AI activities are a pilot project called ‘**Robotics in schools**’ and a project on **big data**. The latter aims to explore business cases from third-party SMEs, which have access to big data via data platforms in the areas of in-vehicle data (automotive) and type 2 diabetes (smart health). Early takeaways from this project are the large number of separate datasets in the health sector, which makes it more difficult to clean, categorise and standardise the data. In addition, SMEs tend not to upskill their in-house personnel to deal with the data, although it may be more useful for the business. The potential data protection and competition law issues that may arise should also be taken into consideration.

The Directorate-General for Taxation and Customs Union (DG TAXUD)¹⁴⁶

DG TAXUD has a number of projects using data analytics/AI.

The **Transaction Network Analysis (TNA)** is a platform for fighting the so-called Missing Trader Intra-Community (MTIC) carousel fraud in the VAT domain. TNA was put in production in April 2019 and has been fully open to all Member States since the end of 2019. It has data analytics capabilities on which algorithms using AI technologies could be developed in the future. The **Central Electronic System for Online Payments (CESOP)**

¹⁴¹ DG GROW, Unit Advanced Technologies, Clusters and Social Economy

¹⁴² https://ec.europa.eu/growth/industry/policy/advanced-technologies/industrial-applications-artificial-intelligence-and-big-data_en

¹⁴³ https://ec.europa.eu/growth/industry/policy/advanced-technologies/industrial-applications-artificial-intelligence-and-big-data_en

¹⁴⁴ For more information on the project, consult: <https://www.digitallytransformyourregion.eu/cities>

¹⁴⁵ For more information, consult: <https://bit.ly/2vSqxZz>

¹⁴⁶ DG TAXUD, B4.002: Taxation systems and digital governance

is another project with the same users as TNA, but focusing on cross-border B2C e-commerce VAT fraud. Its launch date is planned for 2024.

DG TAXUD also has projects focused on leveraging data from the Member States. The **Import Control System (ICS2)**¹⁴⁷ is a tool with analytics capacity to address safety and security risks in the field of customs control. ICS2 uses the advance cargo data about consignments entering the EU from the Entry Summary Declaration (ESD). The project aims to link the ESD to the law enforcement agencies and thus enable them to perform risk analysis in real time. Part of ICS2 has been implemented and is operational, however the analytics capacity part should be approved in December 2020 following internal rules and procedures. A pilot will be launched in 2020 to check the performance followed by putting the tool into operation in 2021. **The Customs Union Performance (CUP) tool** collects data from the Member States on customs performance (e.g. data on number of ESDs and consignments received). It is a mechanism for measuring how customs activities and operations support achieving strategic objectives of the customs union based on key performance indicators. The CUP is used as a steering tool for strategic decision-making (assessing performance, monitoring trends, identifying gaps and areas for improvement). It is also used for raising awareness about the results of customs work to main stakeholders. The **Joint Analytics Capacity** involves the joint work of the European Anti-Fraud Office (OLAF) and the Directorate-General for Budget (DG BUDG). It aims to analyse the financial risks related to the customs activity (avoiding customs duties). In this sense, it is similar to ICS2.

DG TAXUD has an internal initiative focused on **policy lifecycle data analytics**. Activities have been performed to catalogue the data assets in DG TAXUD but the specific purposes they can be used for and the access to them still need to be identified.

Directorate-General for Financial Stability, Financial Services and Capital Markets Union (DG FISMA)¹⁴⁸

Among others, DG FISMA has an AI initiative, RegTech – a technology that can help financial institutions compile the reporting information they are obliged to present to their supervising bodies. The AI tool could enable better identification of customers, and detection of suspicious transactions through pattern recognition thus preventing fraud and money laundering detection.

The European Union Agency for Fundamental Rights (FRA)

In 2018, the FRA started working on the topic of big data and AI, including background research and expert consultations. In May 2018 the Agency published a paper called **'#Big Data: Discrimination in data supported decision-making'** followed by a paper called **'Data Quality and AI – mitigating bias and error to protect fundamental rights'**¹⁴⁹ published in June 2019, both results of an in-house study. Most recently FRA published a paper **'Facial recognition technology: fundamental rights considerations in the context of law enforcement'**. FRA's main project for 2019 is called **'AI, Big Data and Fundamental Rights'**¹⁵⁰. This is a policy-driven study with the objective of contributing to the development of policies and drafting guidelines in the fields of AI, big data and fundamental rights; to increase the understanding on the implications of AI on fundamental rights; and to identify potential gaps in policies to protect fundamental rights when using

¹⁴⁷For more information, consult: https://ec.europa.eu/taxation_customs/general-information-customs/customs-security/ics2_en#heading_7

¹⁴⁸ DG FISMA, Unit B.ADV01: Technological innovation and cybersecurity

¹⁴⁹ See <https://bit.ly/2vLQVVg>

¹⁵⁰ See <https://bit.ly/2uj1oqM>

AI. The study focuses on real-life use cases in five EU Member States – Estonia, Finland, France, the Netherlands and Spain. The final report, which will include a comprehensive fundamental rights analysis, including broader view on fundamental rights, such as privacy and personal data protection, discrimination and access to justice, is expected to be published in the fourth quarter of 2020. As next steps, FRA is assessing the feasibility of a simulation to show how algorithmic bias could occur.

5.2. Activities involving or related to the use of blockchain/DLT

The Joint Research Centre (JRC)¹⁵¹

The JRC has issued a report on '**Blockchain for digital government**'¹⁵² exploring the use of blockchain by governments and identifying projects at various implementation stages. The report analysed a number of projects which were found to present significant potential for scaling up. Such a project is **Chromaway property transactions** in Sweden. The project started in September 2016 by the Swedish Mapping, Cadastre and Land Registration Authority and the Landshypotek Bank. Its aim was to tackle issues related to the lack of transparency, the slow registration system and the complex process for agreements between buyers and sellers. Another project is the **Infrachain governance framework** in Luxembourg launched in 2016. The aim of the Infrachain organisation is to support the creation of independent and incorruptible nodes involved in the operation of blockchain instances. Infrachain develops a governance layer placed on top of existing and future permissioned blockchains. Projects in non-EU countries like Georgia (**Exonum land title registry**) and Switzerland (**uPort decentralised identity project**) are also included in the report.

JRC also contributes to ISO technical standards on blockchain, through participation in the ISO Technical Committee 307, Study Group 2 'Use Cases'. In the context of this Study Group, JRC proposed a use case addressing automation of inheritance proceedings via smart contracts (whereby a death certificate would trigger the contract to perform statutory inheritance and 'last will'). This would eliminate inefficiencies and risks in the collaborative process involving governmental institutions (registry of properties and financial assets), heirs and the testators themselves. One of the key challenges lies in the integration of systems operated by multiple institutions (property, financial assets and other registers). Broadly speaking, JRC is of the opinion that blockchain is a unique enabler of a trusted evidence layer. It will help to exchange information (securely) between different parties but is in itself not sufficient; the trusted layer must be complemented with other technologies such as conversion services or data analytics. However, the use of blockchain raises a number of challenges related to governance, privacy and legal compliance.

JRC has also been working in close cooperation with different policy DGs of the Commission on developing studies on blockchain technology since 2013. Initially focusing on the bitcoin currency, the research work has moved on to analysing the full scale of blockchain, ending up by analysing all aspects of the technology, the type of blockchain and its features. The centre runs a rather unique facility for the live testing of large-scale blockchain infrastructure deployments.

The JRC has several proof of concept projects in the energy field and a pilot research project on citizen identification and how blockchain could digitalise paper ID documents. Following the citizen identification study, there is also an idea to use blockchain for object

¹⁵¹ JRC, Unit B.6 Digital economy and Unit I.2 Foresight, Behavioural Insight, Design for Policy

¹⁵² See <https://bit.ly/2V6z2uM>

identification, e.g. in the Internet of Things, to create links between objects, their owners and what they are authorised to do.

The Directorate-General for Communications Networks, Content and Technology (DG DIGIT)¹⁵³

DG DIGIT has started a collaboration project with the private sector and the Decentralised Identity Foundation (DIF) in the field of Self-Sovereign Identity (SSI), called the eIDAS Bridge. The idea is that any natural or legal person only has to share their credentials once with public administrations, and they will be in full control of their digital identity. The project's outcome would be a pilot SSI application and a legal analysis on what the gaps are in the current Regulation EU 910/2014 with a view to fully enabling SSI. The results of these projects were published in the beginning of 2020¹⁵⁴.

DG DIGIT is also collaborating in the European Blockchain Services Infrastructure (EBSI). This is a joint initiative between the European Commission and the European Blockchain Partnership (EBP) to deliver EU-wide cross-border public services using blockchain technology. The project aims to deliver four use cases by 2021, that could be used as blockchain building blocks similar to the Connecting Europe Facility (CEF) building blocks. The 4 use cases are:

- **'Import one-stop-shop (IOSS) VAT ID sharing (trusted data sharing)'**, proposed by DG TAXUD, which aims at reducing administrative costs by enabling data sharing between institutions in a trusted way;
- **'eSSIF'**, which is a transversal identity layer to create verifiable credentials for online use which can be authenticated with a person's e-ID;
- **'Diplomas'**, where the EBSI represents the diplomas related to the Europass project. Universities can create online versions of diplomas and assign them to the person's verifiable credentials (made with eSSIF). These diplomas can be immediately verified;
- **'Notarisation'**¹⁵⁵, in the context of establishing and verifying authentic documents. Documents can be safely stored and only be made visual/readable to a third 'party' based on a private key.

The Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs (DG GROW)¹⁵⁶

In the context of innovation, DG GROW is focusing on alternative financial solutions such as the token economy, cryptocurrencies and the use of blockchain by industries and businesses. It has undertaken a bottom-up approach and has been monitoring the cryptocurrency market over the past few years. In general, DG GROW sees blockchain as an enabler to the democratisation of finance and economy, serving European citizens, enabling (but also regulating) competition at European level. Through the FinTech action plan 2018¹⁵⁷, DG GROW is now in a position to discuss with other services and to recommend projects.

Some initiatives and use cases explored by DG GROW are **Education: guidebook for SME's on blockchain**, **Blockchain for EU** and **blockchain for industrial transformation** and **E-identity**. DG GROW is monitoring initiatives in the Member States,

¹⁵³ DG DIGIT – Unit D.3.002 Trans-European Services – Building Blocks

¹⁵⁴ <https://ec.europa.eu/cefdigital/wiki/display/CEFDIGITAL/EBSI>

¹⁵⁵ Original sentence in the validated report from DG DIGIT interview is 'Notarisation' in the context of auditing documents. The diplomas can be safely stored...' After verification, the sentence is corrected to replace 'auditing' with 'establishing and verifying authentic' and 'diplomas' is replaced with documents.

¹⁵⁶ DG GROW, Unit GROW.F.2 - Advanced technologies, clusters, and social economy and Unit H.3 - SME Access to Finance

¹⁵⁷ FinTech action plan: For a more competitive and innovative European financial sector, COM(2018) 109/2.

such as the single system for e-identity across Scandinavian countries, a German blockchain initiative to put shares and bonds on the blockchain, projects in the medical sector, postal services and on shareholder rights. Generally, DG GROW observes that the EU neighbouring countries are evolving faster in the adoption of the blockchain technology (in particular, Liechtenstein, Switzerland and Georgia), most likely due to their small size which does not imply issues with too many legacy systems and the need to go through a lengthy process of implementing legislative changes, like in the EU Member States. As main challenges on the use of blockchain, DG GROW outlines the governance and liability issues, the choice of the common platform (existing or new one), the lack of common definition of a cryptocurrency and the lack of high-visibility European blockchain project(s) to serve as an example for a European cryptocurrency.

The Directorate-General for Taxation and Customs Union (DG TAXUD)¹⁵⁸

The **Blockchain@TAXUD** programme started in 2017 with the objective to validate and ensure that the technology is tested and tried before proposing to the Member States to build, deploy and operate blockchain based trans-European systems in production. A proof of concept (PoC) has been initiated in the excise domain – a blockchain platform Hyperledger Fabric 1.0 has been tested on the Exercise Movements Control System (EMCS) for control of tobacco, alcohol and energy. The PoC successfully demonstrated that blockchain has the potential to simplify the business processes as well as the functional complexity between the Member States as regards the ‘common domain’, in a government-to-government scenario. A second PoC was launched in 2018 with eight Member States on board and is currently deployed with the blockchain platform Hyperledger Fabric 1.1. The results were to be presented in March 2020 to the participating Member States¹⁵⁹.

DG TAXUD works in collaboration with DG DIGIT and DG CNECT on the European Blockchain Services Infrastructure (EBSI)¹⁶⁰. Phase 1 of the EBSI foresees deployment of four use cases, one of which is **Import one-stop-shop (IOSS) VAT ID sharing** (trusted data sharing). The project is focused on the exchange of identifiers between tax and customs authorities in the context of the e-Commerce VAT Package ECOFIN 5/12/2017 entering into force on 1 January 2021.

The Directorate-General for Communications Networks, Content and Technology (DG CNECT)¹⁶¹

Strategies and policies related to innovative technologies:

The ISA² programme¹⁶² of the European Commission - Interoperability solutions for public administrations, businesses and citizens - includes a number of different actions towards setting up interoperability solution for public administrations, businesses and citizens, some of which are focused on innovative services.

Projects and initiatives

¹⁵⁸ DG TAXUD, Unit B4.002: Taxation systems and digital governance

¹⁵⁹ No information on the results available at the time of preparation of this report.

¹⁶⁰ <https://ec.europa.eu/cefdigital/wiki/display/CEFDIGITAL/EBSI>

¹⁶¹ DG CNECT, Unit E3: Next-Generation Internet and Unit F.3 - Digital Innovation and Blockchain

¹⁶² https://ec.europa.eu/isa2/home_en

There are a number of projects involving the use of blockchain technology – **Democratic participation, DECODE** and **Prize for blockchain for social good**.

The Democratic Participation project ran between 2013 and 2015. It aimed to develop a system for democratic participation, national and local processes as well as participation of citizens. It has developed a participatory platform managed and used in Barcelona under the name 'Decidim.Barcelona'. Its aim was to reward citizens for participation in democratic processes with social currencies based on blockchain, which could be exchanged against services.

The DECODE project, launched in 2016 aims to decentralise data governance on the internet in order to serve as a counterweight to big tech companies (GAFAs) centralising citizens' data. It has deployed pilots in Amsterdam, focusing on the Internet of Things (Gebied online) and the sharing economy (Amsterdam Digital Register), and in Barcelona, focusing on open democracy (Distributed democracy (Decidim) and the Internet of Things (Citizen sensing). DECODE led to a next initiative: ledger.eu, funding small innovators in decentralised data governance.

DG CNECT initiated the Prize for Blockchains for Social Good¹⁶³ with the objective of stimulating innovation and decentralisation with a view to social good (governments and economic actors). 180 applications have been received for this prize, a quarter of which are in unanticipated areas: health, content quality (fake news), ownership of data (justice field); food traceability and provenance; energy co-production and consumption, education, environment, etc. All applications had clear mapping with sustainability development goals. One of the requirements for all applicants is to release their solution under an open source licence to ensure transparency of algorithms, as well as replicability and portability of their developments.

DG CNECT is also responsible for the **European Blockchain Services Infrastructure (EBSI)** implementation, which will deliver 4 use cases by 2021. In view of these use cases (Trusted data sharing, eSSIF, Diplomas, and Notarisation) DG CNECT collaborates with DG DIGIT, TAXUD and CEF. The aim is to add a fifth use case related to Online Dispute Resolution (ODR) in collaboration with DG JUST. Another idea proposed is the use of blockchain in notarisation tasks, bankruptcy and property exchange.

Directorate-General for Financial Stability, Financial Services and Capital Markets Union
DG FISMA¹⁶⁴

Projects and initiatives

DG FISMA has a blockchain project called **Gateway** which is a repository for financial reports to help investors to easily find financial information in a centralised manner. The tool is currently used in the EU Member States at national level, but preparation of a module for reporting at EU level is in process. The tool is inspired by the United States' financial reporting tool EDGAR, a centralised system for consolidation and presentation of financial reporting.

¹⁶³ <https://www.ngi.eu/event/blockchains-for-social-good/#BFSGP>

¹⁶⁴ DG FISMA, B.ADV01: Technological innovation and cybersecurity

5.3. Ideas for potential usage of AI and or blockchain/DLT

In addition to the projects and initiatives described above, some stakeholders shared ideas during the interviews¹⁶⁵ for potential usage of AI and/or blockchain/DLT that may be worth further exploration and which could grow into initiatives and/or projects. Some of these include:

- possible use of virtual assistance (chatbots)¹⁶⁶;
- use of data science and predictive analytics¹⁶⁷
- facial recognition from surveillance cameras to increase security in the institution¹⁶⁸;
- automation of case law references and “clickable citations”¹⁶⁹;
- graphic representations of relations between cases¹⁷⁰;
- thesaurus and automated translation functionalities¹⁷¹;
- single search windows for all relevant case law, legislation and internal studies databases¹⁷²;

DG JUST plans to execute several projects on blockchain/smart contracts technology addressing different kinds of questions relating to contract law with an emphasis on looking at the practical side of smart contracts use.¹⁷³

¹⁶⁵ **An idea** is defined as ‘a suggestion or plan for doing something’. In the context of our study, it would include thoughts, concepts and/or beliefs on the possible ways to use innovative technologies to solve specific business problems. However, an idea is not yet mature enough to be materialised into an initiative or a project.

¹⁶⁶ Source: Interview with the CJEU.

¹⁶⁷ Court of Justice, The main objective of the project would be to facilitate the organisation and the scheduling of meetings and court proceedings.

¹⁶⁸ *Ibid.*

¹⁶⁹ Source: interview with Mr. Paul Nemitz and interview with OPEU.

¹⁷⁰ *Ibid.*

¹⁷¹ *Ibid.*

¹⁷² *Ibid.*

¹⁷³ Source: interview with DG JUST A.2.

6. MEMBER STATES CONSULTATION RESULTS

6.1. Selected replies to the questionnaire

6.1.1. Country of the organisation

A total of 100 (or 100% of all 100) replies from stakeholders from 25 Member States and two European institutions, i.e. European Court of Justice (CJEU) and the Publications Office (OPEU) have been, received to this question.



DISCLAIMER: Some replies were entirely or partially in a language different from English. In order to make the information comparable, these replies were translated in English. The translations are not an official version. They are only for indicative purposes. The translated parts are marked with an (*).

Table 6.1.1: List of stakeholders, who have provided replies to this study, per Member State

Country	No.	Respondent	Respondent code
Austria	1.	AT – Federal Ministry of Constitutional Affairs, Reforms, Deregulation and Justice	AT
Bulgaria	2.	BG – Ministry of Justice	BG(1)
	3.	BG – National Institute of Justice	BG(2)
Croatia	4.	HR – Ministry of Justice Croatia	HR
Czechia	5.	CZ – Ministry of Justice	CZ
Denmark	6.	DK – Kriminalforsorgen (*The Prison and Probation Service)	DK(1)
	7.	DK – Danish National Police	DK(2)
	8.	DK – Attorney General (Rigsadvokaten)	DK(3)
	9.	DK – Ministry of Justice	DK(4)
	10.	DK – Domstolsstyrelsen (*Danish Court Administration)	DK(5)
Estonia	11.	EE – Ministry of Justice	EE(1)
	12.	EE – Ministry of Justice on behalf of Estonian courts	EE(2)
European institutions or bodies	13.	EU – Court of Justice of the European Union	EU CoJ
European institutions or bodies	14.	EU – Publications Office of the European Union	OPEU
Finland	15.	FI – Ministry of Justice, Finland	FI
France	16.	FR – Ministry of Justice	FR(1)
	17.	FR – Cour de Cassation (*Court of Cassation)	FR(2)
	18.	FR – French Ministry of Justice	FR(3)
Germany	19.	DE – Ministry of Justice, North-Rhine-Westphalia	DE(1)
	20.	DE – Commission for information technology in the judiciary (workgroup use of cognitive systems in judiciary)	DE(2)
	21.	DE – Federal Ministry of Justice and Consumer Protection	DE(3)
Greece	22.	GR – Ministry of Justice	GR(1)
	23.	GR – Supreme Court of Civil and Criminal Justice	GR(2)
Hungary	24.	HU – National Office for the Judiciary	HU(1)
	25.	HU – Ministry of Justice	HU(2)
Ireland	26.	IE – Department of Justice and Equality	IE
Italy	27.	Avvocatura dello Stato (*Governmental Legal Service)	IT(1)
	28.	IT – Ministry of Justice, Department of Justice Affairs	IT(2)
	29.	IT – Ministry of Justice	IT(3)
	30.	IT – Court of Appeal Milano	IT(4)
	31.	IT – Tribunale di Milano; AGI avvocati giuslavoristi italiani (*Court of Milano; Italian labour lawyers)	IT(5)

32.	IT – Ministry of Justice – Court of Appeal Salerno	IT(6)
33.	IT – Procura della Repubblica c/o Tribunale di Cosenza (*Public prosecutor’s office at the Court of Cosenza)	IT(7)
34.	IT – Tribunale di Firenze (*Court of Florence)	IT(8)
35.	IT – Tribunale di Ivrea (*Court of Ivrea)	IT(9)
36.	IT – Court of Appeal Brescia	IT(10)
37.	IT – Corte Suprema di Cassazione (*Supreme cassation court)	IT(11)
38.	IT – Ispettorato generale presso il Ministero di Grazia e Giustizia (*General inspectorate at the Ministry of Justice)	IT(12)
39.	IT – Tribunale di Sorveglianza di Sassari (*Supervisory Court of Sassari)	IT(13)
40.	IT – Procura della Repubblica presso il Tribunale di Lucca (*Public prosecutor’s office at the Court of Lucca)	IT(14)
41.	IT – Tribunale per I Minorenni – Cagliari (*Juvenile court – Cagliari)	IT(15)
42.	IT – Court of Ravenna	IT(16)
43.	IT – Procura Della Repubblica di Palermo	IT(17)
44.	IT – Tribunale per I Minorenni- Bari	IT(18)
45.	IT – Procura della Repubblica presso il Tribunale di Monza (*Public prosecutor’s office at the Court of Monza)	IT(19)
46.	IT – Procura Della Repubblica di Macerata (*Public prosecutor’s office of Macerata)	IT(20)
47.	IT – Tribunale per I Minorenni – Perugia (*Juvenile court – Perugia)	IT(21)
48.	IT – Procura della Repubblica di Busto Arsizio(*Public prosecutor’s office of Busto Arsizio)	IT(22)
49.	IT – Tribunale di Bergamo (*Court of Bergamo)	IT(23)
50.	IT – Procura della Repubblica Presso il Tribunale di Lodi (*Public prosecutor’s office at the Court of Lodi)	IT(24)
51.	IT – Tribunale di Busto Arsizio (*Court of Busto Arsizio)	IT(25)
52.	IT – Procura Generale della Repubblica presso la Corte di Appello di Cagliari (*Prosecutor’s general office at the Court of Appeals of Cagliari)	IT(26)

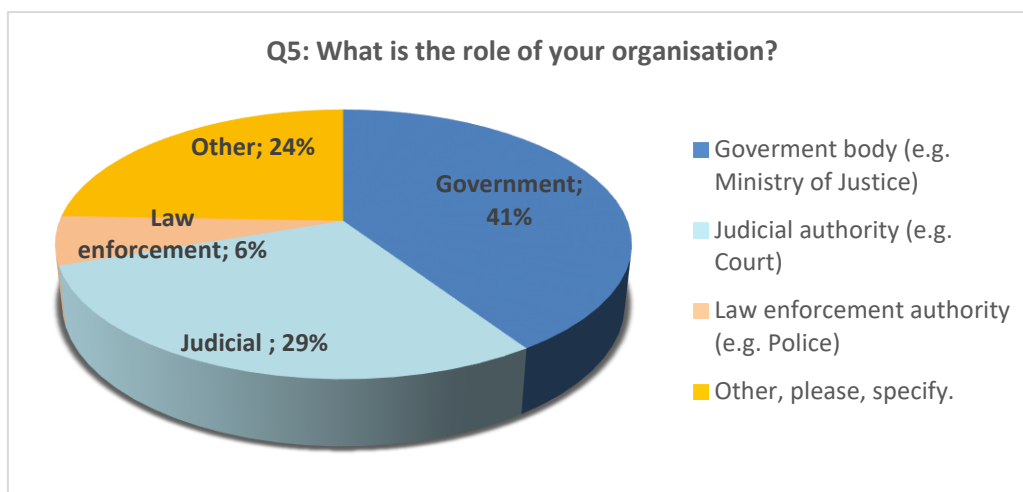
	53.	IT – Procura della Repubblica di Palermo (*Public prosecutor's office of Palermo)	IT(27)
	54.	IT – Tribunale di Pavia (*Court of Pavia)	IT(28)
	55.	IT – Tribunale di Lecco (*Court of Lecco)	IT(29)
	56.	IT – Tribunale di Verese (*Court of Verese)	IT(30)
	57.	IT – Tribunale Ordinario di Como (*Ordinary court of Como)	IT(31)
	58.	IT – Tribunale di Sondrio (*Court of Sondrio)	IT(32)
	59.	IT – Tribunale di Genova (*Court of Genoa)	IT(33)
	60.	IT – Tribunale di Bologna (*Court of Bologna)	IT(34)
	61.	Giustizia Amministrativa (Consiglio di Stato e TT.AA.RR.) (*Administrative Justice [State Council, Regional Administrative Courts])	IT(35)
Lithuania	62.	LT – Prosecutor General's Office	LT(1)
	63.	LT – Ministry of Social Security and Labour	LT(2)
	64.	LT – Forensic Science Center of Lithuania	LT(3)
Luxembourg	65.	LU – Ministry of Justice	LU
Latvia	66.	LV – Prosecution Office of the Republic of Latvia	LV
Malta	67.	MT – Department of Justice	MT
Netherlands	68.	NL – Centraal Orgaan opvang asielzoekers (*Central Agency for the Reception of Asylum Seekers)	NL(1)
	69.	NL – Ministry of Justice and Security	NL(2)
	70.	NL – Ministry of Justice and Security –Jurisprudence-Robot	NL(3)
	71.	NL – Ministry of Justice and Security –DigiAkkoord	NL(4)
	72.	NL – Ministry of Justice and Security – Financial Emergency Brake (FEB)	NL(5)
	73.	NL – Ministry of Justice and Security – Known Traveller Digital Identity (KTDI)	NL(6)
Portugal	74.	Instituto Nacional de Medicina Legal e Ciências Forenses (*National Institute of Legal Medicine and Forensic Sciences (INMLCF))	PT(1)
	75.	PT – General Public Prosecutors Office	PT(2)
	76.	PT – The Directorate-General for Justice Policy	PT(3)

	77.	PT – Instituto dos Registos e do Notariado (*Institute of Registries and Notaries)	PT(4)
	78.	PT – Ministry of Justice	PT(5)
	79.	PT – Instituto Nacional da Propriedade Industrial (*National Institute of Industrial Property (INPI))	PT(6)
	80.	PT – Conselho Superior da Magistratura (*Superior Council of Magistrates – High Judicial Council)	PT(7)
Romania	81.	RO – Ministry of Justice	RO
Slovenia	82.	SI – Ministry of Justice of the Republic of Slovenia	SI(1)
	83.	SI – Sodni svet Republike Slovenije (*Judicial Council)	SI(2)
Slovak Republic	84.	SK – Ministry of Justice of the Slovak Republic	SK
Spain	85.	ES – Judicial Documentation Centre (Centro de Documentación Judicial [CENDOJ])	ES(1)
	86.	ES – Ministry of Justice	ES(2)
Sweden	87.	SE – Swedish Prosecution Authority	SE(1)
	88.	SE – Bolagsverket (The Swedish Companies Registration Office)	SE(2)
	89.	SE – Ekobrottsmyndigheten (*Swedish Economic Crime Authority)	SE(3)
	90.	SE – Swedish Prison and Probation Service	SE(4)
	91.	SE – Swedish Consumer Agency	SE(5)
	92.	SE – County Administrative Board of Västra Götaland County	SE(6)
	93.	SE – Swedish Competition Authority	SE(7)
	94.	SE – Swedish Coast Guard	SE(8)
	95.	SE – Skatteverket (*Swedish Tax Agency)	SE(9)
	96.	SE – Tullverket (*Swedish Customs Service)	SE(10)
	97.	SE – Swedish National Courts Administration (Domstolsverket)	SE(11)
	98.	SE – Ministry of Justice	SE(12)
	99.	SE – Lantmäteriet (*Swedish mapping, cadastral and land registration authority)	SE(13)
United Kingdom	100.	UK – Northern Ireland Courts and Tribunals Service	UK

6.1.2. Role of the organisation

A total of 86 (or 86% of all 100) replies from stakeholders have been received to this question, where 35 (or 41% of the 86 replies) indicated that their organisation is a 'Government body', 25 (or 29% of the 86 replies) indicated their organisation is a 'Judicial

authority', 5 (or 6% of the 86 replies) said their organisation is a 'Law enforcement authority', and 21 (or 24% of the 86 replies) selected 'Other'.



6.1.3. Existing polices and strategies on the use of innovative technologies

A total of 69 (or 69% of all 100) replies from stakeholders have been received, where 35 (or 51% of the 69 replies) selected 'Yes', 24 (or 35% of the 69 replies) indicated 'No', and 10 (or 14% of the 69 replies) selected 'Other'.

The number of stakeholders who did not reply to this question, is not taken into account for the calculation of the percentages represented in the chart below.

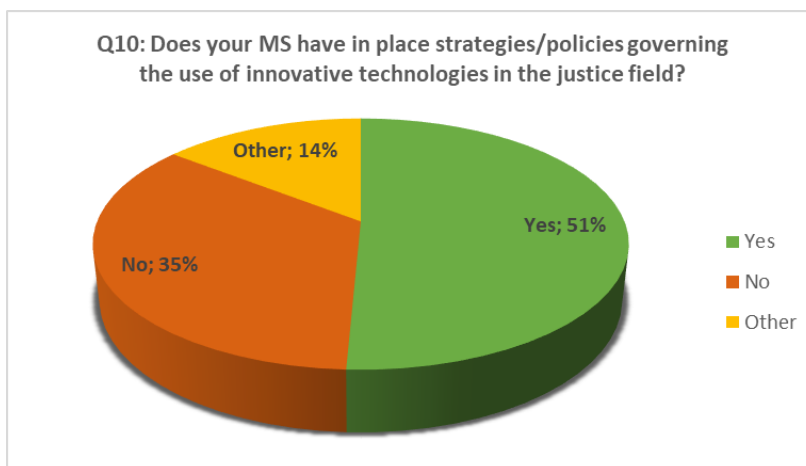


Table 6.1.2: Member State policies and strategies – replies

Reply	No.	Respondent	Respondent code
Yes	1.	PT – General Public Prosecutors Office	PT(2)
	2.	ES – Judicial Documentation Center (Centro de Documentación Judicial [CENDOJ])	ES(1)
	3.	LT – Prosecutor General's Office	LT(1)
	4.	ES – Ministry of Justice	ES(2)
	5.	PT – The Directorate-General for Justice Policy	PT(3)
	6.	PT – Instituto dos Registos e do Notariado (*Institute of Registries and Notaries)	PT(4)
	7.	EU – Court of Justice of the European Union	EU_CoJ

	8.	HU – National Office for the Judiciary	HU(1)
	9.	DK – Attorney General (Rigsadvokaten)	DK(3)
	10.	FR – Cour de Cassation (*Court of Cassation)	FR(2)
	11.	PT – Ministry of Justice	PT(5)
	12.	AT – Federal Ministry of Constitutional Affairs, Reforms, Deregulation and Justice	AT
	13.	IE – Department of Justice and Equality	IE
	14.	CZ – Ministry of Justice of the Czech Republic	CZ
	15.	SE – The Ministry of Justice	SE(12)
	16.	PT – Instituto Nacional da Propriedade Industrial (*National Institute of Industrial Property (INPI))	PT(6)
	17.	NL – Ministry of Justice and Security	NL(2)
	18.	NL – Ministry of Justice and Security - Jurisprudence-Robot	NL(3)
	19.	NL – Ministry of Justice and Security – DigiAkkoord	NL(4)
	20.	NL – Ministry of Justice and Security – Financial Emergency Brake (FEB)	NL(5)
	21.	NL – Ministry of Justice and Security – Known Traveller Digital Identity (KTDI)	NL(6)
	22.	IT – Avvocatura dello Stato (*Governmental Legal Service)	IT(1)
	23.	IT – Ministry of Justice, Department of Justice Affairs	IT(2)
	24.	IT – Court of Appeal Milano	IT(4)
	25.	IT – Procura della Repubblica c/o Tribunale di Cosenza	IT(7)
	26.	IT – Tribunale di Ivrea	IT(9)
	27.	IT – Court of Appeal Brescia	IT(10)
	28.	IT – Corte Suprema di Cassazione	IT(11)
	29.	IT – Ispettorato generale presso il Ministero di Grazia e Giustizia	IT(12)
	30.	IT – Court of Ravenna	IT(16)
	31.	IT – Procura della Repubblica di Busto Arsizio	IT(22)
	32.	IT – Procura della Repubblica Presso il Tribunale di Lodi	IT(24)
	33.	IT – Tribunale di Busto Arsizio	IT(25)
	34.	EE – Ministry of Justice	EE(1)
	35.	EU – Publications Office of the European Union	EU_Pub
TOTAL: 35 replies			
No	1.	NL – Centraal Orgaan opvang asielzoekers (*Central Agency for the Reception of Asylum Seekers)	NL(1)
	2.	GR – Ministry of Justice	GR(1)
	3.	DK – Kriminalforsorgen (*The Prison and Probation Service)	DK(1)
	4.	DK – The Danish National Police	DK(2)
	5.	DE – Ministry of Justice, North-Rhine-Westphalia	DE(1)
	6.	BG – Ministry of Justice	BG(1)
	7.	SI – Ministry of Justice of the Republic of Slovenia	SI(1)
	8.	DE – Commission for information technology in the judiciary (workgroup use of cognitive systems in judiciary)	DE(2)
	9.	LT – Ministry of Social Security and Labour	LT(2)
	10.	LT – Forensic Science Center of Lithuania	LT(3)
	11.	RO – Ministry of Justice	RO
	12.	DK – Ministry of Justice	DK(4)
	13.	HU – Ministry of Justice of Hungary	HU(2)

	14.	DE – Federal Ministry of Justice and Consumer Protection	DE(3)
	15.	IT – Procura della Repubblica presso il Tribunale di Lucca	IT(14)
	16.	IT – Procura della Repubblica presso il Tribunale di Monza	IT(19)
	17.	IT – Tribunale per I Minorenni-Perugia	IT(21)
	18.	HR – Ministry of Justice Croatia	HR
	19.	GR – Supreme Court of Civil and Criminal Justice-Greece	GR(2)
	20.	SI – Sodni svet Republike SlovenijeE (*Judicial Council)	SI(2)
	21.	UK – Northern Ireland Courts and Tribunals Service	UK
	22.	IT – Giustizia Amministrativa (Consiglio di Stato e TT.AA.RR.) (*Administrative Justice [State Council, Regional Administrative Courts])	IT(35)
	23.	LV – Prosecution Office of the Republic of Latvia	LV
	24.	DK – Domstolsstyrelsen (*Danish Court Administration)	DK(5)
TOTAL: 24 replies			
Other	1.	PT – Instituto Nacional de Medicina Legal e Ciências Forenses (*National Institute of Legal Medicine and Forensic Sciences (INMLCF))	PT(1)
	2.	SK – Ministry of Justice of the Slovak Republic	SK
	3.	LU – Ministry of Justice	LU
	4.	FR – Ministry of Justice	FR(1)
	5.	MT – Department of Justice	MT
	6.	SE – Swedish National Courts Administration (Domstolsverket)	SE(11)
	7.	FI – Ministry of Justice, Finland	FI
	8.	PT – Conselho Superior da Magistratura – (*Superior Council of Magistrature – High Judicial Council)	PT(7)
	9.	IT – Tribunale di Sorveglianza di Sassari	IT(13)
	10.	BG – National Institute of Justice	BG(2)
TOTAL: 10 replies			

More detailed information about the strategies is presented in Section 6.2 of this report.

6.1.4. Artificial Intelligence elements in the relevant policies and strategies

Q11: If you indicated 'Yes' to question 10, do the relevant document(s) address and elaborate on the use of Artificial Intelligence in the justice field?

A total of 35 (or 35% of all 100) replies from stakeholders have been received, where 16 (or 46% of the 35 replies) selected 'Yes', 13 (or 37% of the 35 replies) indicated 'No', and 6 (or 17% of the 35 replies) selected 'Other'.

The number of stakeholders who did not reply to this question, is not taken into account for the calculation of the percentages represented in the chart below.

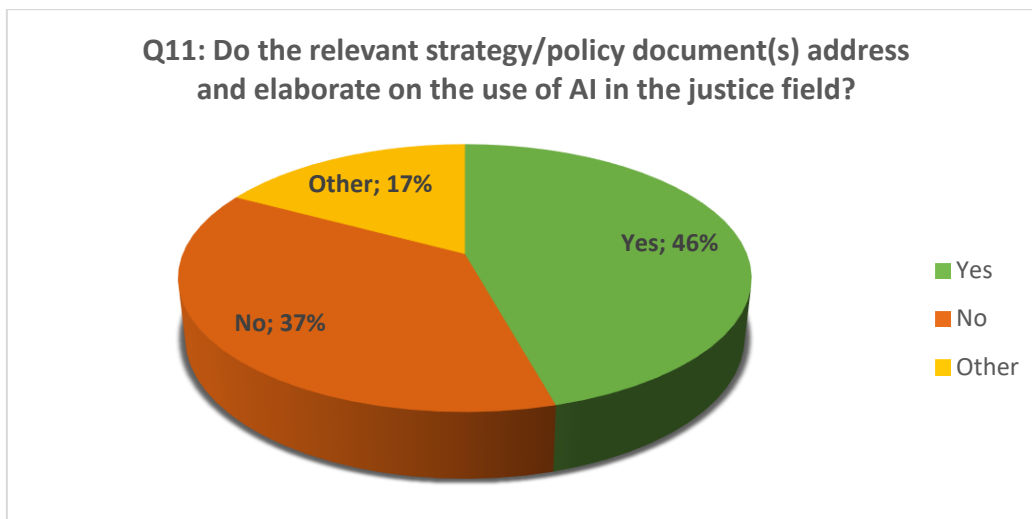


Table 6.1.3: MS Strategy/policy elaborate on the use of AI in the justice field – replies

Reply	No.	Respondent	Respondent code
Yes	1.	ES – Judicial Documentation Center (Centro de Documentación Judicial [CENDOJ])	ES(1)
	2.	ES – Ministry of Justice	ES(2)
	3.	EU – Court of Justice of the European Union	EU_CoJ
	4.	DK – Attorney General (Rigsadvokaten)	DK(3)
	5.	FR – Cour de Cassation (*Court of Cassation)	FR(2)
	6.	AT – Federal Ministry of Constitutional Affairs, Reforms, Deregulation and Justice	AT
	7.	CZ – Ministry of Justice of the Czech Republic	CZ
	8.	NL – Ministry of Justice and Security	NL(2)
	9.	NL – Ministry of Justice and Security – Jurisprudence – Robot	NL(3)
	10.	NL – Ministry of Justice and Security – DigiAkkoord	NL(4)
	11.	NL – Ministry of Justice and Security – Financial Emergency Brake (FEB)	NL(5)
	12.	NL – Ministry of Justice and Security – Known Traveller Digital Identity (KTDI)	NL(6)
	13.	IT – Procura della Repubblica c/o Tribunale di Cosenza	IT(7)
	14.	IT – Corte Suprema di Cassazione	IT(11)
	15.	IT – Procura della Repubblica Presso il Tribunale di Lodi	IT(24)
	16.	EU – Publications Office of the European Union	EU_Pub
TOTAL: 16 replies			
No	1.	LT – Prosecutor General's Office	LT(1)
	2.	PT – The Directorate-General for Justice Policy	PT(3)
	3.	HU – National Office for the Judiciary	HU(1)
	4.	PT – Ministry of Justice	PT(5)
	5.	IE – Department of Justice and Equality	IE
	6.	SE – The Ministry of Justice	SE(12)
	7.	PT – Instituto Nacional da Propriedade Industrial (*National Institute of Industrial Property (INPI))	PT(6)
	8.	IT – Ministry of Justice, Department of Justice Affairs	IT(2)
	9.	IT – Tribunale di Ivrea	IT(9)
	10.	IT – Court of Appeal Brescia	IT(10)

	11.	IT – Court of Ravenna	IT(16)
	12.	HR – Ministry of Justice Croatia	HR
	13.	GR – Supreme Court of Civil and Criminal Justice-Greece	GR(2)
TOTAL: 13 replies			
Other	1.	PT – General Public Prosecutors Office	PT(2)
	2.	PT – Instituto dos Registos e do Notariado (*Institute of Registries and Notaries)	PT(4)
	3.	IT – Avvocatura dello Stato (*Governmental Legal Service)	IT(1)
	4.	IT – Procura della Repubblica di Busto Arsizio	IT(22)
	5.	IT – Tribunale di Busto Arsizio	IT(25)
	6.	EE – Ministry of Justice	EE(1)
TOTAL: 6 replies			

6.1.5. Blockchain/DLT elements in the relevant policies and strategies

Q14: If you indicated 'Yes' to question 10, do relevant documents elaborate on the use of the blockchain/DLT in the justice field?

A total of 31 (or 31% of all 100) stakeholders replied to this question, where 5 (or 16% of the 31 replies) selected 'Yes', 20 (or 65% of the 31 replies) indicated 'No', and 6 (or 19% of the 31 replies) selected 'Other'.

The number of stakeholders who did not reply to this question, is not taken into account for the calculation of the percentages represented in the chart below.

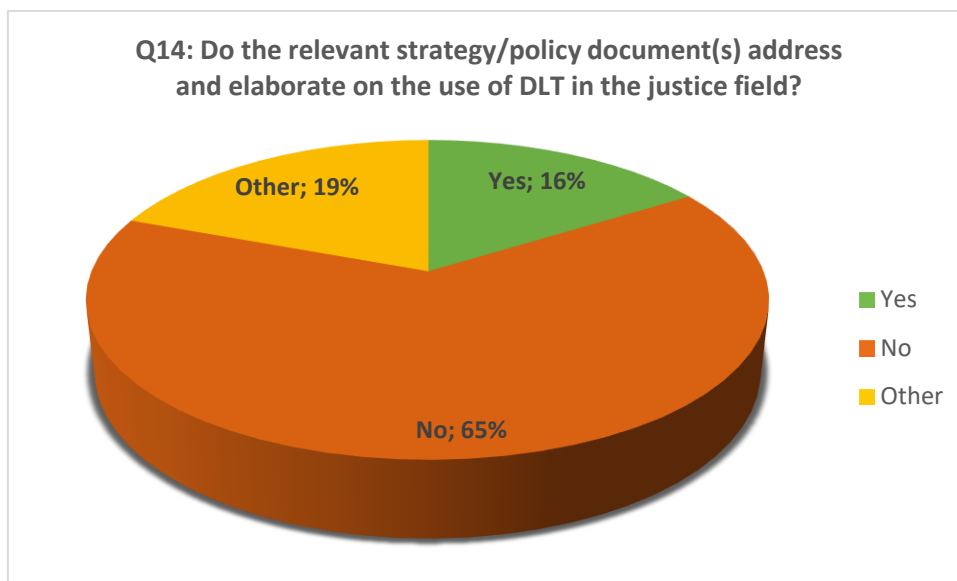


Table 6.1.4: MS Strategy/policy elaborate on the use of blockchain/DLT in the justice field – replies

Reply	No.	Respondent	Respondent code
Yes	1.	NL – Ministry of Justice and Security	NL(2)
	2.	NL – Ministry of Justice and Security – Jurisprudence – Robot	NL(3)
	3.	NL – Ministry of Justice and Security – DigiAkkoord	NL(4)
	4.	NL – Ministry of Justice and Security – Financial Emergency Brake (FEB)	NL(5)

	5.	NL – Ministry of Justice and Security – Known Traveller Digital Identity (KTDI)	NL(6)
TOTAL: 5 replies			
No	1.	PT – General Public Prosecutors Office	PT(2)
	2.	LT – Prosecutor General's Office	LT(1)
	3.	ES – Ministry of Justice	ES(2)
	4.	PT – Directorate-General for Justice Policy	PT(3)
	5.	HU – National Office for the Judiciary	HU(1)
	6.	PT – Ministry of Justice	PT(5)
	7.	AT – Federal Ministry of Constitutional Affairs, Reforms, Deregulation and Justice	AT
	8.	IE – Department of Justice and Equality	IE
	9.	CZ – Ministry of Justice of the Czech Republic	CZ
	10.	SE – Ministry of Justice	SE(12)
	11.	PT – Instituto Nacional da Propriedade Industrial (*National Institute of Industrial Property (INPI))	PT(6)
	12.	IT – Avvocatura dello Stato (*Governmental Legal Service)	IT(1)
	13.	IT – Ministry of Justice, Department of Justice Affairs	IT(2)
	14.	IT – Procura della Repubblica c/o Tribunale di Cosenza	IT(7)
	15.	IT – Tribunale di Ivrea	IT(9)
	16.	IT – Court of Appeal Brescia	IT(10)
	17.	IT – Corte Suprema di Cassazione	IT(11)
	18.	IT – Court of Ravenna	IT(16)
	19.	HR – Ministry of Justice	HR
	20.	EU – Publications Office of the European Union	EU_Pub
TOTAL: 20 replies			
Other	1.	PT – Instituto dos Registos e do Notariado (*Institute of Registries and Notaries)	PT(4)
	2.	EU – Court of Justice of the European Union	EU_CoJ
	3.	DK – Attorney General (Rigsadvokaten)	DK(3)
	4.	IT – Procura della Repubblica di Busto Arsizio	IT(22)
	5.	IT – Tribunale di Busto Arsizio	IT(25)
	6.	EE – Ministry of Justice	EE(1)
TOTAL: 6 replies			

6.1.6. Artificial Intelligence-legal framework

Q17: Does your country currently have legislation¹⁷⁴ in force governing or applicable to the use of AI in the justice field?

A total of 57 (or 57% of all 100) replies from stakeholders have been received, where 9 (or 16% of the 57 replies) selected 'Yes', 35 (or 61% of the 57 replies) indicated 'No', and 13 (or 23% of the 57 replies) selected 'Other'.

The number of stakeholders who did not reply to this question, is not taken into account for the calculation of the percentages represented in the chart below.

¹⁷⁴ For the purposes of this study, 'legislation' or 'legislative framework' should mean constitutions, codes of law, laws and their implementing regulations, which are in force in the Member States, and which govern in their entirety or contain provisions that are directly or indirectly governing use of AI (and/or of DLT) and applicable to the justice field or related fields.

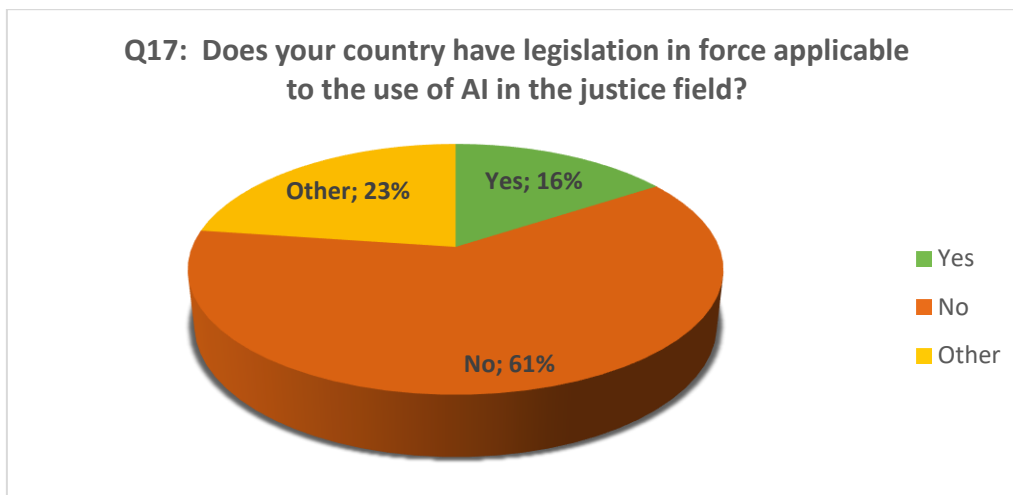


Table 6.1.5: Legislation applicable to AI – replies

Reply	No.	Respondent	Respondent code
Yes	1.	SE – The Ministry of Justice	SE(12)
	2.	NL – Ministry of Justice and Security	NL(2)
	3.	NL – Ministry of Justice and Security – Jurisprudence – Robot	NL(3)
	4.	NL – Ministry of Justice and Security – DigiAkkoord	NL(4)
	5.	NL – Ministry of Justice and Security – Financial Emergency Brake (FEB)	NL(5)
	6.	NL – Ministry of Justice and Security – Known Traveller Digital Identity (KTDI)	NL(6)
	7.	DE – Federal Ministry of Justice and Consumer Protection	DE(3)
	8.	IT – Court of Ravenna	IT(16)
	9.	EU – Publications Office of the European Union	EU_Pub
TOTAL: 9 replies			
No	1.	NL – Centraal Orgaan opvang asielzoekers (*Central Agency for the Reception of Asylum Seekers)	NL(1)
	2.	PT – General Public Prosecutors Office	PT(2)
	3.	SK – Ministry of Justice, Slovak Republic	SK
	4.	GR – Ministry of Justice	GR(1)
	5.	ES – Judicial Documentation Center (Centro de Documentación Judicial [CENDOJ])	ES(1)
	6.	LU – Ministry of Justice	LU
	7.	ES – Ministry of Justice	ES(2)
	8.	DK – Kriminalforsorgen (*The Prison and Probation Service)	DK(1)
	9.	PT – The Directorate-General for Justice Policy	PT(3)
	10.	PT – Instituto dos Registos e do Notariado (*Institute of Registries and Notaries)	PT(4)
	11.	DK – The Danish National Police	DK(2)
	12.	BG – Ministry of Justice	BG(1)
	13.	FR – Ministry of Justice	FR(1)
	14.	FR – Cour de Cassation (*Court of Cassation)	FR(2)
	15.	SE – Skatteverket (*Swedish Tax Agency)	SE(9)
	16.	PT – Ministry of Justice	PT(5)
	17.	AT – Federal Ministry of Constitutional Affairs, Reforms, Deregulation and Justice	AT

	18.	SE – Swedish National Courts Administration (Domstolsverket)	SE(11)
	19.	SI – Ministry of Justice of the Republic of Slovenia	SI(1)
	20.	IE – Department of Justice and Equality	IE
	21.	CZ – Ministry of Justice of the Czech Republic	CZ
	22.	FI – Ministry of Justice, Finland	FI
	23.	PT – Instituto Nacional da Propriedade Industrial (*National Institute of Industrial Property (INPI))	PT(6)
	24.	LT – Ministry of Social Security and Labour	LT(2)
	25.	LT – Forensic Science Center of Lithuania	LT(3)
	26.	RO – Ministry of Justice	RO
	27.	DK – Ministry of Justice	DK(4)
	28.	HU – Ministry of Justice of Hungary	HU(2)
	29.	IT – Avvocatura dello Stato (*Governmental Legal Service)	IT(1)
	30.	IT – Procura della Repubblica c/o Tribunale di Cosenza	IT(7)
	31.	IT – Tribunale di Ivrea	IT(9)
	32.	IT – Court of Appeal Brescia	IT(10)
	33.	IT – Corte Suprema di Cassazione	IT(11)
	34.	IT – Procura della Repubblica presso il Tribunale di Monza	IT(19)
	35.	HR – Ministry of Justice, Croatia	HR
TOTAL: 35 replies			
Other	1.	PT – Instituto Nacional de Medicina Legal e Ciências Forenses (*National Institute of Legal Medicine and Forensic Sciences (INMLCF))	PT(1)
	2.	DE – Ministry of Justice, North-Rhine-Westphalia	DE(1)
	3.	EU – Court of Justice of the European Union	EU_CoJ
	4.	HU – National Office for the Judiciary	HU(1)
	5.	DK – Attorney General (Rigsadvokaten)	DK(3)
	6.	MT – Department of Justice	MT
	7.	DE – Commission for information technology in the judiciary (workgroup use of cognitive systems in judiciary)	DE(2)
	8.	PT – Conselho Superior da Magistratura – (*Superior Council of Magistrature - High Judicial Council)	PT(7)
	9.	IT – Ministry of Justice, Department of Justice Affairs	IT(2)
	10.	IT – Tribunale di Sorveglianza di Sassari	IT(13)
	11.	IT – Procura della Repubblica di Busto Arsizio	IT(22)
	12.	IT – Procura della Repubblica Presso il Tribunale di Lodi	IT(24)
	13.	IT – Tribunale di Busto Arsizio	IT(25)
TOTAL: 13 replies			

6.1.7. Blockchain/DLT-Legal framework

Q23: Does your country currently have legislation in force governing or applicable to the use of blockchain/DLT in the justice field?

A total of 56 (or 56% of all 100) replies from stakeholders have been received, where 6 (or 11% of the 56 replies) selected 'Yes', 38 (or 68% of the 56 replies) indicated 'No', and 12 (or 21% of the 56 replies) selected 'Other'.

The number of stakeholders who did not reply to this question, is not taken into account for the calculation of the percentages represented in the chart below.

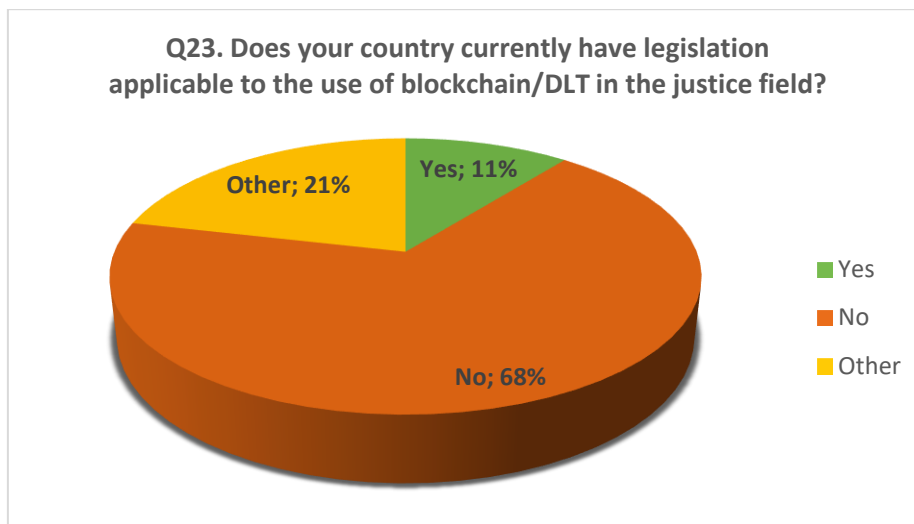


Table 6.1.6: MS Legislation applicable to blockchain/DLT – replies

Reply	No.	Respondent	Respondent code
Yes	1.	SE – The Ministry of Justice	SE(12)
	2.	IT – Court of Ravenna	IT(16)
	3.	IT – Procura della Repubblica di Busto Arsizio	IT(22)
	4.	IT – Procura della Repubblica Presso il Tribunale di Lodi	IT(24)
	5.	IT – Tribunale di Busto Arsizio	IT(25)
	6.	NL – Ministry of Justice and Security	NL(2)
TOTAL: 6 replies			
No	1.	NL – Centraal Orgaan opvang asielzoekers (*Central Agency for the Reception of Asylum Seekers)	NL(1)
	2.	PT – General Public Prosecutors Office	PT(2)
	3.	SK – Ministry of Justice of the Slovak Republic	SK
	4.	GR – Ministry of Justice	GR(1)
	5.	ES – Judicial Documentation Center (Centro de Documentación Judicial [CENDOJ])	ES(1)
	6.	LU – Ministry of Justice	LU
	7.	ES – Ministry of Justice	ES(2)
	8.	DK – Kriminalforsorgen (*The Prison and Probation Service)	DK(1)
	9.	PT – The Directorate-General for Justice Policy	PT(3)
	10.	PT – Instituto dos Registos e do Notariado (*Institute of Registries and Notaries)	PT(4)
	11.	DK – The Danish National Police	DK(2)
	12.	DE – Ministry of Justice, North-Rhine-Westphalia	DE(1)
	13.	HU – National Office for the Judiciary	HU(1)
	14.	BG – Ministry of Justice	BG(1)
	15.	FR – Ministry of Justice	FR(1)
	16.	FR – Cour de Cassation (*Court of Cassation)	FR(2)
	17.	SE – Skatteverket (*Swedish Tax Agency)	SE(9)
	18.	PT – Ministry of Justice	PT(5)
	19.	AT – Federal Ministry of Constitutional Affairs, Reforms, Deregulation and Justice	AT

	20.	SE – Swedish National Courts Administration (Domstolsverket)	SE(11)
	21.	SI – Ministry of Justice of the Republic of Slovenia	SI(1)
	22.	IE – Department of Justice and Equality	IE
	23.	CZ – Ministry of Justice of the Czech Republic	CZ
	24.	DE – Commission for information technology in the judiciary (workgroup use of cognitive systems in judiciary)	DE(2)
	25.	FI – Ministry of Justice	FI
	26.	PT – Instituto Nacional da Propriedade Industrial (*National Institute of Industrial Property (INPI))	PT(6)
	27.	LT – Ministry of Social Security and Labour	LT(2)
	28.	LT – Forensic Science Center of Lithuania	LT(3)
	29.	RO – Ministry of Justice	RO
	30.	DK – Ministry of Justice	DK(4)
	31.	HU – Ministry of Justice	HU(2)
	32.	DE – Federal Ministry of Justice and Consumer Protection	DE(3)
	33.	IT – Ministry of Justice, Department of Justice Affairs	IT(2)
	34.	IT – Procura della Repubblica c/o Tribunale di Cosenza	IT(7)
	35.	IT – Court of Appeal Brescia	IT(10)
	36.	IT – Corte Suprema di Cassazione	IT(11)
	37.	IT – Procura della Repubblica di Monza	IT(19)
	38.	HR – Ministry of Justice Croatia	HR
TOTAL: 38 replies			
Other	1.	PT – Instituto Nacional de Medicina Legal e Ciências Forenses (*National Institute of Legal Medicine and Forensic Sciences (INMLCF))	PT(1)
	2.	EU – Court of Justice of the European Union	EU_CoJ
	3.	DK – Attorney General (Rigsadvokaten)	DK(3)
	4.	MT – Department of Justice	MT
	5.	PT – Conselho Superior da Magistratura – (*Superior Council of Magistrature – High Judicial Council)	PT(7)
	6.	NL – Ministry of Justice and Security – Jurisprudence – Robot	NL(3)
	7.	NL – Ministry of Justice and Security – DigiAkkoord	NL(4)
	8.	NL – Ministry of Justice and Security – Financial Emergency Brake (FEB)	NL(5)
	9.	NL – Ministry of Justice and Security – Known Traveller Digital Identity (KTDI)	NL(6)
	10.	IT – Avvocatura dello Stato (*Governmental Legal Service)	IT(1)
	11.	IT – Tribunale di Ivrea	IT(9)
	12.	EU – Publications Office of the European Union	EU_Pub
TOTAL: 12 replies			

6.1.8. Existing projects using innovative technologies in the justice field

Q28: Is your organisation currently involved in projects using innovative technology in the justice field?

A total of 98 (or 98% of all 100) replies from stakeholders have been received, where 57 (or 58% of the 98 replies) selected 'Yes', 35 (or 36% of the 98 replies) indicated 'No', and 6 (or 6% of the 98 replies) selected 'Other'.

The number of stakeholders who did not reply to this question, is not taken into account for the calculation of the percentages represented in the chart below.



Table 6.1.7: Involvement in projects using AI technologies – replies

Reply	No.	Respondent	Respondent code
Yes	1.	PT – General Public Prosecutors Office	PT(2)
	2.	SE – Bolagsverket (The Swedish Companies Registration Office)	SE(2)
	3.	ES – Judicial Documentation Center (Centro de Documentación Judicial [CENDOJ])	ES(1)
	4.	LT – Prosecutor General's Office	LT(1)
	5.	ES – Ministry of Justice	ES(2)
	6.	PT – The Directorate-General for Justice Policy	PT(3)
	7.	PT – Instituto dos Registos e do Notariado (*Institute of Registries and Notaries)	PT(4)
	8.	SE – Swedish Prison and Probation Service	SE(4)
	9.	DE – Ministry of Justice, North-Rhine-Westphalia	DE(1)
	10.	EU – Court of Justice of the European Union	EU_CoJ
	11.	HU – National Office for the Judiciary	HU(1)
	12.	FR – Ministry of Justice	FR(1)
	13.	FR – Cour de Cassation (*Court of Cassation)	FR(2)
	14.	SE – Skatteverket (*Swedish Tax Agency)	SE(9)
	15.	PT – Ministry of Justice	PT(5)
	16.	SE – Tullverket (*Swedish Customs Service)	SE(10)
	17.	MT – Department of Justice	MT
	18.	AT – Federal Ministry of Constitutional Affairs, Reforms, Deregulation and Justice	AT
	19.	SE – Swedish National Courts Administration (Domstolsverket)	SE(11)

20.	FR – Ministry of Justice	FR(3)
21.	IE – Department of Justice and Equality	IE
22.	CZ – Ministry of Justice	CZ
23.	DE – Commission for information technology in the judiciary (workgroup use of cognitive systems in judiciary)	DE(2)
24.	FI – Ministry of Justice	FI
25.	PT – Instituto Nacional da Propriedade Industrial (*National Institute of Industrial Property (INPI))	PT(6)
26.	LT – Forensic Science Center of Lithuania	LT(3)
27.	NL – Ministry of Justice and Security	NL(2)
28.	NL – Ministry of Justice and Security - Jurisprudence-Robot	NL(3)
29.	NL – Ministry of Justice and Security - DigiAkkoord	NL(4)
30.	NL – Ministry of Justice and Security - Financial Emergency Brake (FEB)	NL(5)
31.	NL – Ministry of Justice and Security - Known Traveller Digital Identity (KTDI)	NL(6)
32.	IT – Avvocatura dello Stato (*Governmental Legal Service)	IT(1)
33.	IT – Ministry of Justice, Department of Justice Affairs	IT(2)
34.	IT – Ministry of Justice	IT(3)
35.	IT – Court of Appeal Milano	IT(4)
36.	IT – Tribunale di Milano; (AGI avvocati giuslavoristi italiani)	IT(5)
37.	IT – Ministry of Justice – Court of Appeal SALERNO	IT(6)
38.	IT – Procura della Repubblica c/o Tribunale di Cosenza	IT(7)
39.	IT – Tribunale di Firenze	IT(8)
40.	IT – Tribunale di Ivrea	IT(9)
41.	IT – Court of Appeal Brescia	IT(10)
42.	IT – Corte Suprema di Cassazione	IT(11)
43.	IT – Ispettorato generale presso il Ministero di Grazia e Giustizia	IT(12)
44.	IT – Court of Ravenna	IT(16)
45.	IT – Procura della Repubblica di Macerata	IT(20)
46.	IT – Procura della Repubblica di Busto Arsizio	IT(22)
47.	IT – Tribunale di Bergamo	IT(23)
48.	IT – Procura della Repubblica Presso il Tribunale di Lodi	IT(24)
49.	IT – Tribunale di Busto Arsizio	IT(25)
50.	IT – Tribunale di Genova	IT(33)
51.	IT – Tribunale di Bologna	IT(34)
52.	HR – Ministry of Justice	HR
53.	UK – Northern Ireland Courts and Tribunals Service	UK
54.	LV – Prosecution Office of the Republic of Latvia	LV
55.	EE – Ministry of Justice	EE(1)
56.	EE – Ministry of Justice on behalf of Estonian courts	EE(2)
57.	EU – Publications Office of the European Union	EU_Pub
TOTAL: 57 replies		

No	1.	PT – Instituto Nacional de Medicina Legal e Ciências Forenses (*National Institute of Legal Medicine and Forensic Sciences (INMLCF))	PT(1)
	2.	NL – Centraal Orgaan opvang asielzoekers (*Central Agency for the Reception of Asylum Seekers)	NL(1)
	3.	SK – Ministry of Justice	SK
	4.	SE – Swedish Prosecution Authority	SE(1)
	5.	GR – Ministry of Justice	GR(1)
	6.	SE – Ekobrottsmyndigheten (*Swedish Economic Crime Authority)	SE(3)
	7.	LU – Ministry of Justice	LU
	8.	DK – Kriminalforsorgen (*The Prison and Probation Service)	DK(1)
	9.	SE – Swedish Consumer Agency	SE(5)
	10.	SE – Swedish Competition Authority	SE(7)
	11.	SE – Swedish Coast Guard	SE(8)
	12.	BG – Ministry of Justice	BG(1)
	13.	LT – Ministry of Social Security and Labour	LT(2)
	14.	PT – Conselho Superior da Magistratura – (*Superior Council of Magistrature – High Judicial Council)	PT(7)
	15.	RO – Ministry of Justice	RO
	16.	DK – Ministry of Justice	DK(4)
	17.	SE – Lantmäteriet (*Swedish mapping, cadastral and land registration authority)	SE(13)
	18.	HU – Ministry of Justice	HU(2)
	19.	IT – Tribunale di Sorveglianza di Sassari	IT(13)
	20.	IT – Procura della Repubblica presso il Tribunale di Lucca	IT(14)
	21.	IT – Tribunale per I Minorenni – Cagliari	IT(15)
	22.	Procura della Repubblica di Palermo	IT(17)
	23.	IT – Tribunale per I Minorenni-Bari	IT(18)
	24.	IT – Procura della Repubblica presso il Tribunale di Monza	IT(19)
	25.	IT – Tribunale per I Minorenni-Perugia	IT(21)
	26.	IT – Procura Generale della Repubblica presso la Corte di Appello di Cagliari	IT(26)
	27.	IT – Procura della Repubblica di Palermo	IT(27)
	28.	IT – Tribunale di Pavia	IT(28)
	29.	IT – Tribunale di Lecco	IT(29)
	30.	IT – Tribunale di Varese	IT(30)
	31.	IT – Tribunale Ordinario di Como	IT(31)
	32.	IT – Tribunale di Sondrio	IT(32)
	33.	GR – Supreme Court of Civil and Criminal Justice	GR(2)
	34.	SI – Sodni svet Republike Slovenije (*Judicial Council)	SI(2)
	35.	IT – Giustizia Amministrativa (Consiglio di Stato e TT.AA.RR.) (*Administrative Justice [State Council, Regional Administrative Courts])	IT(35)
TOTAL: 35 replies			
Other	1.	SE – County Administrative Board of Västra Götaland County	SE(6)
	2.	DK – The Danish National Police	DK(2)
	3.	DK – Attorney General (Rigsadvokaten)	DK(3)
	4.	SI – Ministry of Justice	SI(1)
	5.	BG – National Institute of Justice	BG(2)

	6.	DK – Domstolsstyrelsen (*Danish Court Administration)	DK(5)
TOTAL: 6 replies			

6.1.9. Artificial Intelligence-existing projects

Q29: If you indicated 'Yes' to question 28, please, indicate in how many projects, that are exploring or using **AI technology**, your organisation is currently involved?

A total of 52 (or 52% of all 100) replies from stakeholders have been received, where 13 (or 25% of the 52 replies) selected 'None', 29 (or 55% of the 52 replies) selected '1-3 projects', 5 (or 10% of the 52 replies) indicated '4-5 projects', and 5 (or 10% of the 52 replies) selected 'More than 5 projects'.

The number of stakeholders who did not reply to this question, is not taken into account for the calculation of the percentages represented in the chart below.

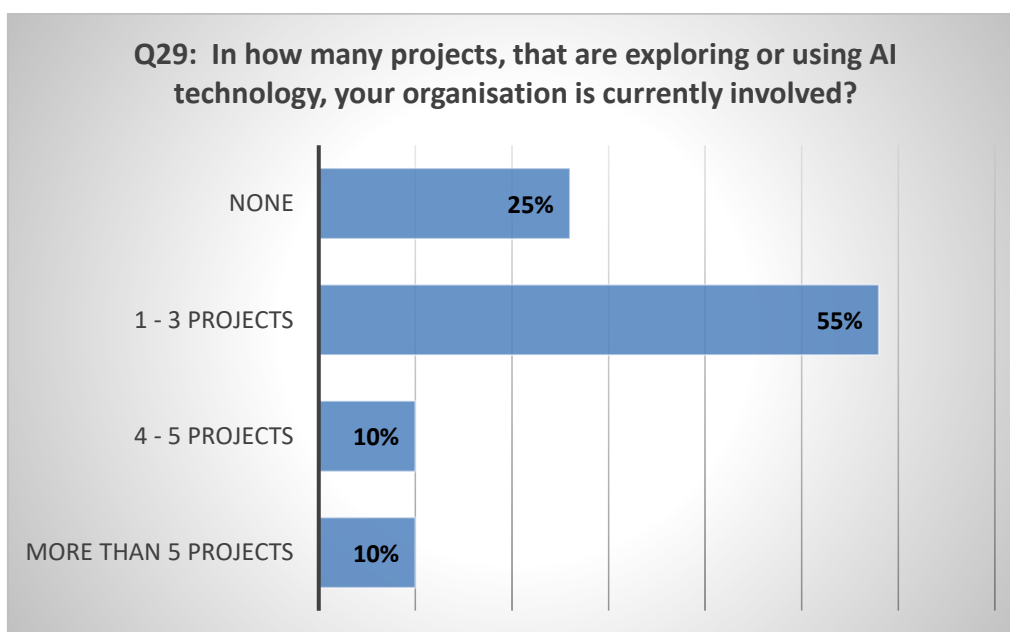


Table 6.1.8: Number of projects using AI technologies – replies

Reply	No.	Respondent	Respondent code
None	1.	PT – General Public Prosecutors Office	PT(2)
	2.	LT – Prosecutor General's Office	LT(1)
	3.	PT – The Directorate-General for Justice Policy	PT(3)
	4.	SE – Swedish Prison and Probation Service	SE(4)
	5.	HU – National Office for the Judiciary	HU(1)
	6.	FR – French Ministry of Justice	FR(3)
	7.	IE – Department of Justice and Equality	IE
	8.	IT – Ispettorato generale presso il Ministero di Grazia e Giustizia	IT(12)
	9.	IT – Procura della Repubblica di Busto Arsizio	IT(22)
	10.	IT – Tribunale di Bergamo	IT(23)
	11.	IT – Procura della Repubblica Presso il Tribunale di Lodi	IT(24)
	12.	IT -Tribunale di Busto Arsizio	IT(25)

	13.	UK – Northern Ireland Courts and Tribunals Service	UK
TOTAL: 13 replies			
1 – 3 Projects	1.	SE – Bolagsverket (The Swedish Companies Registration Office)	SE(2)
	2.	PT – Instituto dos Registos e do Notariado (*Institute of Registries and Notaries)	PT(4)
	3.	FR – Cour de Cassation (*Court of Cassation)	FR(1)
	4.	FR – French Ministry of Justice	FR(2)
	5.	SE – Skatteverket (*Swedish Tax Agency)	SE(9)
	6.	PT – Ministry of Justice	PT(5)
	7.	SE – Tullverket (*Swedish Customs Service)	SE(10)
	8.	MT – Department of Justice	MT
	9.	CZ – Ministry of Justice	CZ
	10.	FI – Ministry of Justice	FI
	11.	PT – Instituto Nacional da Propriedade Industrial (*National Institute of Industrial Property (INPI))	PT(6)
	12.	LT – Forensic Science Center of Lithuania	LT(3)
	13.	IT – Avvocatura dello Stato (*Governmental Legal Service)	IT(1)
	14.	IT – Ministry of Justice, Department of Justice Affairs	IT(2)
	15.	IT – Ministry of Justice	IT(3)
	16.	IT – Court of Appeal Milano	IT(4)
	17.	IT – Tribunale di Milano (AGI avvocati giuslavoristi italiani)	IT(5)
	18.	IT – Ministry of Justice, Court of Appeal Salerno	IT(6)
	19.	IT – Procura della Repubblica c/o Tribunale di Cosenza	IT(7)
	20.	IT – Tribunale di Firenze	IT(8)
	21.	IT – Tribunale di Ivrea	IT(9)
	22.	IT – Court of Appeal Brescia	IT(10)
	23.	IT – Corte Suprema di Cassazione	IT(11)
	24.	IT – Court of Ravenna	IT(16)
	25.	IT – Court of Ravenna	IT(33)
	26.	IT – Tribunale di Bologna	IT(34)
	27.	HR – Ministry of Justice Croatia	HR
	28.	EE – Ministry of Justice on behalf of Estonian courts	EE(2)
	29.	EU – Publications Office of the European Union	EU_Pub
TOTAL: 29 replies			
4 – 5 Projects	1.	ES – Judicial Documentation Center (Centro de Documentación Judicial [CENDOJ])	ES(1)
	2.	DE – Ministry of Justice, North-Rhine-Westphalia	DE(1)
	3.	AT – Federal Ministry of Constitutional Affairs, Reforms, Deregulation and Justice	AT
	4.	SE – Swedish National Courts Administration (Domstolsverket)	SE(11)
	5.	EE – Ministry of Justice	EE(1)
TOTAL: 5 replies			
>5 Projects	1.	ES – Ministry of Justice	ES(2)
	2.	EU – Court of Justice of the European Union	EU_CoJ
	3.	DE – Commission for information technology in the judiciary (workgroup use of cognitive systems in judiciary)	DE(2)
	4.	NL – Ministry of Justice and Security	NL(2)
	5.	NL – Ministry of Justice and Security – Jurisprudence – Robot	NL(3)
TOTAL: 5 replies			

6.1.10. Artificial Intelligence-elaborated projects in this study

Q30: In the context of this questionnaire, please indicate for how many projects that are exploring or using AI technology you would be able to provide information? If you have project information for more than 4 projects, please, indicate in the free text below and we will organise a dedicated interview with you.

A total of 42 (or 42% of all 100) replies from stakeholders have been received, where 26 (or 62% of the 42 replies) selected '1 Project', 5 (or 12% of the 42 replies) selected '2 Projects', 3 (or 7% of the 42 replies) indicated '3 Projects', 2 (or 5% of the 42 replies) indicated '4 Projects', and 6 (or 14% of the 42 replies) selected 'Other'.

The number of stakeholders who did not reply to this question is not taken into account for the calculation of the percentages represented in the chart below.

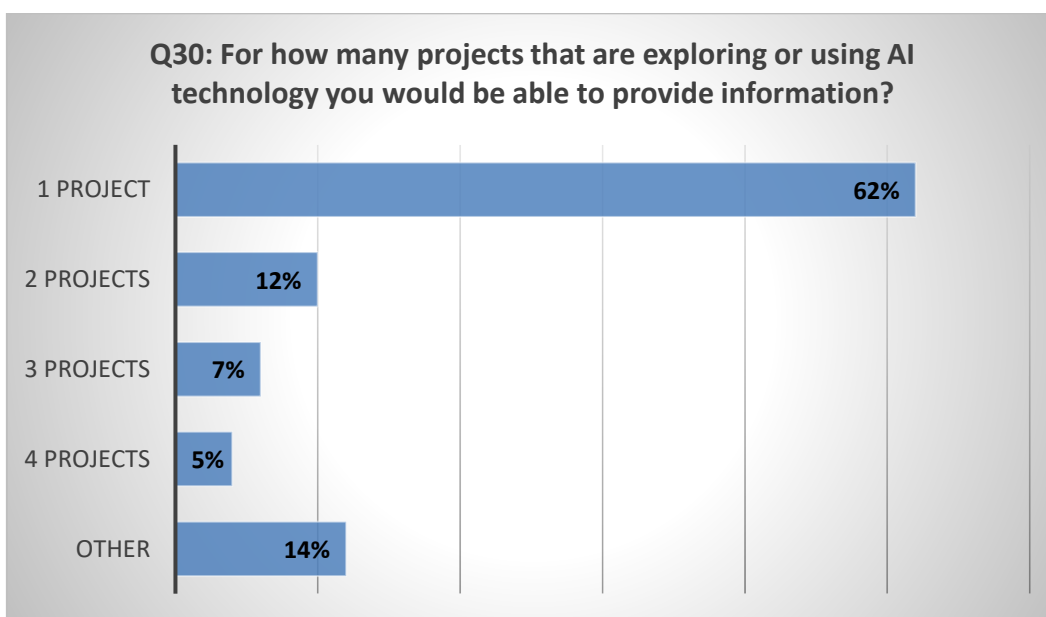


Table 6.1.9: Number of projects using AI technologies described in this study – replies

Reply	No.	Respondent	Respondent code
1 Project	1.	SE – Bolagsverket (The Swedish Companies Registration Office)	SE(2)
	2.	PT – Instituto dos Registos e do Notariado (*Institute of Registries and Notaries)	PT(4)
	3.	DE – Ministry of Justice, North-Rhine-Westphalia	DE(1)
	4.	EU – Court of Justice of the European Union	EU_CoJ
	5.	FR – Ministry of Justice	FR(1)
	6.	FR – Cour de Cassation (*Court of Cassation)	FR(2)
	7.	SE – Skatteverket (*Swedish Tax Agency)	SE(9)
	8.	SE – Tullverket (*Swedish Customs Service)	SE(10)
	9.	CZ – Ministry of Justice	CZ

	10.	PT – Instituto Nacional da Propriedade Industrial (*National Institute of Industrial Property (INPI))	PT(6)
	11.	LT – Forensic Science Center of Lithuania	LT(3)
	12.	NL – Ministry of Justice and Security – Jurisprudence – Robot	NL(3)
	13.	IT – Avvocatura dello Stato (*Govermental Legal Service)	IT(1)
	14.	IT – Ministry of Justice, Department of Justice Affairs	IT(2)
	15.	IT – Ministry of Justice	IT(3)
	16.	IT – Ministry of Justice, Court of Appeal Salerno	IT(6)
	17.	IT – Procura della Repubblica c/o Tribunale di Cosenza	IT(7)
	18.	Tribunale Firenze	IT(8)
	19.	IT – Tribunale di Ivrea	IT(9)
	20.	IT – Court of Appeal Brescia	IT(10)
	21.	IT – Corte Suprema di Cassazione	IT(11)
	22.	IT – Court of Ravenna	IT(16)
	23.	IT – Court of Ravenna	IT(33)
	24.	IT – Tribunale di Bologna	IT(34)
	25.	HR – Ministry of Justice	HR
	26.	EE – Ministry of Justice, on behalf of Estonian courts	EE(2)
TOTAL: 26 replies			
2 Projects	1.	PT – Ministry of Justice	PT(5)
	2.	MT – Department of Justice	MT
	3.	AT – Federal Ministry of Constitutional Affairs, Reforms, Deregulation and Justice	AT
	4.	IT – Tribunale di Milano – (AGI avvocati giuslavoristi italiani)	IT(5)
	5.	EU – Publications Office of the European Union	EU_Pub
TOTAL: 5 replies			
3 Projects	1.	ES – Ministry of Justice	ES(2)
	2.	FI – Ministry of Justice	FI
	3.	IT – Court of Appeal Milano	IT(4)
TOTAL: 3 replies			
4 Projects	1.	ES – Judicial Documentation Center (Centro de Documentación Judicial [CENDOJ])	ES(1)
	2.	DE – Commission for information technology in the judiciary (workgroup use of cognitive systems in judiciary)	DE(2)
TOTAL: 2 replies			
Other	1.	SE – Swedish National Courts Administration (Domstolsverket)	SE(11)
	2.	NL – Ministry of Justice and Security	NL(2)
	3.	EE – Ministry of Justice	EE(1)
	4.	IT – Procura della Repubblica di Busto Arsizio	IT(22)
	5.	IT – Procura della Repubblica Presso il Tribunale di Lodi	IT(24)
	6.	IT -Tribunale di Busto Arsizio	IT(25)
TOTAL: 6 replies			

The following four (4) respondents who replied to have a number of projects provided additional information as given in the table below.

6.1.11. Blockchain/DLT-existing projects

Q31: If you indicated 'Yes' in question 28, please indicate in how many projects, that are exploring or using **blockchain/DLT**, your organisation is currently involved?

A total of 54 (or 54% of all 100) replies from stakeholders have been received, where 41 (or 76% of the 54 replies) selected 'None', and 13 (or 24% of the 54 replies) selected '1-3 projects'. No-one selected '4-5 projects', or 'More than 5 Projects'.

The number of stakeholders who did not reply to this question, is not taken into account for the calculation of the percentages represented in the chart below.

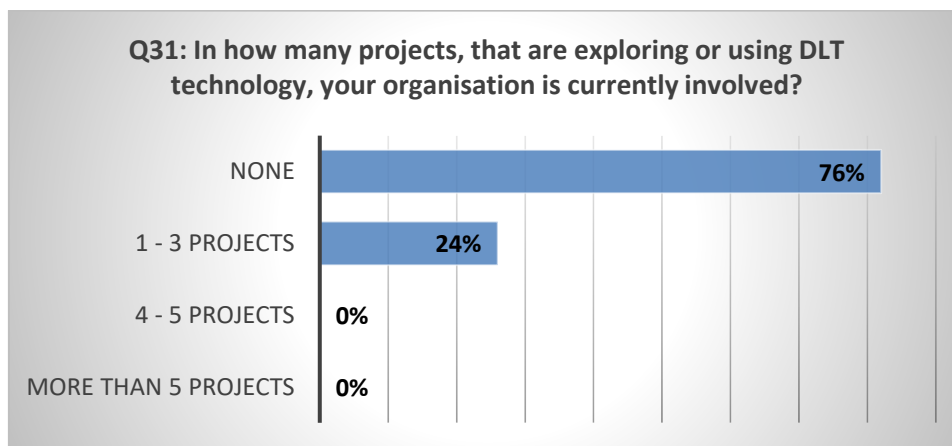


Table 6.1.10: Projects using blockchain/DLT technologies – replies

Reply	No.	Respondent	Respondent code
None	1.	PT – General Public Prosecutors Office	PT(2)
	2.	SE – Bolagsverket (The Swedish Companies Registration Office)	SE(2)
	3.	ES – Judicial Documentation Center (Centro de Documentación Judicial [CENDOJ])	ES(1)
	4.	LT – Prosecutor General's Office	LT(1)
	5.	ES – Ministry of Justice	ES(2)
	6.	PT – Directorate-General for Justice Policy	PT(3)
	7.	PT – Instituto dos Registos e do Notariado (*Institute of Registries and Notaries)	PT(4)
	8.	SE – Swedish Prison and Probation Service	SE(4)
	9.	DE – Ministry of Justice, North-Rhine-Westphalia	DE(1)
	10.	EU – Court of Justice of the European Union	EU_CoJ
	11.	HU – National Office for the Judiciary	HU(1)
	12.	FR – Cour de Cassation (*Court of Cassation)	FR(2)
	13.	PT – Ministry of Justice	PT(5)
	14.	SE – Tullverket (*Swedish Customs Service)	SE(10)
	15.	AT – Federal Ministry of Constitutional Affairs, Reforms, Deregulation and Justice	AT
	16.	SE – Swedish National Courts Administration (Domstolsverket)	SE(11)
	17.	FR – French Ministry of Justice	FR(3)
	18.	IE – Department of Justice and Equality	IE
	19.	CZ – Ministry of Justice of the Czech Republic	CZ
	20.	FI – Ministry of Justice, Finland	FI
	21.	IT – Avvocatura dello Stato (*Governmental Legal Service)	IT(1)

	22.	IT – Ministry of Justice, Department of Justice Affairs	IT(2)
	23.	IT – Ministry of Justice	IT(3)
	24.	IT – Court of Appeal Milano	IT(4)
	25.	IT – Tribunale di Milano; AGI avvocati giuslavoristi italiani	IT(5)
	26.	IT – Ministry of Justice, Court of Appeal Salerno	IT(6)
	27.	IT – Procura della Repubblica c/o Tribunale di Cosenza	IT(7)
	28.	IT – Tribunale di Firenze	IT(8)
	29.	IT – Tribunale di Ivrea	IT(9)
	30.	IT – Court of Appeal Brescia	IT(10)
	31.	IT – Corte Suprema di Cassazione	IT(11)
	32.	IT – Ispettorato generale presso il Ministero di Grazia e Giustizia	IT(12)
	33.	IT – Procura della Repubblica di Busto Arsizio	IT(22)
	34.	IT – Tribunale di Bergamo	IT(23)
	35.	IT – Procura della Repubblica Presso il Tribunale di Lodi	IT(24)
	36.	IT – Tribunale di Busto Arsizio	IT(25)
	37.	IT – Court of Ravenna	IT(33)
	38.	IT – Tribunale di Bologna	IT(34)
	39.	HR – Ministry of Justice Croatia	HR
	40.	UK – Northern Ireland Courts and Tribunals Service	UK
	41.	EU – Publications Office of the European Union	EU_Pub
TOTAL: 41 replies			
1 – 3 Projects	1.	FR – Ministry of Justice	FR(1)
	2.	SE – Skatteverket (*Swedish Tax Agency)	SE(9)
	3.	MT – Department of Justice	MT
	4.	DE – Commission for information technology in the judiciary (workgroup use of cognitive systems in judiciary)	DE(2)
	5.	PT – Instituto Nacional da Propriedade Industrial (*National Institute of Industrial Property (INPI))	PT(6)
	6.	LT – Forensic Science Center of Lithuania	LT(3)
	7.	NL – Ministry of Justice and Security	NL(2)
	8.	NL – Ministry of Justice and Security – Jurisprudence – Robot	NL(3)
	9.	NL – Ministry of Justice and Security – DigiAkkoord	NL(4)
	10.	NL – Ministry of Justice and Security – Financial Emergency Brake (FEB)	NL(5)
	11.	NL – Ministry of Justice and Security – Known Traveller Digital Identity (KTDI)	NL(6)
	12.	IT – Court of Ravenna	IT(16)
	13.	EE – Ministry of Justice on behalf of Estonian courts	EE(2)
TOTAL: 13 replies			

6.1.12. Blockchain/DLT – elaborated projects in this study

Q32: In the context of this questionnaire, please indicate for how many projects that are exploring or using **blockchain/DLT** you would be able to provide information? If you have project information for more than 4 projects, please, indicate in the free text below and we will organise a dedicated interview with you.

A total of 14 (or 14% of all 100) replies from stakeholders have been received, where 10 (or 71% of the 14 replies) selected '1 Project', 1 (or 7% of the 14 replies) selected '2 Projects', no-one indicated to be able to provide information about more than 2 projects, and 3 (or 22% of the 14 replies) selected 'Other'.

The number of stakeholders who did not reply to this question, is not taken into account for the calculation of the percentages represented in the chart below.

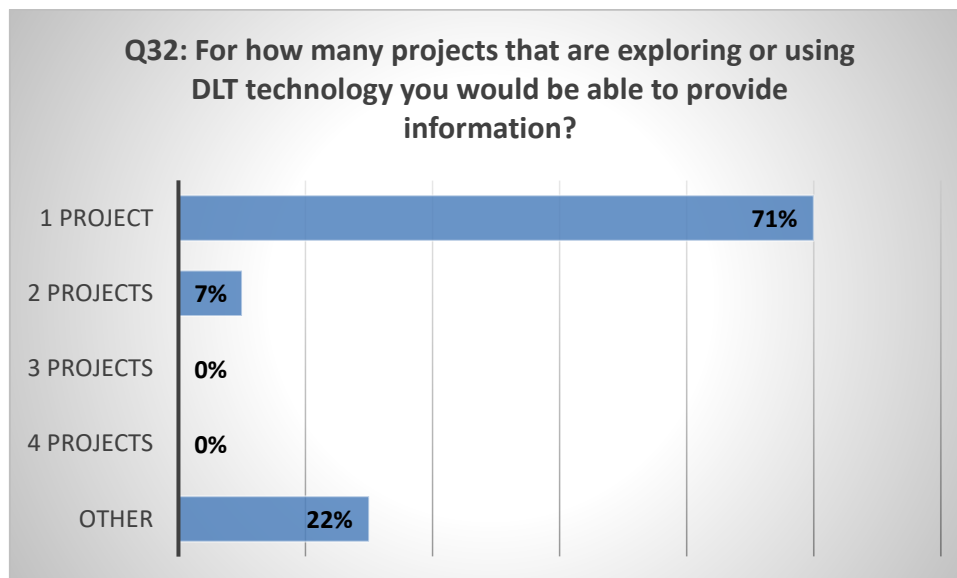


Table 6.1.11: Number of projects using blockchain/DLT technologies described – replies

Reply	No.	Respondent	Respondent code
1 Project	1.	FR – Ministry of Justice	FR(1)
	2.	SE – Skatteverket (*Swedish Tax Agency)	SE(9)
	3.	MT – Department of Justice	MT
	4.	PT – Instituto Nacional da Propriedade Industrial (*National Institute of Industrial Property (INPI))	PT(6)
	5.	LT – Forensic Science Center of Lithuania	LT(3)
	6.	NL – Ministry of Justice and Security – DigiAkkoord	NL(4)
	7.	NL – Ministry of Justice and Security – Financial Emergency Brake (FEB)	NL(5)
	8.	NL – Ministry of Justice and Security – Known Traveller Digital Identity (KTDI)	NL(6)
	9.	IT – Court of Ravenna	IT(16)
	10.	EE – Ministry of Justice on behalf of Estonian courts	EE(2)
TOTAL: 10 replies			
2 Projects	1.	DE – Commission for information technology in the judiciary (workgroup use of cognitive systems in judiciary)	DE(2)
TOTAL: 1 reply			
Other	1.	NL – Ministry of Justice and Security	NL(2)
	2.	IT – Procura della Repubblica di Busto Arsizio	IT(22)
	3.	IT – Tribunale di Busto Arsizio	IT(25)
TOTAL: 3 replies			

6.2. National strategies and policies

A total of 32 stakeholders from 17 Member States replied that they have in place national strategies or policies on the use of innovative technologies¹⁷⁵.

Disclaimer: The table contains the replies of national administrations and bodies from 17 Member States, who replied that their Member State has in place a national strategy or policy on the use of innovative technologies in the justice field. The table further contains information on 7 Member States who did not provide information about a policy or a strategy, however one was found online based on desk research.

The status of strategies or policies is indicated in the table below as **Adopted**,¹⁷⁶ **In preparation**¹⁷⁷ or **Planned**¹⁷⁸ in Member States.

The table represents information gathered about strategies and policies of the Member States based on the replies to the questionnaire, desk research and/or interviews with representatives of the respective Member States' national authorities. Where provided by the stakeholders in their replies to the questionnaire, during an interview or publicly available, the strategies and/or policies are included in the List of References (Annex I) and a link is included in the 'Comments' section of the table below. If the text of a strategy or policy was not provided, not available, not constituting a 'national strategy or plan' or not yet in the phase 'Adopted', this is indicated with 'Not applicable (N/A)'.

The summaries presented have been proposed by the contractor after reviewing the respective document. In the cases where a document was not available, information on it is provided by the respondent in their reply to the questionnaire, this information is included in the 'Summary' section and the source is indicated.

¹⁷⁵ Including 'Yes' and 'Other' replies.

¹⁷⁶ RGB=146-208-80

¹⁷⁷ RGB=91-155-213

¹⁷⁸ RGB=255-255-204

Table 6.2: National strategies and policies focusing on innovative technologies

No	Member State	Strategy/policy/plan	AI/DLT	Phase	Summary	No. in Annex I – List of References	Comments
1	Austria	e-Justice Strategy ¹⁷⁹	AI	Adopted, December 2018	The document identifies AI as the strategic technology of the future, identifies potential areas of application, and outlines the current intended boundaries in the judiciary through strategic guidelines.	27	https://bit.ly/2udz0pS
2	Bulgaria	National Programme for Development of Bulgaria 2030 ¹⁸⁰	General	In preparation	General strategy on development comprising a number of key objectives, one of which is the technological development and fostering innovation and digital economy.	N/A	Draft document available in Bulgarian: file:///C:/Users/P70153/Downloads/Bulgaria%202030%20proekt%20(3).pdf A strategy on the AI development has been proposed and is currently under preparation, but not publically available.
		Strategic action plan 2020-2022 ¹⁸¹	General	Adopted	The National Institute of Justice's activity aims at providing high-quality training for justice professionals. The Institute's training activity is regulated by the Constitution, the Judiciary System Act, and the Internal Rules of the Organisation on its Training Activity and other relevant documents. The Institute has adopted the Strategic action plan 2020-2022, which sets out key policies that shall be	N/A	Available in Bulgarian at: http://www.nij.bg/Articles/Articles.aspx?lang=bg-BG&pageid=1793

¹⁷⁹ Source: Reply to questionnaire and desk research.

¹⁸⁰ Source: Desk research.

¹⁸¹ Source: Reply to questionnaire.

No	Member State	Strategy/policy/plan	AI/DLT	Phase	Summary	No. in Annex I – List of References	Comments
					developed for the purposes of providing excellency in training for justice professionals. One of the strategic objectives of the Institute is to deploy innovative methods of training and promote the use of innovative technologies in judicial training. ¹⁸²		
3	Belgium	AI4Belgium report ¹⁸³	AI	In preparation	<p>The main objectives of the future Belgian national strategy includes:</p> <ul style="list-style-type: none"> • Concluding a new learning deal with skills building programmes to prepare existing and upcoming generations to the societal transformations that AI technologies bring along, including lifelong learning and reskilling and reinforcement of human skills in AI at all education levels; • Financial funding and initiatives to fuel research and innovation power in the private 	N/A	<p>Report: https://www.ai4belgium.be/wp-content/uploads/2019/04/report_en.pdf</p> <p>See more information on the future strategy: https://ec.europa.eu/knowledge4policy/ai-watch/belgium-ai-strategy-report_en</p>

¹⁸² Source: Reply to questionnaire.

¹⁸³ Source: Desk research.

No	Member State	Strategy/policy/plan	AI/DLT	Phase	Summary	No. in Annex I – List of References	Comments
					<p>sector such as reinforced research laboratories and projects, focusing on SMEs;</p> <ul style="list-style-type: none"> Transformation of the public sector ecosystem; Fostering collaboration and networking; Development of ethical guidelines for the use of AI. <p>All these objectives propose strategic policy actions for their fulfilment.</p>		
4	Croatia	Strategy on the promotion and use of innovative technologies ¹⁸⁴	General	In preparation	Document not available.	N/A	
5	Cyprus	National Artificial Intelligence Strategies ¹⁸⁵	AI	In preparation	<p>Cyprus will focus on the following priority areas:</p> <ul style="list-style-type: none"> Cultivating talent, skills and lifelong learning; Increasing the competitiveness of businesses through 	N/A	

¹⁸⁴ Source: Interview with the Croatian Ministry of Justice and desk research. The Strategy has been prepared by the Ministry of Economy.

¹⁸⁵ Source: Desk research

No	Member State	Strategy/policy/plan	AI/DLT	Phase	Summary	No. in Annex I – List of References	Comments
					<p>support initiatives towards research and innovation and maximising opportunities for networking and partnerships;</p> <ul style="list-style-type: none"> • Improving the quality of public services through the use of digital and AI-related applications; • Creating national data areas; • Developing ethical and reliable AI. 		
6	Czech Republic ¹⁸⁶	National Strategy on AI 2019 -2030 ¹⁸⁷	AI	Adopted, May 2019	<p>The National Strategy on AI is linked to the Coordinated Plan for AI. It targets priority areas of development of AI and their impacts. Each priority area contains a summary of the current situation, based primarily on the Report on the AI Potential in the Czech Republic and the mapping performed by the AI Platform of the Confederation of Industry. There are a total of seven chapters, which correspond to the areas defined in the Coordination Plan. Chapter 6 of the National</p>	21	<p>https://www.mpo.cz/assets/en/guidepost/for-the-media/press-releases/2019/5/NAIS_eng_web.pdf</p>

¹⁸⁶ Note: In the reply to the questionnaire, the respondent organisation indicated that the strategy period covers 2019 to 2035. However, the strategy itself indicates a period until 2030.

¹⁸⁷ Source: Reply to questionnaire and desk research.

No	Member State	Strategy/policy/plan	AI/DLT	Phase	Summary	No. in Annex I – List of References	Comments
					Strategy on AI, Legal and societal aspects of AI, ethical rules, consumer protection and security issues, sets out a number of objectives concerning the use of innovative technologies in the justice sector.		
7	Denmark	Denmark's National Strategy for AI ¹⁸⁸	AI	Adopted, March 2019	<p>The strategy proposes four objectives for the Danish development and use of AI:</p> <ul style="list-style-type: none"> - Denmark should have a common ethical and human-centred basis for AI - Danish researchers should research and develop AI - Danish businesses should achieve growth through developing and using AI - The public sector should use AI to offer world-class services. <p>These main objectives are followed by 24 initiatives. In a nutshell, the strategy develops and focuses on four areas: responsible foundation for AI; more and better data; strong expertise and new</p>	18	https://bit.ly/32aB2Uj https://bit.ly/2vNW9Qk

¹⁸⁸ Source: Desk research.

No	Member State	Strategy/ policy/plan	AI/DLT	Phase	Summary	No. in Annex I – List of References	Comments
					knowledge; and increased investment in AI.		
8	Estonia	National AI strategy 2019-2021 ¹⁸⁹	AI	Adopted, July 2019	Following the adoption of the national strategy on AI, the Estonian government plans to invest EUR 10 million between 2019-2021, reinforcing its role in supporting the use of AI in both the public and private sectors. Since October 2019, Estonia has deployed 23 AI solutions for its public sector and aims to have 50 use cases by 2020. At the same time, the private sector is also using AI in multiple business areas. From a legal perspective, there is no indication regarding possible adaptation of the current legislation as AI developed in Estonia will be completely human-centric. For the Estonian government, the benefits of using AI will be on developing e-governance and attracting new investments in innovation activities.	24	https://www.kratid.ee/in-english ; https://bit.ly/2HE5qx5

¹⁸⁹ Source: Reply to questionnaire.

No	Member State	Strategy/policy/plan	AI/DLT	Phase	Summary	No. in Annex I – List of References	Comments
9	Finland	Age of AI Programme ¹⁹⁰	AI	Adopted 2017	<p>The document highlights the importance of AI for Finland and describes the steps taken towards making Finland highly advanced in this field. It lists the actions taken so far and plans for the future. It further analyses the current and future position of Finland in the competitive international landscape and elaborates the impact of AI on both the public and private sectors. There are 11 key actions:</p> <ol style="list-style-type: none"> 1. Enhance business competitiveness through the use of AI 2. Effectively utilise data in all sectors 3. Ensure that AI can be adopted more quickly and easily 4. Ensure top-level expertise and attract top experts 5. Make bold decisions and investments 6. Build the world’s best public services 7. Establish new models for collaboration 	19	https://tem.fi/en/artificial-intelligence-programme

¹⁹⁰ Source: Desk research

No	Member State	Strategy/policy/plan	AI/DLT	Phase	Summary	No. in Annex I – List of References	Comments
					8. Make Finland a frontrunner in the age of AI 9. Prepare for artificial intelligence to change the nature of work 10. Steer AI development into a trust-based, human-centric direction 11. Prepare for security challenges		
		Digitalisation plan for the justice field ¹⁹¹	General	Adopted	Document not available.	N/A	The document is regularly updated and includes projects and initiatives, which are utilising innovative technologies.
10	France	Open Justice Programme ¹⁹²	AI	Adopted	Open Data of administrative and judicial rulings, automatic anonymisation of judicial sentences by the use of an AI technology.	N/A	France has an interministerial directorate (DINUM) that promotes making data available to the public (Open Data) and the use of shared digital resources and services by ministries and government agencies. It encourages the use of innovative technologies in the public administration in general. Moreover, France has created a national coordinator for AI strategy.
		AI for Humanity ¹⁹³	AI	Adopted in March 2018	The main objectives of the French AI strategy, as highlighted by the French President, are to: <ul style="list-style-type: none"> • Improve the AI education and training ecosystem to 		https://www.aiforhumanity.fr/en/

¹⁹¹ Source: Reply to questionnaire

¹⁹² Source: Reply to questionnaire

¹⁹³ Source: Desk research

No	Member State	Strategy/policy/plan	AI/DLT	Phase	Summary	No. in Annex I – List of References	Comments
					develop and attract the best AI talent <ul style="list-style-type: none"> • 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 		
11	Germany	AI strategy ¹⁹⁴	AI	Adopted, November 2018	The strategy sets three main goals: <ul style="list-style-type: none"> • Making Germany and Europe a leading centre for AI and thus helping safeguard Germany's competitiveness in the future (e.g. by developing existing Centres of Excellence for AI at supra-regional level, establishing additional Centres of Excellence for AI, and developing them into a national network of at least 12 centres and application hubs). • Integrating AI in society in ethical, legal, cultural and institutional terms in the context of a broad societal dialogue and active 	17	Strategy available at: www.ki-strategie-deutschland.de

¹⁹⁴ Source: Desk research and interview consultations

No	Member State	Strategy/policy/plan	AI/DLT	Phase	Summary	No. in Annex I – List of References	Comments
					<p>political measures (e.g. by elaborating guidelines for developing and using AI systems in a way that is compatible with data protection rules).</p> <ul style="list-style-type: none"> Foster responsible development and use of AI to serve the good of society (e.g. by setting up a German observatory for AI). 		
12	Hungary	AI strategy ¹⁹⁵ AI Action Plan	AI	In preparation ¹⁹⁶	<p>In October 2019, Hungary announced the launch of an AI Action Plan, which provides initial steps towards a national AI Strategy. The announcement of the AI Action Plan highlighted various preliminary initiatives that will be further developed in the AI Strategy, such as:</p> <ul style="list-style-type: none"> Encouraging the development of AI technologies by reinforcing opportunities for basic research and innovations in AI Fostering education in AI-related skills and competences 	N/A	<p>http://abouthungary.hu/news-in-brief/hungarys-artificial-intelligence-strategy-is-ready/</p> <p>https://www.kormany.hu/en/ministry-for-innovation-and-technology/news/ai-action-plan-and-strategy-to-be-developed-this-year</p>

¹⁹⁵ Source: Desk research

¹⁹⁶ Not available online

No	Member State	Strategy/policy/plan	AI/DLT	Phase	Summary	No. in Annex I – List of References	Comments
					<ul style="list-style-type: none"> Developing a regulatory framework and strengthening international relations Supporting the creation of a well-developed infrastructure and data sharing facilities 		
13	Ireland	National Digital Strategy ¹⁹⁷	General	In preparation	Adding to the Irish National Digital Strategy is the development of an Irish National AI strategy. This Strategy is to provide a high-level direction for the development, adoption and implementation of AI in Ireland. The strategy is planned to be published in 2020. ¹⁹⁸	N/A	https://bit.ly/3bLZPT0
14	Italy	Report of the Digital Transformation team at the Prime Minister's Office ¹⁹⁹	General	Adopted	One of the objectives set by the Minister of Justice crystallised in an act of political and institutional guidance for the year 2020 which is a continuation of the work already undertaken. Another objective is the continuation of the digitalisation of services provided to citizens through a wide dissemination of	N/A	https://www.giustizia.it/giustizia/it/mg_1_29_6_2.page

¹⁹⁷ Source: Interview with Irish Ministry of Justice

¹⁹⁸ Information provided during interview

¹⁹⁹ Source: Reply to questionnaire

No	Member State	Strategy/policy/plan	AI/DLT	Phase	Summary	No. in Annex I – List of References	Comments
					information and communication technologies, as well as through the re-engineering of systems. The strengthening and use of innovative technologies, such as AI systems, Blockchain and Distributed Ledger Technology (DLT) is therefore considered of fundamental importance. This will be done in compliance with the principles set out in the European Ethical Charter on the use of artificial intelligence in judicial systems and their environment adopted by the European Commission for the Efficiency of Justice (CEPEJ) on 4 December 2018. ²⁰⁰		
		National Strategy on Artificial Intelligence ²⁰¹	AI	In preparation	Key objectives of the strategy aiming to increase the development and competitiveness of AI in Italy will be: <ul style="list-style-type: none"> Improving AI-related skills and competences at all education levels and creating lifelong learning and reskilling 	N/A	

²⁰⁰ Comment provided by the stakeholder in their reply to the questionnaire.

²⁰¹ Source: Desk research

No	Member State	Strategy/ policy/plan	AI/DLT	Phase	Summary	No. in Annex I – List of References	Comments
					<p>opportunities for the labour force</p> <ul style="list-style-type: none"> • Fostering AI research and innovation to enhance the competitiveness of the entrepreneurial ecosystem • Establishing a regulatory and ethical framework to ensure a sustainable and trustworthy AI • Supporting (international) networks and partnerships • Developing a data infrastructure to fuel AI developments • Improving public services through a wider adoption and use of AI applications 		
15	Latvia	Strategy on Developing AI Solutions ²⁰²	AI	Adopted	<p>This strategy devotes particular attention to the promotion of AI in the public administration. It also outlines policy actions in the following areas:</p> <ul style="list-style-type: none"> • Raising the awareness of and competences in AI across society through education reforms • Promoting the adoption and development of AI in 	30	Available in Latvian only: https://ec.europa.eu/knowledge4policy/ai-watch/latvia-ai-strategy-report

²⁰² Source: Desk research

No	Member State	Strategy/ policy/plan	AI/DLT	Phase	Summary	No. in Annex I – List of References	Comments
					<p>the public and private sector</p> <ul style="list-style-type: none"> • Actively engage in national and international cooperation • Developing an appropriate legal and ethical framework for AI • Unleashing the benefits of a well-developed data ecosystem • Investing in a digital and telecommunication infrastructure to support AI developments 		
16	Luxembourg	Paperless Justice programme ²⁰³	General	Launched/ Adopted	<p>Aims at digitalising the justice system by using innovative technologies. In the view of the Ministry of Justice, a good IT infrastructure is an indispensable prerequisite in order to make the most of current and future developments in the field of AI. Once the digitalisation of judicial institutions is properly in place, it is only natural to consider the use and development of AI tools in the justice field. The JUCIV case management system of the Luxembourgish judiciary for civil and commercial cases is</p>	N/A	/

²⁰³ Source: Reply to questionnaire and interview with the Ministry of Justice.

No	Member State	Strategy/policy/plan	AI/DLT	Phase	Summary	No. in Annex I – List of References	Comments
					the basis of the programme. The objective is to improve systems like JUCIV and open it to lawyers, other legal professionals and the public. The plan is then to implement AI as part of the system. Luxembourg is also willing to upgrade other systems like JUCHA for criminal cases and the portal Guichet.lu/My Guichet.lu for citizens and legal entities.		
		Strategic vision for Luxembourg 204	AI	Adopted in May 2019	The strategy is part of a broader policy program called Digital Luxembourg aiming at coordinating and strengthening Luxembourg’s efforts in the digital transformation towards the development of a solid digital society. The strategy acts as a vision paper outlining the ambitions of Luxembourg in the field of artificial intelligence and presenting strategic policy recommendations in key areas. The policy vision of Luxembourg’s strategy is to support the development of a	N/A	https://digital-luxembourg.public.lu/sites/default/files/2019-05/AI_EN.pdf

²⁰⁴ Source: Desk research

No	Member State	Strategy/policy/plan	AI/DLT	Phase	Summary	No. in Annex I – List of References	Comments
					human-centric AI based on an efficient and sustainable data-driven ecosystem. It aims at positioning Luxembourg as a leading digital society in the world		
17	Lithuania	Lithuanian Artificial Intelligence Strategy: a vision for the future ²⁰⁵	General	Adopted in May 2019	<p>The strategy provides an overview of the current AI landscape in Lithuania and a range of policy recommendations in key areas with the aim to:</p> <ul style="list-style-type: none"> • Improve the skills and education in AI for all citizens • Strengthen the national research and innovation ecosystem in the field of AI • Increase the deployment, development and use of AI in all economic activities, including both the private and public sector • Promote national and international collaborations in AI and enhance network opportunities • Developing an ethical and legal framework for a sustainable and 	29	http://kurklit.lt/wp-content/uploads/2018/09/StrategyIndesignpdf.pdf

²⁰⁵ Source: Desk research

No	Member State	Strategy/policy/plan	AI/DLT	Phase	Summary	No. in Annex I – List of References	Comments
					transparent development of AI applications <ul style="list-style-type: none"> Establish a responsible and efficient data ecosystem for AI 		
18	Malta	Digital Strategy 2014 – 2020 ²⁰⁶	General	Adopted in 2014	Establishes the vision on how ICT can be deployed to enhance socio-economic development. As a national strategy, it encourages all sectors of government, including justice, to make use of innovative technologies in order to improve the provision of services and the quality of life of the Maltese population. Hence, while no specific e-justice strategy is in place, the national strategy outlines the strategic enablers that need to be taken into account when introducing innovative technologies within the justice field.	27	In addition, other national legislation and policies have been adopted. It circumscribes the parameters of digitisation across public administration, namely: <ul style="list-style-type: none"> The Innovative Technology Arrangements and Services Act: https://legislation.mt/eli/cap/592/eng/pdf Mapping Tomorrow – A Strategic Plan for the Digital Transformation of the Public Administration 2019 – 2021 https://bit.ly/2HHNce6 - see Page 38.
		New Digital Justice Strategy 2020-2026 ²⁰⁷	General	In preparation	Document not available.	N/A	

²⁰⁶ Source: Reply to questionnaire and interview with the Ministry of Justice

²⁰⁷ Source: Interview with the Ministry of Justice

No	Member State	Strategy/policy/plan	AI/DLT	Phase	Summary	No. in Annex I – List of References	Comments
		A Strategy and vision for Artificial Intelligence for Malta 2030 ²⁰⁸	AI	Adopted in 2019	<p>The objective for Malta is to gain a strategic competitive advantage in the global economy in the field of AI. To achieve this objective, the policy report presents three pillars to lay the foundations for Malta's AI strategy:</p> <ul style="list-style-type: none"> • Creation of a solid AI ecosystem based on investments, start-up support and innovation • Support for increased adoption of AI in the public sector • Support measures for the adoption of AI in the private sector 		https://malta.ai/wp-content/uploads/2019/11/Malta_The_Ultimate_AI_Launchpad_vFinal.pdf
19	The Netherlands	Strategic Action Plan on AI (October 2019) ²⁰⁹ (See also documents in the comment)	AI	Adopted	The Strategic Action Plan establishes the Dutch intention and principles to be in the forefront of the use of AI, while protecting the public interest. The main goal of the strategy is organised into three tracks. The first track encompasses the creation of numerous Public Private Partnerships, especially with	25	<p>Strategic Action Plan on AI: https://bit.ly/2P7jJhO</p> <p>Letter to Parliament from the Minister for Legal Protection on Transparency of algorithms used by the government: https://bit.ly/2ufZ6sv</p> <p>Letter to Parliament from the Minister for Legal Protection about AI and algorithms: https://bit.ly/3bUKO1g</p>

²⁰⁸ Source: Desk research

²⁰⁹ Source: Reply to the questionnaire

No	Member State	Strategy/policy/plan	AI/DLT	Phase	Summary	No. in Annex I – List of References	Comments
					the Dutch AI Coalition ²¹⁰ with the main objective to capitalise on societal and economic opportunities. The second track aims to guarantee the preconditions for a <i>favourable AI climate in the economy and society at large</i> . The third track focuses on <i>strengthening foundations</i> with the concern of safeguarding human fundamental rights and ensuring proper legal and ethical frameworks. Finally, these three tracks incorporate 11 objectives that guideline and support the national Strategy.		<p>Letter to Parliament from the Minister of the Interior and Kingdom Relations regarding Cabinet response to the University of Utrecht’s report on Algorithms and Fundamental Rights: https://bit.ly/2P9wDLX</p> <p>Letter to Parliament from the Minister for Legal Protection on the Protection of Horizontal Privacy: https://bit.ly/2V75hdb</p> <p>Letter to parliament about AI, public values and human rights: https://bit.ly/2P7jK5m</p> <p>Letter to Parliament about safeguards against the risks of data analysis by the government: https://bit.ly/2v2fKfl</p> <p>Guidelines for applying algorithms by government: https://bit.ly/2SYKENQ</p>
20	Poland	Artificial Intelligence Development Policy for Poland ²¹¹	AI	In preparation	The objective of Poland’s strategy is to encourage the growth and innovation of the knowledge-based economy by supporting AI science and research developments, as	N/A	Available in Polish: https://ec.europa.eu/knowledge4policy/ai-watch/poland-ai-strategy-report_en

²¹⁰ Official Website to the Dutch AI Coalition: <https://nlaic.com/>

²¹¹ Source: Desk research

No	Member State	Strategy/policy/plan	AI/DLT	Phase	Summary	No. in Annex I – List of References	Comments
					well as to prepare citizens for the digital transformation by improving their competences. Along the process of achieving these objectives it is important to account for the protection of human dignity and to ensure conditions for fair competition.		
21	Portugal	AI Portugal 2030 – Portuguese National Initiative on digital skills. An innovation and growth strategy to foster AI in Portugal in the European context ²¹²	AI	Adopted	This strategy is fully aligned with the Coordinated Action Plan of the EU and its Member States and is included in INCoDe.2030, the Portuguese initiative to foster digital skills. It considers and promotes a coordinated approach at a European level encouraging the use of AI to help solve global challenges, from health to climate, from transport to agriculture, and from cybersecurity to industry in general. The current text is the result of a two-year dialogue and should continuously evolve as a result of annual reviews and a systematic process of mobilising citizens and key stakeholders. The objectives include economic growth, scientific excellence, and increasing the qualifications of the labour	23	https://www.incode2030.gov.pt/sites/default/files/julho_incode_brochura.pdf https://ec.europa.eu/knowledge4policy/ai-watch/portugal-ai-strategy-report#aistrategy

²¹² Source: Reply to questionnaire and interview

No	Member State	Strategy/policy/plan	AI/DLT	Phase	Summary	No. in Annex I – List of References	Comments
					force, particularly with regard to using new technologies, while promoting inclusion and awareness at all levels of education. The growing use of AI should also strengthen societal robustness by building a clear vision of the impacts of AI in democracy, privacy, security, fairness, the labour market, governmental and commercial transparency, and equity. Although AI could be highly disruptive in all these dimensions if it is made ethical-by-design it could provide a set of powerful tools which improve society and democracy.		
22	Slovakia	2030 Digital Transformation Strategy for Slovakia ²¹³	Digital Transformation/AI	Adopted	The <i>2030 Digital Transformation Strategy for Slovakia</i> represents Slovakian perception of the need for transformation from an industrial society into an information society. Furthermore, this Strategy, mainly coordinated by the Office of the Deputy Prime Minister of the Slovak Republic for Investment and Informatisation, follows the EU agenda for the Single Digital	28	2030 Digital Transformation Strategy for Slovakia full document available at: https://www.vicpremier.gov.sk/wp-content/uploads/2019/10/SDT-English-Version-FINAL.pdf

²¹³ Source: Desk research

No	Member State	Strategy/ policy/plan	AI/DLT	Phase	Summary	No. in Annex I – List of References	Comments
					Market and the priority of a broad digital transformation. Comprising a period from 2019-2030, the Strategy emphasises and in a certain way prioritises the use of innovative technologies such as AI, in order to pursue <i>economic and sustainable growth</i> and to increase citizens' quality of life.		
		Action plan for the digital transformation of Slovakia for 2019 –2022	General	Adopted in 2019	<p>The Slovakian Action Plan sets out a list of policy initiatives with a short-term horizon that covers the following strategic areas:</p> <ul style="list-style-type: none"> • Supporting digital transformation of schools and education to prepare for digital skills needed in the digital era • Strengthening the basis for a digital and data economy • Improving abilities of the public administration to innovate and use the data for the benefit of citizens • Supporting the development of an AI ecosystem 	N/A	https://www.vicpremier.gov.sk/wp-content/uploads/2019/10/AP-DT-English-Version-FINAL.pdf

No	Member State	Strategy/policy/plan	AI/DLT	Phase	Summary	No. in Annex I – List of References	Comments
23	Slovenia	Action Plan related to the use of AI ²¹⁴	AI	Adopted	Document not available.	N/A	
24	Spain	Spanish Research, Development and Innovation Strategy in AI ²¹⁵	AI	Adopted	The Strategy establishes a series of priorities that will be framed within the new Spanish Strategy for Science, Technology and Innovation (EECTI) 2021-2028. These priorities will be developed as initiatives and activities defined and financed through the Science, Technology and Innovation Stars Plans (PECTI). It will mobilise the synergies between the different levels of public administration and through the co-development of the public and private sectors. One of the conditions in the Strategy for developing technologies and applications of AI is to avoid the negative bias and prejudices of our society, such as gender, race and other forms of discrimination. AI decision-making systems should be developed in a way so that they are bias-free. The	22	https://bit.ly/2SGydr0

²¹⁴ Source: Interview with Ministry of Justice

²¹⁵ Source: Desk research and reply to questionnaire

No	Member State	Strategy/policy/plan	AI/DLT	Phase	Summary	No. in Annex I – List of References	Comments
					Strategy also includes a series of recommendations that transcend R&D and demand the involvement of other sectors and ministerial departments in view of the multidisciplinary and transversal nature of AI and the technological and social revolution it implies.		
25	Sweden	National Approach to AI ²¹⁶	AI	Adopted in 2018	The Swedish national approach on AI aims to confirm Sweden’s vanguard position on the opportunities offered by digital transformation and the use of innovative technologies. Consequently, this document acknowledges the benefits of introducing the use of AI in multiple areas such as in increasing economic and social sustainable growth or environmental challenges. Furthermore, the Strategy establishes key conditions for the use of AI in Sweden via a solid framework and infrastructure that encompasses three main	20	https://bit.ly/328CWoy The Swedish Innovation agency Vinnova ²¹⁷ has a mandate to promote innovation and digitalisation strategies in Sweden and encourage public authorities to look into artificial intelligence (AI). ²¹⁸

²¹⁶ Source: Reply to questionnaire and desk research.

²¹⁷ <https://www.vinnova.se/en/>

²¹⁸ Source: Interview with Swedish Companies Register

No	Member State	Strategy/ policy/plan	AI/DLT	Phase	Summary	No. in Annex I – List of References	Comments
					areas: Education and Training, Research and Innovation, and use.		

6.3. Overview of projects in the Member States

This section presents an overview of the 93 projects identified based on the responses to the questionnaire received from national authorities and the judiciary from 21 Member States and further complemented by the interviews (marked with '*' in the table below). The table below demonstrates the number of projects per Member State, the organisation – project owner, the justice field the project falls in, its status, timeframe and short description.

It is important to highlight that in the context of this study, a project is defined as a piece of planned work or an activity, which is carried out over a period of time and intended to achieve a particular result. More specifically, a project would have a defined budget, timeframe, an assigned project team and specific deliverables; a proof of concept (PoC) or Business case documents are also included. The status of projects is indicated as Completed²¹⁹, Ongoing²²⁰, Planned²²¹, or Suspended²²² in a colour code as presented in the table below.

Project status	Total number	Colour code in Red-Green-Blue (RGB) code
Completed	25	Green
Ongoing	55	Blue
Planned	12	Yellow
Suspended	1	Grey
Total:	93	

A detailed description of all completed and ongoing projects is presented in this document in Annex II – Explored projects and use cases in Member States.

Out of 93 projects, 25 projects have been completed, 55 are ongoing, 12 are planned and 1 has been suspended.

²¹⁹ RGB=146-208-80

²²⁰ RGB=91-155-213

²²¹ RGB=255-230-53

²²² RGB=191-191-191

Table 6.3: Explored projects and use cases in Member States

No	Member State	Organisation/Project owner	Project title	AI/DLT	Status	Timeframe	Justice field	Short description	Project ref. No. in Annex II
1	Austria	Federal Ministry of Justice	AI for analysis of investigative data	AI	Ongoing	2017-2020	Criminal investigation	<p>This project focuses on recognition and population of facts and entities in investigative data (collected through house searches).</p> <p>It aims to solve the problem of processing large amounts of investigative data. The prosecutor has the possibility of training the algorithm with data every day, depending on the respective case and the information they need to analyse. This could be analysis of what documents are there (e.g. invoices), what persons are involved, and identifying whether an email chain contains a formal or an informal conversation.</p> <p>In terms of technology, the project team follows a 'mixed' approach in the training of the algorithms – supervised and unsupervised learning. On the one hand, the prosecutor (or a supporting IT expert) trains the system with the business models and entities they think should be contained in the case. For new entities, the algorithm learns in a supervised manner.</p> <p>In terms of technology, the solution is based on: machine learning; Expert systems and rule-based systems; Natural Language Processing and Computer vision.</p>	3.1
2	Austria	Federal Ministry of Justice	Anonymisation of court decisions	AI	Ongoing	2018-2023	Any	<p>This project focuses on recognition of personal data in court decisions and subsequent anonymisation.</p>	3.2

No	Member State	Organisation/Project owner	Project title	AI/DLT	Status	Timeframe	Justice field	Short description	Project ref. No. in Annex II
								<p>It aims to solve the problem of manual anonymisation of court decisions and data protection compliance. In accordance with the 2019-2023 e-Justice Action Plan, the Federal Ministry wants to publish their decisions in a publicly available court-decision database with free of charge access, and also wants to suggest a publication through the European e-Justice Portal.</p> <p>The solution is based on machine learning and Natural Language Processing.</p>	
3	Austria	Federal Ministry of Justice	Automated allocation and processing of incoming documents	AI	Completed/ In production	Started in 2017 – end 2018	Any	<p>The project fully automates the allocation and processing of incoming documents from electronic channels and/or scanned documents; the extraction of metadata and identification of case numbers with NLP, the categorisation and titling of documents; as well as the recognition of the type of proceedings of new incoming cases.</p> <p>It aims to solve the problem of time-consuming manual document management. The digital filing system also provides other (small) AI tools, e.g. suggests workflows or tasks to the judge (e.g. costs of proceedings).</p> <p>The solution is based on machine learning.</p>	2.1
4	Austria	Federal Ministry of Justice	Searchable case law	AI	Ongoing	2019-2020	Criminal justice	<p>The project focuses on the creation of a digital filing system which suggests workflows or tasks to judges.</p> <p>The tool is based on machine learning and uses Natural Language Processing to make links to external literature and case</p>	3.3

No	Member State	Organisation/Project owner	Project title	AI/DLT	Status	Timeframe	Justice field	Short description	Project ref. No. in Annex II
								law databases and enable clickable citations.	
5	Austria	Federal Ministry of Justice	Facial recognition for inmates	AI	Planned	2020-2021	Criminal justice	<p>This project will focus on the creation of alerts based on video surveillance of inmates by recognising behavioural patterns, expressions, gestures that could imply abnormal situation in prisons.</p> <p>The aim is to bring all recognition aspects, starting from identification of the number of persons in a picture, and identification of aggression.</p> <p>The project aims to reduce the human effort necessary for surveying large volumes of video material and footage in order to detect abnormal behaviour in a timely manner. At a later stage, the project envisages a multi-model approach which would not only use video signals but also other sensors, e.g. microphones and deep sensors. The creation of a digital twin is also envisaged.</p>	Not included
6	Austria	Federal Ministry of Justice	Chatbot on a citizen service portal	AI	Ongoing (In Beta-Test Phase; Preparing for Launch)	Started in 2019 – end May 2020	Any	<p>This project will provide digital services related to court proceedings via a mobile portal.</p> <p>The aim is for citizens to be able to review files at each stage of a case. Citizens will be guided by a chatbot if they have questions (e.g. for legal terms, platform features or possible procedural steps).</p>	3.4

No	Member State	Organisation/Project owner	Project title	AI/DLT	Status	Timeframe	Justice field	Short description	Project ref. No. in Annex II
7	Croatia	Ministry of Justice	Speech-to-Text	AI	Completed/In production	July-December 2018	Any	<p>This project will automate and expedite business processes in courts and state attorney offices by automatically generating minutes of meetings, court decisions, indictments. It is considered as a first step towards eCourts.</p> <p>In terms of technology, the solution is based on machine learning, speech recognition and Language Generation.</p>	2.2
8	Croatia	Ministry of Justice	Project for anonymisation	AI	Ongoing (PoC)	N/I	Any	<p>This project for anonymisation is in the proof of concept phase, and currently negotiations are ongoing with a vendor. To our understanding, the tool would be used for the anonymisation of court documents before their publication.</p>	3.5
9	Czech Republic	Ministry of Justice	Judicial Anonymisation Tool	AI	Ongoing (PoC)	2020-	Any	<p>This project also enables the anonymisation of a large range of decisions by public courts before their publication. The aim is to automate the manual anonymisation of court decisions before publication in view of making them compliant with personal data protection laws.</p> <p>In terms of technology, the solution is based on Expert systems and rule-based systems and Natural Language Processing.</p>	3.6

No	Member State	Organisation/Project owner	Project title	AI/DLT	Status	Timeframe	Justice field	Short description	Project ref. No. in Annex II
10	Denmark	Court Administration (Domstolsstyrelsen)	Domsdatabase	AI	Ongoing	January-December 2020	Any	<p>This project pseudonymises Danish courts' judgments in order to be able to publish them in a move to ensure the transparency of court judgments.</p> <p>In terms of technology, the solution is based on machine learning. Each judgment is pseudonymised and controlled by two human participants. Beforehand, the dataset is pre-screened by the software to identify names, pronouns, phrases and connotations that are problematic in a privacy context.</p>	3.7
11	Denmark	Attorney General (Rigsadvokaten)	Digital Court Planner	AI	Ongoing	2019-	Any	<p>The project focuses on allocation of meeting dates, times and locations to prosecutors based on their profile.</p> <p>It aims to reduce the effort of personnel put into administrative organisation of court meetings and other logistics, to prevent non-efficient meeting planning, and to differentiate between important and less important meetings.</p>	3.9
12	Denmark	Attorney General (Rigsadvokaten)	Anonymise personal and personal sensitive information in organisation's documents	AI	On-hold (pre-PoC)	2018	Any	<p>The project will anonymise personal and personal sensitive information in documents of the organisation so as to reduce the effort needed for the manual work.</p>	Not included
13	Denmark	Danish National Police	Exploring the use of face recognition technology for victim identification across pictorial material of child abuse	AI	Ongoing	2016-	Criminal Justice; Law enforcement	<p>This project explores the possibilities of using facial recognition technology for victim identification in child abuse investigations. Tests are carried out to explore whether the technology can be used for victim identification across pictorial material of child abuse.</p>	3.8

No	Member State	Organisation/Project owner	Project title	AI/DLT	Status	Timeframe	Justice field	Short description	Project ref. No. in Annex II
14	Denmark	Danish National Police	Small-scale projects (1): perceptual hashing	AI	Ongoing	N/I	Criminal justice; Law enforcement	This small-scale project will also be used in the fight against sexual assault and/or child abuse crimes. The tool is under development and uses perceptual hashing to compare videos with content related to sexual assault or abuses. It automatically detects if the same video is present on other hard disks/servers/drives, even if the video has been shortened or edited.	3.10
15	Denmark	Danish National Police	Small-scale projects (2): Prioritisation	AI	Ongoing	N/I	Criminal justice; Law enforcement	This project is aimed at developing a tool, which will analyse material concerning sexual abuse of children and rank the most severe cases highest in order for them to be handled first. In terms of technology, this tool will be based on Machine Learning, Natural Language Processing and Speech Recognition.	3.11
16	Estonia	Ministry of Justice on behalf of Estonian courts	Automated transcription of courts minutes	AI	Ongoing	2018-2020	Any	The project focuses on an automated transcription tool usable in all types of court procedures to generate minutes of court hearings. It aims to solve the problem of manually transcribing court hearings and preparing court minutes, which is time-consuming. In terms of technology, this tool is based on Machine Learning, NLP and speech recognition.	3.12

No	Member State	Organisation/Project owner	Project title	AI/DLT	Status	Timeframe	Justice field	Short description	Project ref. No. in Annex II
17	Finland	Ministry of Justice	Automatic anonymisation and content description of documents containing personal data (Anoppi)	AI	Ongoing	October 2018-September 2020, Pilot starts in spring of 2020	Any	<p>The project consists of two language technology-based AI tools for automatic anonymisation and content description of court decisions and other official decisions issued by authorities. The new applications aim to assist in improving the electronic availability of documents, for example for the purposes of decision-making and research.</p> <p>In terms of technology, the tools are based on expert systems and rule-based systems and use Named Entity Recognition, a type of Natural Language Processing.</p>	3.13
18	Finland	Ministry of Justice	Robot process automation (RPA)	AI	Completed/In production	2019 - January 2020	Enforcement of fines	<p>The RPA project is currently used in the area of enforcement of fines with several objectives: (1) to make enquiries via email to banks and the Finnish Population Centre; (2) to go through data and spot cases of erroneous overpayment in order to facilitate the return of the payment to the citizen; and (3) to allocate overpayments (300-700 cases every year).</p>	2.3
19	Finland	Ministry of Justice	Chatbot-service for divorce/separation situations (part of Aurora project)	AI	Completed but will not go in production	October 2018-February 2019	Civil Justice; Family law and litigation	<p>The pilot chatbot-service for divorce/separation situations aims to improve access to public services (part of "Aurora" project) by helping individuals facing divorce/separation to find the most suitable/effective local services that meets their needs. The tool is based on Expert systems and rule-based systems and Natural Language Processing (NLP). The project will not go into production.</p>	2.4

No	Member State	Organisation/Project owner	Project title	AI/DLT	Status	Timeframe	Justice field	Short description	Project ref. No. in Annex II
20	France	Ministry of Justice	DataJust	AI	Ongoing (PoC)	2019 – early 2022	Civil Justice; General Civil Litigation	<p>The project aims to develop a tool predicting the amount of compensation for different bodily injury claims.</p> <p>The tool would work based on benchmark indicators related to the victim, e.g. gender, age, nature of injury, injury location and seriousness of the bodily injury based on medical expertise. It will analyse the data and match them to the data of victims with similar profiles from previous judgments in order to suggest optimal amount of indemnities that could be claimed. The judgments used for the comparison will be pseudonymised and displayed to the victim for reference.</p> <p>In terms of technology, the solution is based on machine learning, Natural Language Processing and Information Extraction.</p>	3.14
21	France	Ministry of Interior	PreNIUM	DLT	Ongoing (PoC)	January-June 2020	Civil justice	<p>This project studies the feasibility of implementing civil status on a blockchain (for security reasons), i.e. to create a prototype of a civil information register.</p> <p>The project aims to raise awareness about the use of innovative technologies for this administration and to demonstrate how blockchain/DLT can be further used in other administrations.</p>	3.15

No	Member State	Organisation/Project owner	Project title	AI/DLT	Status	Timeframe	Justice field	Short description	Project ref. No. in Annex II
22	France	Cour de Cassation (Court of Cassation)*	AI-driven pseudonymisation of court decisions	AI	Ongoing	February – December 2019	Civil justice	<p>The focus of this PoC is to provide an automated and expedited pseudonymisation of French court decisions, aiming to solve the problem of manual anonymisation and publication of court decisions in compliance with the data protection laws.</p> <p>In terms of technology, the solution is based on machine learning and Natural Language Process (Named Entity Recognition).</p>	3.16
23	Germany	Commission for information technology in the judiciary	Land register analysis component in the project Development of a federal database land register	AI	Ongoing	May 2016- December 2020	Land Registry	<p>This project aims to automate the analysis of existing PDF files with land register information. Afterwards the tool will fragment the file and assign the values to a database field in order to be able to store the contents in a structured manner in a database.</p> <p>In terms of technology, the solution is based on Expert systems and rule-based systems.</p>	3.20
24	Germany	Commission for information technology in the judiciary	Use of blockchain technology in the area of the database land register	DLT	PoC Completed	August – December 2018	Land Registry	<p>This PoC, aimed to assess if a supplementary integrity assurance can be provided for the land register database, by means of blockchain technology.</p> <p>The technology tested is Public but permissioned.</p>	a2.5
25	Germany	Commission for information technology in the judiciary	Automated Anonymisation of Court Decisions	AI	Planned	January 2020- October 2021	Civil Justice; Property law	<p>This project will examine and identify the specific demands and requirements needed for the anonymisation/pseudonymisation of court decisions. The aim is to be able to produce a corpus of anonymised/pseudonymised court</p>	Not included

No	Member State	Organisation/Project owner	Project title	AI/DLT	Status	Timeframe	Justice field	Short description	Project ref. No. in Annex II
								<p>decisions, in which the information and details requiring anonymisation will be marked and annotated.</p> <p>In terms of technology, the solution will be based on Expert and rule-based systems and Natural Language Processing.</p>	
26	Germany	Commission for information technology in the judiciary	Legal Translation Machine Service	AI	Ongoing	June 2018 – December 2020	Any	<p>This project will provide a secure machine translation service so as to improve the process efficiency and acquire insights from available data, reporting and visualisation (e.g. dashboards).</p> <p>In terms of technology, the solution is based on machine learning and Expert systems and rule-based system technology.</p>	3.21
27	Germany	Commission for information technology in the judiciary	Cognitive systems at the prosecutor's office	AI	Ongoing	April 2019- April 2020	Criminal Justice; Criminal Law Enforcement; Criminal Investigation	<p>The project will provide secure machine translation services aiming to: support prosecutors' investigations with structuring files; improve process efficiency in justice; acquire insights from available data, and provide reporting and visualisation (e.g. dashboards).</p> <p>The tool is a customised commercial solution, based on Expert systems and rule-based system technology and natural language processing.</p>	3.22
28	Germany	Commission for information technology in the judiciary	Potentials of blockchain regarding an electronic validity register	DLT	PoC Completed	October 2019- January 2020	Any	<p>The project aimed to examine the possibilities to establish a public electronic register confirming the validity status of documents (valid/revoked) based on blockchain technology. Two examples/uses cases to be examined in</p>	2.6

No	Member State	Organisation/Project owner	Project title	AI/DLT	Status	Timeframe	Justice field	Short description	Project ref. No. in Annex II
								<p>detail are the certificate of inheritance and the notarised certificate of authority.</p> <p>The technology used for blockchain was public but permissioned.</p>	
29	Germany	Central Cybercrime Department of North-Rhine-Westphalia	Research project to fight child pornography with methods of AI	AI	Ongoing (PoC and testing)	April 2019 – (operative phase)	Criminal Justice /Criminal Investigation	<p>The main objective is to identify child pornography images among other pornographic or non-pornographic pictures.</p> <p>It aims to reduce the time needed to manually review images and to increase efficiency.</p> <p>In terms of technology, the solution is based on machine learning and Computer vision.</p>	3.17
30	Germany	Central Cybercrime Department of North-Rhine-Westphalia	Identification of hate crime on social media	AI	Ongoing (Currently training AI to have a scoring system)	Started Q3 2013	Criminal Justice	<p>The tool will include a scoring system for hate crime identification. It is the result of the team effort of the Central Cybercrime Department and university experts with legal background. They rated online postings and the probability that they qualify as illegal offence.</p> <p>The main goal is to develop an autonomous system to provide assistance in screening and identifying hate posts/comments on news and media and in efficiently reporting them to the prosecutor.</p> <p>In terms of technology, the solution is based on machine learning.</p>	3.18

No	Member State	Organisation/Project owner	Project title	AI/DLT	Status	Timeframe	Justice field	Short description	Project ref. No. in Annex II
31	Germany	Central Cybercrime Department of North-Rhine-Westphalia	Future criminal court room	AI	Ongoing	Q1 2020	Criminal Justice; Criminal Proceedings	<p>The aim is to create modern court rooms which allow videotaping and speech-to-text recognition. All participants will receive a transcription and the audio file embedded. 3D-projection of crime scenes is under consideration.</p> <p>The project will result in reducing time and effort and will achieve overall modernisation of court rooms.</p>	3.19
32	Hungary	National Office for the Judiciary	Speech recognition and transcription project	AI	Ongoing	2018	Any	<p>The project explores the use of a speech recognition and transcription software in courts in order to facilitate and expedite the drafting of court decisions and minutes. It would result in reducing manual effort.</p>	3.23
33	Ireland	Department of Justice and Equality	Automatic Number Plate Recognition (ANPR)	AI	Completed	2010	Any	<p>The project resulted in a tool using optical character recognition (OCR) technology to read vehicle registration plates. Later Artificial Intelligence technology has been incorporated in the tool for automatic capturing of plate numbers.</p>	2.7
34	Ireland	Department of Justice and Equality	Evaluate the potential of facial matching technologies as an aid to the intelligence gathering process	AI	Ongoing (PoC)	2019	Any	<p>The project's aim is to evaluate the potential of facial matching technologies as an aid to the intelligence gathering process.</p>	3.24
35	Italy	Court of Appeal, Brescia	Predictive justice – a database to provide predictable guidelines and timing in particular areas	AI	Ongoing	April 2018-December 2020	Civil Justice; Labour and Social Security Law; Contract and Commercial Law; Company Law	<p>This project will implement a jurisprudence database in order to provide predictions of guidelines and timing in particular areas of law.</p> <p>In terms of technology, the database uses expert and rule-based systems and natural language processing.</p>	3.26

No	Member State	Organisation/Project owner	Project title	AI/DLT	Status	Timeframe	Justice field	Short description	Project ref. No. in Annex II
36	Italy	Court of Appeal, Milano	GAM – Giustizia Antitrust Milanese (*Milan Antitrust Justice) (knowledge management AI system)	AI	Completed	N/I	Competition Law	This project focused on collecting case law in the competition field. The system is one of the elements needed for the digitalisation of civil and criminal proceedings as well as some administrative functions such as requesting reimbursement of expenses and collection of credit payments from debtors (sanctions, penalties and legal fees). In terms of technology the solution uses expert systems and rule-based systems.	2.8
37	Italy	Tribunale di Bologna (*Court of Bologna)	Convention	AI	Planned	N/I	Civil Justice; General Civil Litigation; Family Law and Litigation	This project will aim to identify the criteria for quantifying personal injury and maintenance allowances. It will be based on machine learning systems.	Not included
38	Italy	Court of Appeal Salerno	AI in management system of courtrooms	AI	Planned	N/I	Any	This project aims to improve the efficiency and to expedite the management of courtrooms and the organisation of court hearings. In terms of AI technologies, it will use Expert systems and rule-based systems.	Not included
39	Italy	Corte Suprema di Cassazione (*Supreme Court of Cassation)	New monitoring system for the IT infrastructure of cassation court	AI	Planned	N/I	Any	The project will focus on renewing and improving the efficiency of the monitoring system for the IT infrastructure of the court of cassation, using machine learning technology and natural language processing.	Not included

No	Member State	Organisation/Project owner	Project title	AI/DLT	Status	Timeframe	Justice field	Short description	Project ref. No. in Annex II
40	Italy	Tribunale Firenze (*Court of Florence)	The city of simple justice: simplification and reduction of administrative burdens in the context of the resolution of civil disputes	AI	Ongoing (Research)	2018 renewable every year	Competition Law	The project focuses on the preparation of models or algorithms that allow the assessment of the mediability of the disputes, i.e. to what extent disputes could be solved via mediation, also in order for the parties and/or the judge to be able to anticipate the probability of a successful mediation. In terms of technology the solution uses machine learning and natural language processing, speech recognition, Computer vision and Optimisation.	3.27
41	Italy	Tribunale di Genova (*Court of Genoa)	Predictive Algorithms and Judicial Decisions	AI	Ongoing	N/I	Any	The project will result in the creation of predictive algorithms for judicial decisions based on the semantic analysis of existing decisions. The project intends not only to develop analytical algorithms but also suitable tools to explain their operating logic.	3.28
42	Italy	Tribunale di Milano; AGI avvocati giuslavoristi italiani (Italian labour lawyers)	Portale giurisprudenza del lavoro (*Labour case law portal)	AI	Suspended	18 months	Civil Justice; Labour and Social Security Law; Employment Law	The project focused on case law management and accessibility to court decisions. The solution was based on expert and rule-based systems and natural language processing.	Not included
43	Italy	Court of Ravenna	Processo Civile Telematico – PCT (*Digital civil trial)	AI	Ongoing	Started 2015	Civil Justice; General Civil Litigation	The project aims to digitalise civil proceedings. The key objectives are to improve efficiency; increase productivity by automating low-value, routine activities; achieve faster time-to-trial; enhance the 'clearance rate'(number of cases processed).	3.29

No	Member State	Organisation/Project owner	Project title	AI/DLT	Status	Timeframe	Justice field	Short description	Project ref. No. in Annex II
								The technology used is machine learning and Computer vision.	
44	Italy	Court of Ravenna	Digital Signature	DLT	Ongoing	Started 2015	Any	This project complements the existing IT system of the Court of Ravenna by introducing a digital signature solution and data storage on a private/consortium, permissioned blockchain.	3.30
45	Italy	Department of Justice Affairs, Ministry of Justice	<i>Aut Dedere Aut Judicare</i>	AI	Ongoing	September 2017	Criminal Justice; Criminal Law Enforcement	The focus is on data analysis and statistics in the field of international judicial cooperation in criminal matters by detecting certain data in different documents, such as arrest warrants, transfers, extraditions, etc. In terms of technology, the solution is based on expert systems and rule-based systems.	3.31
46	Italy	Ministry of Justice	Semi-automated anonymisation of sensible named entities in text documents	AI	Ongoing	September 2019-March 2020	Civil Justice; Criminal Justice; General Civil Litigation; Criminal Proceedings	This project focuses on investigating by utilising innovative NLP and AI techniques for automatically identifying named entities (both physical persons and legal entities) and related sensitive information, candidates to be anonymised. It aims to solve the problem of manual identification and deletion of personal data through legal workflow automation.	3.32
47	Italy	Procura della Repubblica c/o Tribunale di Cosenza (*Public Prosecutor at the Court of Consenza)	Giustizia penale e intelligenza artificiale (*Criminal justice and AI)	AI	Ongoing	December 2019- December 2021	Criminal Justice; Criminal Investigation; Sentence Enforcement	The project is focused on conceptual modelling of data related procedures past provisions along with the development of a taxonomy; design of an IT system to support these procedures based on raw data; definition of similarity metrics among procedures; design of a dashboard in order to monitor the interpretative	3.33

No	Member State	Organisation/Project owner	Project title	AI/DLT	Status	Timeframe	Justice field	Short description	Project ref. No. in Annex II
								<p>behaviour and the identification of uneven behaviour, etc.</p> <p>It aims to automate manual business processes, in particular legal workflow automation.</p> <p>In terms of technology, It will use data mining and/or Machine Learning algorithms in order to identify the similarity among procedures. A 'pilot case' will focus on gender violence.</p> <p>In terms of technology, it uses machine learning/deep learning; natural language processing and Optimisation.</p>	
48	Italy	Governmental Legal Service*	Avvocatura 2020	AI	Ongoing	June 2018-December 2020	Dispute resolution procedures	<p>This project focuses on roles management, recognition and classification of documents and identification of different tasks.</p> <p>The solution uses machine learning and natural language processing.</p>	3.25
49	Italy	Procura della Repubblica presso il Tribunale di Monza (*Public Prosecutor at the Court of Monza)	Digital Signature	DLT	Ongoing	2015 – currently	Civil Justice; General Civil Litigation	<p>The main aim of the tool is to provide a digital signature and data storage. The tool would assist in document management, in particular digital signing of documents. It would tackle high volumes of documents in a secure and traceable way.</p> <p>The tool is custom developed, based on technologies such as trusted data sharing and “anchoring” of data in classical systems to ensure their integrity. It functions with a private network of nodes.</p>	3.34

No	Member State	Organisation/Project owner	Project title	AI/DLT	Status	Timeframe	Justice field	Short description	Project ref. No. in Annex II
50	Latvia	Prosecutor General's Office*	Voice recognition	AI	Completed (In production)	N/I	Any	This project resulted in a tool that applies AI for voice recognition to be used for court administration.	2.9
51	Lithuania	Forensic Science Centre of Lithuania	Real-time network, text, and speaker analytics for combating organised crime – ROXANNE	AI	Ongoing (Development)	September 2019 – August 2022	Criminal Justice; Criminal Law Enforcement; Criminal Investigation	<p>The project focuses on the tracking and uncovering of organised (often cross-border) criminal networks.</p> <p>The outcome will be ROXANNE, an analytics platform enhancing investigation capabilities especially for large criminal cases. Its aim is to improve identification of persons of interest by developing a bi-directional interface between multimodal technologies (such as speaker identification, automatic speech recognition, entity recognition and resolution, and face/place/background identification), as well as criminal network analysis (such as crime pattern and graph theories). Another objective is to enhance criminal network analysis technology in order to significantly reduce network size and to develop a dashboard for visualisation of investigation output to be integrated with existing tools.</p> <p>In terms of technology, the solution is based on machine learning/deep learning; natural language processing and speech recognition.</p>	3.35
52	Luxembourg	Ministry of Justice and the judicial authorities	Anonymisation of the case law	AI	In production/Ongoing testing	Testing from November 2019 to May 2020	Civil Justice	<p>This tool was initially tried out by the French Court of Cassation to anonymise court judgments.</p> <p>The solution provider trained the algorithm with the anonymisation rules that the Luxembourgish courts follow. Once a judgment is anonymised by the</p>	3.36

No	Member State	Organisation/Project owner	Project title	AI/DLT	Status	Timeframe	Justice field	Short description	Project ref. No. in Annex II
								<p>tool, the court clerks verify the results. The aim is to reduce time spent for manual processing of the judgments and make them public in compliance with data protection laws.</p> <p>In terms of technology, the solution is based on machine learning/deep learning and natural language processing .</p>	
53	Malta	Notary to the government	Notarypedia	AI	Ongoing	March 2018-March 2020	Notarial Research	<p>The project aims to digitalise historic manuscript documents and to explore the possibilities to make the search in digital libraries more versatile. It uses graph-based representations that allow for the automatic generation of different logical views integrating information items together in a more interesting and user – friendly way. The main target group are the notaries.</p> <p>In terms of technology, the solution is based on machine learning/deep learning and natural language processing (Named Entity Recognition and Information Extraction).</p>	3.37
54	Malta	Department of Justice	Semantics4Courts	AI	Ongoing (PoC)	November 2018 – June 2021	Any	<p>The project implements a semantic layer on court documents such as judgments. The aim is to semantically enrich and link them thus make them easily searchable. Other objectives are creating machine readable digital versions of case law, facilitating payment of court fees, identifying information on insolvency procedures, etc. Semantics4Court will extract information from the eCourt's portal and legislation.mt and will create references between cases and legislation.</p>	3.38

No	Member State	Organisation/Project owner	Project title	AI/DLT	Status	Timeframe	Justice field	Short description	Project ref. No. in Annex II
								In terms of technology, the solution is based on machine learning/deep learning and natural language processing (Named Entity Recognition and Information Extraction).	
55	Malta	Department of Justice	Lawyers' Register	DLT	Completed, but not yet implemented	2019	Lawyers' registration	<p>The pilot project assessed the blockchain technology benefits and challenges.</p> <p>It aimed at creating a system of transparency where the data (lawyers' warrants information) is shared by all parties (lawyers, the public and the government) in a transparent, immutable and decentralised way. This is the first electronic register for lawyers. Currently, the tool is developed as a private blockchain, however, its design allows it to go on a public one in future. The intention is to put the names and warrants of lawyers on the public chain as the latter does not contain personal data.</p> <p>In terms of blockchain technology, it is private/consortium, permissioned (Ethereum).</p>	2.10
56	The Netherlands	Ministry of Justice and Security	Jurisprudentierobot (Jurisprudence-robot)	AI	Completed (PoC)	December 2018 – April 2019	Criminal Justice; Criminal Court Proceedings	<p>This completed project focused on ensuring that attorneys will quickly find relevant jurisprudence and other necessary information.</p> <p>The technology used is machine learning/deep learning and NLP.</p>	2.11
57	The Netherlands	Ministry of Justice and Security	DigiAkkoord	DLT	Ongoing (PoC)	2018 – currently	Any	The project aims to support the approval process of workflows, transactions and documents for the government by means of public but permissioned blockchain.	3.39

No	Member State	Organisation/Project owner	Project title	AI/DLT	Status	Timeframe	Justice field	Short description	Project ref. No. in Annex II
58	The Netherlands	Ministry of Justice and Security	The financial emergency brake	DLT	Ongoing (PoC)	2017 Implementation: 2020/2021	Administrative Justice; Administrative Proceedings,	<p>The ongoing project will provide citizens with a GDPR compliant way to declare payment inability.</p> <p>The project focuses on vulnerable citizens that have difficult financial situations and issues with the repayment of loans. By using the solution the responsible organisation for collecting debts will have timely information about the debtor. In this way, it can contact the debtor and find out other arrangement for payment of the loan. The debtor will have a personal digital wallet (based on blockchain) which can send specific information regarding his/her situation to the debt collecting organisation.</p> <p>The blockchain technology used is private/consortium, permissioned; Hyperledger.</p>	3.40
59	The Netherlands	Ministry of Justice and Security	Known Traveller Digital Identity Pilot Project (KTDI)	DLT	Ongoing (PoC)	Summer 2020 – end 2020 (6 months) and possible prolongation for 6 more months	Civil Justice	<p>This project focuses on testing the applicability of a digital identity during an end-to-end passenger journey from the perspective of the traveller, public and private organisations. All the information of the passenger would be uploaded upfront. The system would have the passengers' data and be able to recognise him/her based on a facial image. When the passenger walks through the gates of the airport, the system will recognise him via a visual scan and do the check-in automatically.</p>	3.41

No	Member State	Organisation/Project owner	Project title	AI/DLT	Status	Timeframe	Justice field	Short description	Project ref. No. in Annex II
60	Portugal	Instituto dos Registos e do Notariado (*Institute of Registries and Notaries)	IReNe – Web Personal Assistant	AI	Completed/live since November 2019	2019 (6 months)	Civil Justice; Civil registry of citizens	<p>This project resulted in the creation of IRENE – an intelligent assistant that provides online help to citizens who need to use the services of the Portuguese Institute of Registry and Notary (IRN). It navigates them through the online services saving them the effort to go in person to the IRN physical facilities.</p> <p>In terms of technology, the solution is based on machine learning and natural language processing.</p>	2.12
61	Portugal	General Public Prosecutor's Office	AI technology for evidence analysis	AI	Ongoing	2019-2021	Criminal justice	<p>This project uses classification, indexation and advanced search AI technologies for the new case management system (CMS) of the Public Prosecutor's Office. The tool will take into account the specificities of the procedural rules of the Portuguese judiciary. The CMS is expected to bring more comprehensive ways to visualise the concrete documents.</p>	3.42
62	Portugal	Ministry of Justice	Balcão Único Do Prério Lab (BUPi) Lab AI/ Unique hotpoint for citizens[5]	AI	Completed/ In production	The pilot running between November 2017 and November 2018	Land Registry	<p>This project resulted in the creation of BUPi e-Platform which connects databases and applications with relevant information on landowners, land location and area among other elements. It aims to enable access to the information through one single point, while facilitating the relation between citizens and the national land register administration.</p> <p>In terms of technology, the solution is based on machine learning, expert systems and rule-based systems and Computer vision.</p>	2.13

No	Member State	Organisation/Project owner	Project title	AI/DLT	Status	Timeframe	Justice field	Short description	Project ref. No. in Annex II
63	Portugal	Ministry of Justice	BALCAT – Project on ballistics analysis	AI	Planned	9 months	Criminal Justice	This project will aim to create a database for ballistics forensic analysis. In the case of a serious crime, collected evidence (i.e. information about the weapon's owner) is essential for the investigation. A proper database for identifying the owner and other information based on the weapon's registration will be easily accessible to police authorities. Thanks to the tool they would be able to access the information and the analysis almost immediately.	Not included
64	Portugal	Ministry of Justice	Modelação, Predição e Decisão em Contexto de Jurisprudência	AI	Planned	The pilot is planned to start end of 2020	Any	This pilot project will use past court decisions to assist magistrates when receiving inquiries or documents from lawyers. It will enable faster conclusions by magistrates, thus enabling faster justice for citizens.	Not included
65	Portugal	Ministry of Justice	Magistratos	AI	Ongoing	Until December 2020	Administrative Justice; Tax and Judicial courts	The project aims to deliver a unique interface for magistrates (including prosecutors), enabling the indexation of documents and information which are part of a judicial case. It also allows a fast search of documents and contents. The technology applies in the domain of judicial inquiry and judicial decisions. The expected gain is reducing the time for rendering court decisions.	3.43

No	Member State	Organisation/Project owner	Project title	AI/DLT	Status	Timeframe	Justice field	Short description	Project ref. No. in Annex II
66	Portugal	Instituto Nacional da Propriedade Industrial (National Institute of Industrial Property (NIIP))	Intelligent Patent e-filing and processing system	AI	Planned	March 2020 – March 2022	Industrial Property	This project aims to develop a new service for the general public, which will validate patent applications prior to submission. Secondly, it aims to facilitate the examination process for NIIP examiners, including automatic classification of patent applications, automatic dispatch to the right examiners team and automatic generation of prior art search report. This will decrease the risk of duplication of patents. In terms of technology, the solution is based on machine learning; natural language processing and computer vision.	Not included
67	Portugal	Instituto Nacional da Propriedade Industrial (National Institute of Industrial Property (NIIP))	Experimentation and testing of Blockchain in IP	DLT	Planned	February 2020 - March 2022	Industrial Property	This project will assess if a blockchain/DLT-based solution could increase security within the NIIP procedures and data management in the domains of decentralised enforcement of legal contracts, trusted data sharing, “anchoring” of data in classical systems etc.	Not included
68	Slovenia	Supreme Court of the Republic of Slovenia	Return Service Data Handwriting Recognition	AI	Ongoing (in production)	2014 – currently	Any	This project recognises handwritten dates on documents. According to the law, dates have to be handwritten. The tool scans the handwritten text and recognise the date and month. It recognises the date only if it is provided in a specific placeholder of the document.	3.44
69	Slovenia	Supreme Court of the Republic of Slovenia	COVL – Central Department for Enforcement on the basis of Authentic Documents	AI	Completed	2004-2008	Any	This project automates the enforcement of authentic documents. It aims to improve efficiency in business processes related to enforcement by introducing a centralised	2.14

No	Member State	Organisation/Project owner	Project title	AI/DLT	Status	Timeframe	Justice field	Short description	Project ref. No. in Annex II
								way of work, automated document and process management.	
70	Spain	Ministry of Justice	Textualisation of audio-visual media	AI	Ongoing	December 2018-December 2020	Any	This project focuses on providing a tool that would transcribe audio and video files and then allow possible search in the text. In terms of technology, the solution is based on machine learning, advanced search and semantic search information.	3.45
71	Spain	Ministry of Justice	Automated document classification	AI	Ongoing	November 2018 - December 2021	Any	The project is focused on automated document classification to expedite the administrative judicial procedures. The solution is based on machine learning and natural language processing .	3.46
72	Spain	Ministry of Justice	Biometrics for personalities	AI	Planned	November 2019-December 2021	Criminal Justice; Criminal Law Enforcement; Criminal Court Proceedings	This project will facilitate the access to justice for citizens. The solution is based on machine learning and computer vision.	Not included
73	Spain	Centro de Documentación Judicial (Judicial Documentation Centre [CENDOJ])	Automated sentences classification	AI	Ongoing	2018-2022	Any	This project focuses on classification of sentences in order to provide more accurate search results, as well as to link sentences with other documents (other sentences, legislation, publications) related to the same subject. The solution is based on machine learning and natural language processing.	3.49

No	Member State	Organisation/Project owner	Project title	AI/DLT	Status	Timeframe	Justice field	Short description	Project ref. No. in Annex II
74	Spain	Centro de Documentación Judicial (Judicial Documentation Centre [CENDOJ])	Creation of structured data	AI	Ongoing	2018-2022	Any	<p>The project focuses on the automated creation of documents and structured data. The aim is to achieve more accurate search results for users of the tool. The tool looks for personal data such as a personal identity number, address or other that identify a person. The project is currently in the testing phase.</p> <p>The tool is based on machine learning technologies, such as NLP and supervised learning.</p>	3.50
75	Spain	Centro de Documentación Judicial (Judicial Documentation Centre [CENDOJ])	Business intelligence	AI	Ongoing	2018-2022	Any	<p>This project aims to gather knowledge on the use of applications as well as collect contents of documents, i.e. judgments, legislation, publications and prosecutor's documents. The objective is to improve the quality of the search application, to ensure accurate results and to offer a friendly and intuitive application.</p> <p>The solution is based on machine learning and natural language processing.</p>	3.47
76	Spain	Centro de Documentación Judicial (Judicial Documentation Centre [CENDOJ])	Automated sentences pseudonymisation	AI	Ongoing	2018-2022	Any	<p>The project aims to reduce the costs and the time needed for the pseudonymisation of court judgements and decisions in order to be able to make them public in a swifter manner.</p> <p>The solution is based on machine learning, expert and rule-based systems and natural language processing.</p>	3.48
77	Sweden	Bolagsverket (The Swedish Companies Registration Office)	Tool to choose company name	AI	Ongoing	January 2019 – end 2020 (potentially	Civil Justice; Company law	<p>This project aims to provide possibilities for an entrepreneur to choose a company name, which has good chances of being approved in Bolagsverket's manual processes. As a result the risk of rejecting</p>	3.51

No	Member State	Organisation/Project owner	Project title	AI/DLT	Status	Timeframe	Justice field	Short description	Project ref. No. in Annex II
						to be prolonged)		<p>the company names will decrease and the procedure will become more efficient. In an extension of the project, the process could be fully or partially automated.</p> <p>In terms of technology, the solution is based on machine learning and natural language processing .</p>	
78	Sweden	Skatteverket (Swedish Tax Agency)	Legal guidance with AI support	AI	Completed (PoC)	Q2 2019 - Q4 2019	Administrative Justice; Administrative Law; Administrative Proceedings	<p>This solution for the Tax Agency provides support in the search of information so that it could be more easily found. Metadata and keywords are added and the search queries are optimised to identify them.</p> <p>The solution is based on machine learning and natural language processing.</p>	2.24
79	Sweden	Skatteverket (Swedish Tax Agency)	Digital receipt processing	DLT	Completed (PoC)	Q2 2018 - currently	Administrative Justice; Administrative Law; Administrative Proceedings	<p>During this project a solution, identified under a previous phase, was further explored. The first phase of the project was about blockchain-inspired technical solutions for accounting, auditing and taxation and the second was about digital receipt processing. It digitalises receipts of companies.</p> <p>The tool will be used by the Tax Agency and private companies. The Tax Agency will be able to confirm whether a digital receipt has already been expensed and has previously affected the accounts of a company. Companies also would like to know if a receipt has already been used for compensation of an employee on a travel account of one company, or by another company. This is to make sure the same receipt cannot be compensated for more than once in the same or different</p>	2.16

No	Member State	Organisation/Project owner	Project title	AI/DLT	Status	Timeframe	Justice field	Short description	Project ref. No. in Annex II
								companies, whether intentionally or by mistake. This phase 2 ended with launching the pilot for digital receipt processing.	
80	Sweden	Skatteverket (Swedish Tax Agency)	Personnel registers	DLT	Completed (PoC)	Q2 2018 – currently	Administrative Justice	During this project a solution, identified under a previous phase, was further explored. The first phase of the project was about blockchain-inspired technical solutions for accounting, auditing and taxation and the second was about personnel registers. According to the law, employees should be registered in a personnel register. To aid the fight against illegal labour, a new digital approach would be helpful.	2.17
81	Sweden	Skatteverket (Swedish Tax Agency)	Real-time/SINK	DLT	Completed (PoC)	Q2 2018 – currently	Administrative Justice	During this project a solution, identified under a previous phase, was further explored. The first phase of the project was about blockchain-inspired technical solutions for accounting, auditing and taxation. The second phase is called Real-time/SINK. It aims to register accounting and tax payments information in real-time. This solution looks at the machine-to-machine communication possibilities in accounting.	2.18
82	Sweden	Skatteverket (Swedish Tax Agency)	Proxies	DLT	Completed (PoC)	Q2 2018 – currently	Administrative Justice	During this project a solution, identified under a previous phase, was further explored. The first phase of the project was about blockchain-inspired technical solutions for accounting, auditing and taxation. The second phase is called Proxies.	2.19

No	Member State	Organisation/Project owner	Project title	AI/DLT	Status	Timeframe	Justice field	Short description	Project ref. No. in Annex II
								<p>The tool provides assistance in managing the proxies of citizens via one single point. These proxies indicate the rights and authorisations of a person in a company or an organisation. The Proxies solution will provide the possibility to know if a proxy is the latest version and is valid. Digital signing of proxies is already possible, but it is hard to recall a proxy, since there may be copies. With this solution, recalls and version control is possible.</p> <p>In terms of technology, the solution uses a central registry or blockchain for encrypted and anonymised references to the proxies.</p> <p>In the case of authorisations within companies, no central registry or blockchain is needed. This will facilitate the process of employees signing on behalf of their company. This solution will function as an independent authorisation validation tool.</p>	
83	Sweden	Skatteverket (Swedish Tax Agency)	Company information services	DLT	Completed (PoC)	Q2 2018 – currently	Administrative Justice	<p>During this project a solution, identified under a previous phase, was further explored. The first phase of the project was about blockchain-inspired technical solutions for accounting, auditing and taxation. The second phase, Company information services, enables managing company information in a simple and standardised way, which would have to be shared only once, so it can easily be consulted by the authorities and be available for standardised reporting.</p>	2.20

No	Member State	Organisation/Project owner	Project title	AI/DLT	Status	Timeframe	Justice field	Short description	Project ref. No. in Annex II
84	Sweden	Skatteverket (Swedish Tax Agency)	Invoices	DLT	Completed (PoC)	Q2 2018 – currently	Administrative Justice	<p>During this project a solution, identified under a previous phase, was further explored. The first phase of the project was about blockchain-inspired technical solutions for accounting, auditing and taxation. In the second phase, Invoices, a tool was developed for tracking taxes for goods sold in companies and stores. It will support the Tax Agency in detecting tax fraud and securing VAT revenues. All taxes will pass directly through a single server and only one VAT bill will be generated. The ambition is to secure data integrity, data security, and privacy.</p> <p>The project aims to validate the invoices received from sellers and buyers in order to ensure that they are not manipulated, used twice, and to reduce the risk of fraud.</p>	2.21
85	Sweden	Skatteverket (Swedish Tax Agency)	Smart contracts for land Registries	DLT	Completed (PoC)	2017 – 2018	Land registry	<p>This project explored Smart Contracts in the context of land registers.</p> <p>The solution aimed at significantly reducing time and effort in carrying out real estate transactions and the activities related to the contract signing, registration of property and receiving the property title etc. The tool automates and digitalises these activities with a blockchain technology.</p> <p>More information on the project is available in the report “The Land Registry in the blockchain – testbed”, published by Kairos Future in March 2017.</p>	2.22

No	Member State	Organisation/Project owner	Project title	AI/DLT	Status	Timeframe	Justice field	Short description	Project ref. No. in Annex II
86	Sweden	Tullverket (*Swedish Customs Service)	PROFILE (work package on fiscal risk management, illegal waste transport and fraud in fish-trade)	AI	Ongoing	August 2018 – July 2021	Administrative Justice; Criminal Justice	The aim is to leverage state-of-the-art data analytics and incorporate new data sources for effective customs risk management. The project develops new methods to analyse cross-border transport of goods, currently between Sweden and Norway, and to improve the identification of errors in customs declarations by matching the description of goods to their respective code. The solution is based on machine learning and natural language processing.	3.52
87	Sweden	Swedish Competition Authority	Enhancing the Efficiency of Investigative Work by the Swedish Competition Authority's Enforcement Units	AI	Planned	April 2020 – April 2021 (Pending decision on funding)	Administrative Law; Administrative Proceedings; Criminal Law Enforcement; Criminal Investigation	This project will focus on classification and separation of evidence (i.e. emails) containing information relevant for antitrust investigations by means of topic modelling and clustering algorithms. The tool will aim to replace the time-consuming manual identification, selection and classification of antitrust investigation data.	Not included
88	Sweden	Swedish Consumer Agency	Test Balloon	AI	Completed (PoC)	N/I	Civil Justice; Consumer law	This project aimed to explore the possibilities of a bot (FairAdBot) to map hidden advertisements. The "FairAdBot" makes use of image recognition and text analysis.	2.23

No	Member State	Organisation/Project owner	Project title	AI/DLT	Status	Timeframe	Justice field	Short description	Project ref. No. in Annex II
89	Sweden	Domstolsverket (Swedish National Courts Administration)	Automatic transcription	AI	Completed PoC	N/I	Any	Using automated transcription information can be cross-referenced using recorded voices and video tapings. Additionally to the automated transcription, automated translation could be used. This would reduce time and costs and will assist the work of translators and transcribers. The solution is based on machine learning and speech recognition.	2.15
90	Sweden	Domstolsverket (Swedish National Courts Administration)	Translation	AI	Ongoing PoC	N/I	Any	This project developed an AI tool for translating existing court decisions. Currently, this is done manually and is costly and time-consuming. The project is based on a request from courts to investigate the potential of using AI. The solution is based on machine learning and natural language processing	3.53
91	Sweden	Domstolsverket (Swedish National Courts Administration)	Anonymisation of court decisions	AI	Ongoing PoC	N/I	Any	This project will provide anonymisation before a court decision becomes public. The AI tool aims to expedite and assist the work of administrators. Based on a first version, the results are very satisfactory although preserving the context has been a challenge. The solution is based on machine learning and natural language processing. The solution is expected to go in production.	3.54

No	Member State	Organisation/Project owner	Project title	AI/DLT	Status	Timeframe	Justice field	Short description	Project ref. No. in Annex II
92	Sweden	Domstolsverket (Swedish National Courts Administration)	Chatbots	AI	Completed (PoC)	N/I	AnyY	<p>This project uses the Microsoft Bot Framework (open source) to test the possibility of providing answers to simple and repetitive questions on the National Courts website. Currently, the solution is under development and is planned to go into production in the near future. The deployment of different chatbots is planned. They could be deployed either on local servers, in the cloud or in a hybrid manner.</p> <p>This solution is based on natural language processing.</p>	2.25
93	Sweden	Domstolsverket (Swedish National Courts Administration)	Decision-making	AI	Ongoing PoC	N/I	Any	<p>This project aims to explore what AI/ML techniques can be used to assist the decision-making process in courts and what data-driven insights can be identified with the help of AI. The project is of an explorative nature and will not necessarily lead to a finished product.</p> <p>This solution will explore machine learning and recursive neural networks.</p>	3.55

6.4. Member States authorities – Overview of initiatives and ideas

The table below presents a global overview of **initiatives**²²³ for future implementation of AI and/or DLT by the Member States' authorities or judiciary and which have been discussed with the stakeholders during the interview consultations.

Table 6.4. – Member States authorities – Overview of initiatives and ideas

Member State	Organisation	Initiative title	AI/DLT domain	Justice field	Short description
Denmark	Danish National Police	To be confirmed in terms of available budget and maturity of the concept	AI	Criminal Justice; Criminal Investigation; Law enforcement	This initiative will broaden the scope of the existing tool of the Danish National Police, Perceptual Hashing. Based on ML, the AI tool will identify the most urgent materials and improve prioritisation of investigations of sexual harassment.
Estonia	Ministry of Justice	Business name bot	AI	Any	This initiative aims to assist companies during the name registration process by providing an assessment if a company name is suitable and legally correct.
		Chatbot for legal aid	AI	Any	This initiative will provide legal advice to people.
		Different analyse tools	AI	Any	This tool will provide different analyses, i.e. of criminal proceeds or to the impact of legislation.

²²³ **An initiative** is defined as 'a new plan or action to improve something or solve a problem'. In the context of our study, it would mean a well-thought-out action, with steps undertaken towards materialising it into a project, however, without specific budget assigned and/or timeframe for its implementation.

		Transcription tool	AI	Any	The main objective of this tool is to save time needed for taking minutes and could possibly be expanded to other justice areas.
		Risk assessment tool	AI	Any	N/A
Greece	Ministry of Justice	Anonymisation of Court decisions for Open Data use	AI	Any	Greece plans to participate in a project under the 2019-2023 e-Justice Action Plan: Anonymisation and pseudoanonymisation of court decisions for Open Data use.
Malta	Department of Justice	Online platform for uploading of notarial deeds and other documents	General	Notarial law	One of the digital initiatives currently being undertaken is the Notary Archives, which is a tool for handling notary deeds that are more recent. It will allow notaries and citizens to procure these documents online. The original paper deeds would need to be scanned. As a second step the tool is intended to provide an online platform for notaries to upload their deeds directly. However, this would require legislative changes that will allow electronic deeds to be considered originals. AI and a link to Notarypedia (above) could be used for this purpose the project arrives to this stage.

Romania	Ministry of Justice	Anonymisation and pseudoanonymisation of court decisions for Open Data use	AI	Any	Romania plans to participate in a project under the 2019-2023 e-Justice Action Plan: Anonymisation and pseudoanonymisation of court decisions for Open Data use. The leading Member State of this initiative is Austria, which is in the process of drafting the project ²²⁴ .
		Voice Recognition	AI	Any	Romania is planning to participate in a project under the 2019-2023 e-Justice Action Plan: Voice Recognition. The leading Member State is the Netherlands. The project itself has not started yet as the Netherlands is in the preparation phase ²²⁵ .
Slovenia	Ministry of Justice	Renewable rental contract	DLT	N/A	The Ministry will explore the potential use of BC/DLT in renewable rental contracts.

The table below presents a global overview of **ideas**²²⁶ for future implementation of AI and/or DLT by Member States' authorities or judiciary and which have been discussed with the stakeholders during the interview consultations.

Member State	Organisation	Technology cluster	AI/DLT domain	Short description of idea
Croatia	Ministry of Justice	Recommendation tool	AI	Tool for providing recommendation to judges, in order to address the harmonisation of case law.

²²⁴ At the time of the stakeholder consultations for this project.

²²⁵ At the time of the stakeholder consultations for this project.

²²⁶ **An idea** is defined as 'a suggestion or plan for doing something'. In the context of our study, it would include thoughts, concepts and/or beliefs on the possible ways to use innovative technologies to solve specific business problems. However, an idea is not yet mature enough to be materialised into an initiative or a project.

		Chatbot	AI	A chatbot for internal use and as a service for citizens.
Germany	Central Cybercrime Department of North-Rhine-Westphalia	Hybrid cloud for document and electronic evidence	AI	Regarding overall project results according to the current state of research, in the first stage the AI fulfils the demand placed on it for the ability to differentiate and recognise deconstructed image content in a hybrid cloud scenario. The hybrid cloud concept in this case could be reused in document and electronic evidences (emails) investigation.
Greece	Ministry of Justice	Decision-making of judicial proceedings	AI	This idea consists of using AI to propose wording of court decisions in order to impact positively the work of judges and administrators.
Latvia	Prosecution Office	Speech-to-text	AI	Speech-to-text application.
		Automatic translation	AI	Automatic translation tool to provide translation for evidence from other languages into Latvian and vice versa.
Luxembourg	Ministry of Justice	Chatbot for citizens	AI	The idea is to create a chatbot that would assist citizens in providing information on legal proceedings.
Portugal	The Directorate-General for Justice Policy	Computer-assisted legislative drafting (LEDA)	AI	Potential of using the LEDA system, currently used in the Netherlands. According to an academic article ²²⁷ , this system was built to support Dutch legislative draftsmen during the drafting process. LEDA is a Legislative Design and Advisory System designed to offer easy access to the Dutch Directives for Regulations (Aanwijzingen voor de regelgeving). It guides users through an interactive drafting checklist and checks legislative drafts to see whether or not important drafting requirements are met. The LEDA system is currently being used within Dutch

²²⁷ W. Voermans, 'Computer-assisted legislative drafting in the Netherlands: the LEDA system', Centre for Legislative Studies Schoordijk Institute, Faculty of Law, Tilburg University, 2019.

				ministerial departments. However, this is still an idea and is being discussed internally.
Sweden	Swedish Consumer Agency	Search algorithm	AI	An AI-based algorithm to search traders' webpages looking for hidden marketing. This is a time-consuming manual job, and it is expected to be done better and faster with the help of an AI tool.
		Search algorithm	AI	Mystery shopping. A way to identify if and how some webpages collect and process personal data and if there is any misuse of these data, e.g. sold to data brokers.
		e-Evidence	DLT	A blockchain application to save and secure e-Evidence.
		Consumer behaviour analysis	AI	A tool that would help better understand and to analyse consumer behaviour on the internet.
Sweden	Swedish Prison and Probation Service	Automation of administrative processes	AI	Currently, occupancy planning of the organisation and other administrative processes are managed manually within IT systems. The idea would be to explore how the use of innovative technologies such as AI could help improve those processes.
		Traceability and reliability of information	DLT	High volume of information is shared with other national authorities. This exchange of information requires ensuring traceability and reliability, for which the use of DLT could be a potential solution..

7. LEGAL PROFESSIONAL ORGANISATIONS CONSULTATION RESULTS

7.1. Selected replies to the questionnaire

39 replies have been submitted by stakeholders from 19 Member States and one reply from stakeholders at European level – the European Union of Judicial Officers (UEHJ) and European Bailiffs’ Foundation (EUBF).

7.1.1. Country of organisation

Q2: What is the Country of your organisation?

A total of 39 replies were received from stakeholders from 19 Member States and one reply from two European-level organisations.

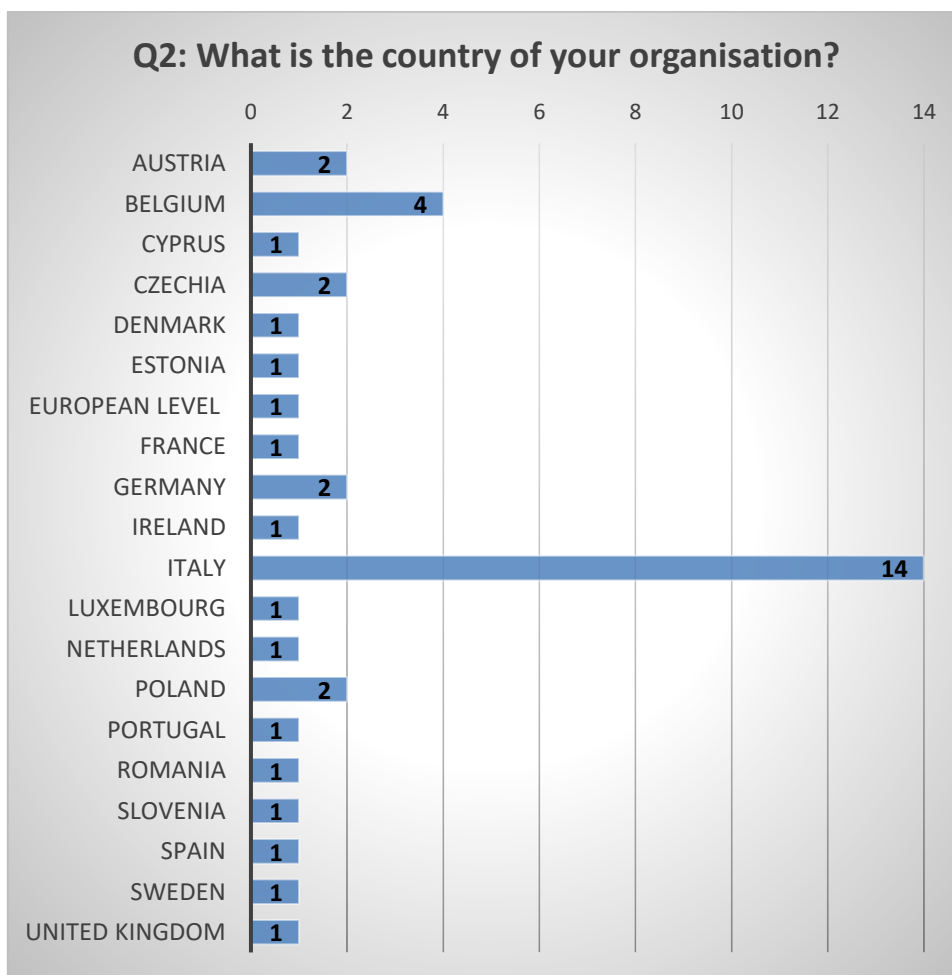


Table 7.1.1: Country of the organisation

Reply	No.	Respondent	Respondent code
Austria	1.	PHH Rechtsanwaelte (*PHH Attorneys at law)	AT(1)
	2.	Österreichischer Rechtsanwaltskammertag (Austrian Bar)	AT(2)
Belgium	3.	Olivier Vajda	BE(1)

	4.	Avocat Geoffrey Deliége	BE(2)
	5.	European Judicial Training Network	BE(3)
	6.	Orde van Vlaamse Balies (Flemish Bar Association)	BE(4)
Cyprus	7.	Judicial Training School-Supreme Court	CY
Czechia	8.	Czech Bar Association	CZ(1)
	9.	Justiční akademie (Judicial Academy)	CZ(2)
Denmark	10.	The Danish Bar And Law Society	DK
Estonia	11.	Estonian Bar Association	EE
European level	12.	Union européenne des huissiers de justice (UEHJ) + Fondation européenne des huissiers de justice (EUBF) /European Union of Judicial Officers (UEHJ) + European Bailiffs' Foundation (EUBF)	International
France	13.	Cabinet Morelon Avocat Paris	FR
Germany	14.	Bundesrechtsanwaltskammer (German Federal Bar)	DE(1)
	15.	Deutscher Anwaltverein (German Bar Association)	DE(2)
Ireland	16.	Judicial Studies Committee	IE
Italy	17.	Studio legale Avv. Francesco Patruno (*Law firm Francesco Patruno)	IT(1)
	18.	Avv. Silvia Maria Vercelloni	IT(2)
	19.	Studio Legale Guidarelli (*Law firm Guidarelli)	IT(3)
	20.	Studio legale Avv. Vincenzo Gandolfo (*Law firm Vincenzo Gandolfo)	IT(4)
	21.	Tagliabue Giulio Antonio	IT(5)
	22.	Studio legale (*Law firm)	IT(6)
	23.	mls	IT(7)
	24.	Consiglio Nazionale Ordine degli Psicologi (*National Council of the Order of Psychologists)	IT(8)
	25.	Consiglio Nazionale dell'Ordine dei Consulenti del Lavoro (*National Council of the Order of Labour Consultants)	IT(9)
	26.	Consiglio Nazionale dei Geologi (*National Council of Geologists)	IT(10)
	27.	Consiglio Nazionale del Notariato (*National Council of Notaries)	IT(11)
	28.	CNPAPAL (*National College of Agricultural Experts and Graduated Agricultural Experts)	IT(12)
	29.	Scuola Superiore Sant'Anna (Sant'Anna School of Advanced Studies – Pisa)	IT(13)
	30.	Collegio Nazionale degli Agrotecnici e degli Agrotecnici Laureati (*National College of Agricultural Technicians and Graduated Agricultural Technicians)	IT(14)
Luxembourg	31.	Kaufhold&Reveillaud, Avocats	LU
Netherlands	32.	SSR, Training and Study Centre for the Judiciary	NL
Poland	33.	Kancelaria Prawna (*Law firm)	PL(1)
	34.	Polish Bar Council	PL(2)
Portugal	35.	Centro de Estudos Judiciários (Centre for Judicial Studies)	PT
Romania	36.	National Institute of Magistracy	RO
Slovenia	37.	Bar Association of Slovenia	SI

Spain	38.	Consejo General de la Abogacía Española, Delegación en Bruselas (General Council of Spanish Lawyers)	ES
Sweden	39.	Simon Advokatbyrå AB	SE
United Kingdom	40.	The Law Society of England and Wales	UK

7.1.2. Role of the organisation

Q5: What is the role of your organisation?

A total of 40 (or 100% of all 40) replies were received to this question, where 1 (or 2% of the 40 replies) indicated to be from an academic organisation, 1 (or 2% of the 40 replies) indicated that their organisation is a bailiff organisation, 18 (or 45% of the 40 replies) indicated that their organisation is a bar or law society, 7 (or 18% of the 40 replies) said their organisation is a private law practice, and 13 (or 33% of the 40 replies) selected 'Other'.

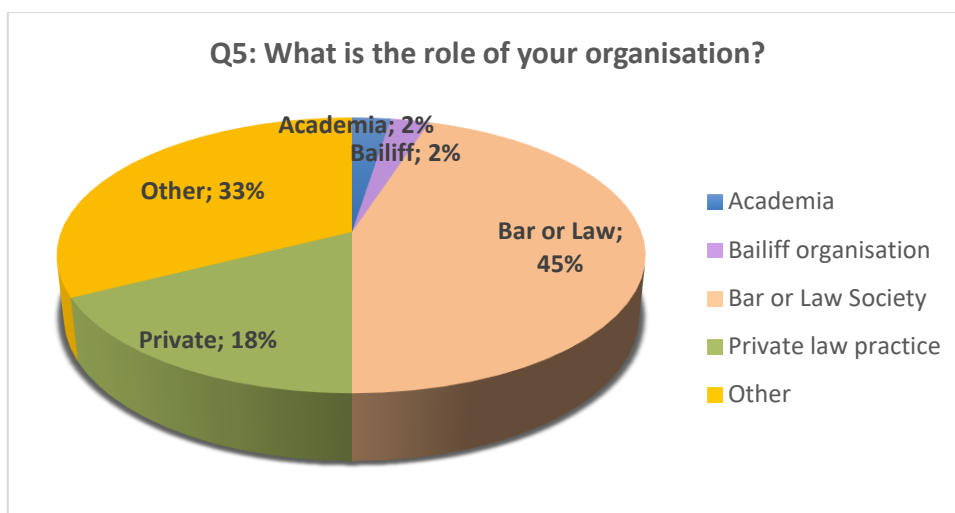


Table 7.1.2: Role of the organisation

Reply	Respondent	Respondent code
Academia	IT – Scuola Superiore Sant’Anna (LIDER-Lab of D’Irpolis Institute) (Sant’Anna School of Advanced Studies – Pisa)	IT(13)
Bailiff organisation	EU – Union européenne des huissiers de justice (UEHJ) + Fondation européenne des huissiers de justice (EUBF)) (European Union of Judicial Officers (UEHJ) + European Bailiffs’ Foundation (EUBF))	International
Bar or Law Society	ES – Consejo General de la Abogacía Española, Delegación en Bruselas (General Council of Spanish Lawyers)	ES
	SI – Bar Association of Slovenia	SI
	BE – Olivier Vajda	BE(1)
	EE – Estonian Bar Association	EE
	DK – The Danish Bar And Law Society	DK
	AT – Österreichischer Rechtsanwaltskammertag (Austrian Bar)	AT(2)
	DE – Bundesrechtsanwaltskammer (German Federal Bar)	DE(1)

	FR – Cabinet Morelon Avocat Paris	FR
	CZ – Czech Bar Association	CZ(1)
	BE – Orde van Vlaamse Balies (Flemish Bar Association)	BE(4)
	UK -The Law Society of England and Wales	UK
	PL – The Polish Bar Council	PL(2)
	DE – Deutscher Anwaltverein (German Bar Association)	DE(2)
	IT – Studio legale Avv. Francesco Patruno (*Law firm Francesco Patruno)	IT(1)
	IT – Studio Legale Guidarelli (*Law firm Guidarelli)	IT(3)
	IT – Studio legale Avv. Vincenzo Gandolfo (*Law firm Vincenzo Gandolfo)	IT(4)
	IT – Tagliabue Giulio Antonio	IT(5)
	IT – mls	IT(7)
Private law practice	SE – Simon Advokatbyrå AB	SE
	AT – PHH Rechtsanwalte (*PHH Attorneys at law)	AT(1)
	PL – Kancelaria Prawna (*Law firm)	PL(1)
	BE – Avocat Geoffrey Deliége	BE(2)
	IT – Avv. Silvia Maria Vercelloni	IT(2)
	LU – Kaufhold&Reveillaud, Advocates	LU
	IT – Studio Legale (*Law firm)	IT(6)
Other	RO – National Institute of Magistracy	RO
	CY – Judicial Training School-Supreme Court	CY
	PT – Centro de Estudos Judiciários (Centre for Judicial Studies)	PT
	IE – Judicial Studies Committee	IE
	BE – European Judicial Training Network	BE(3)
	CZ – Justiční akademie (Judicial Academy)	CZ(2)
	NL – SSR, Training and Study Centre for the Judiciary	NL
	IT – Consiglio Nazionale Ordine degli Psicologi (*National Council of the Order of Psychologists)	IT(8)
	IT – Consiglio Nazionale dell'Ordine dei Consulenti del Lavoro (*National Council of the Order of Labour Consultants)	IT(9)
	IT – Consiglio Nazionale dei Geologi (*National Council of Geologists)	IT(10)
	IT – Consiglio Nazionale del Notariato (National Council of Notaries)	IT(11)
	IT – Collegio Nazionale dei Periti Agrari e dei Periti Agrari Laureati (*National College of Agricultural Experts and Graduated Agricultural Experts) (CNPAPAL)	IT(12)
	IT – Collegio Nazionale degli Agrotecnici e degli Agrotecnici Laureati (*National College of Agricultural Technicians and Graduated Agricultural Technicians)	IT(14)

7.1.3. Existing policies and strategies on the use of innovative technologies in the justice field

Q10: Does your organisation have in place strategies/policies governing/promoting/fostering the use of innovative technologies in the justice field?

A total of 39 (or 98% of all 40) replies were received to this question, where 16 (or 41% of the 39 replies) selected 'Yes', 20 (or 51% of the 39 replies) indicated 'No', and 3 (or 8% of the 39 replies) selected 'Other'.

The number of stakeholders who did not reply to this question, is not taken into account for the calculation of the percentages represented in the chart below.

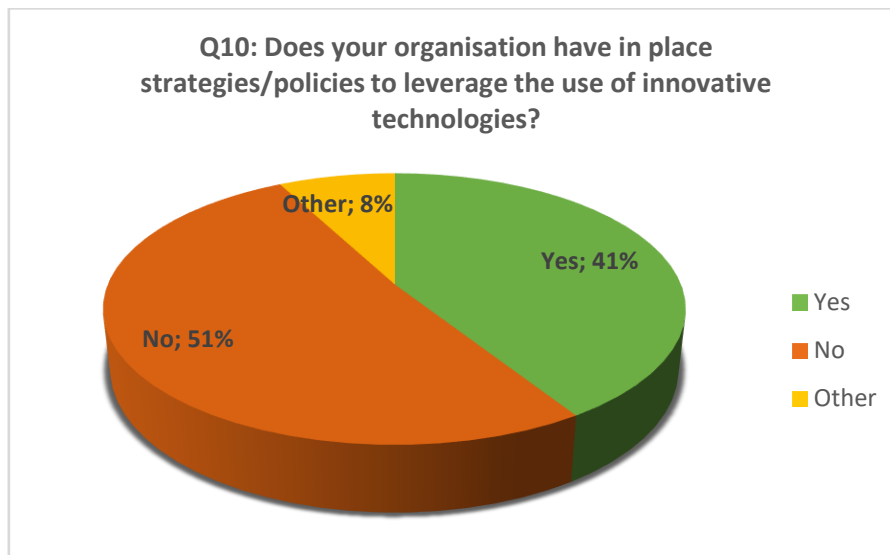


Table 7.1.3: Strategies and policies on the use of innovative technologies

Reply	Respondent	Respondent code
Yes	ES – Consejo General de la Abogacía Española, Delegación en Bruselas (General Council of Spanish Lawyers)	ES
	SE – Simon Advokatbyrå AB	SE
	AT – PHH Rechtsanwaelte (*PHH Attorneys at law)	AT(1)
	AT – Österreichischer Rechtsanwaltskammertag (Austrian Bar)	AT(2)
	FR – Cabinet Morelon Avocat Paris	FR
	EU – Union européenne des huissiers de justice (UEHJ) + Fondation européenne des huissiers de justice (EUBF)) (European Union of Judicial Officers (UEHJ) + European Bailiffs’ Foundation (EUBF))	International
	CZ – Justiční akademie (Judicial Academy)	CZ(2)
	UK – The Law Society of England and Wales	UK
	IT – Avv. Silvia Maria Vercelloni	IT(2)
	IT – Studio Legale Guidarelli (*Law firm Guidarelli)	IT(3)
	IT – Studio legale Avv. Vincenzo Gandolfo (*Law firm Vincenzo Gandolfo)	IT(4)
	IT – Consiglio Nazionale Ordine degli Psicologi (*National Council of the Order of Psychologists)	IT(8)
	IT – Consiglio Nazionale dell’Ordine dei Consulenti del Lavoro (*National Council of the Order of Labour Consultants)	IT(9)
IT – Consiglio Nazionale del Notariato (National Council of Notaries)	IT(11)	
IT – CNPAPAL (*National College of Agricultural Experts and Graduated Agricultural Experts)	IT(12)	

	IT – Scuola Superiore Sant’Anna (LIDER-Lab of DIRpolis Institute) (Sant’Anna School of Advanced Studies – Pisa)	IT(13)
No	SI – Bar Association of Slovenia	SI
	RO – National Institute of Magistracy	RO
	BE – Olivier Vajda	BE(1)
	CY – Judicial Training School-Supreme Court	CY
	PL – Kancelaria Prawna (*Law firm)	PL(1)
	BE – Avocat Geoffrey Deliége	BE(2)
	PT – Centro de Estudos Judiciários (Centre for Judicial Studies)	PT
	IE – Judicial Studies Committee	IE
	EE – Estonian Bar Association	EE
	DK – The Danish Bar And Law Society	DK
	DE – Bundesrechtsanwaltskammer (German Federal Bar)	DE(1)
	BE – European Judicial Training Network	BE(3)
	BE – Orde van Vlaamse Balies (Flemish Bar Association)	BE(4)
	PL – The Polish Bar Council	PL(2)
	DE – Deutscher Anwaltverein (German Bar Association)	DE(2)
	IT – Studio legale Avv. Francesco Patruno (*Law firm Francesco Patruno)	IT(1)
	IT – Tagliabue Giulio Antonio	IT(5)
	LU – Kaufhold&Reveillaud, Advocates	LU
IT – mls	IT(7)	
IT – Collegio Nazionale degli Agrotecnici e degli Agrotecnici Laureati (*National College of Agricultural Technicians and Graduated Agricultural Technicians)	IT(14)	
Other	CZ – Czech Bar Association	CZ(1)
	NL – SSR, Training and Study Centre for the Judiciary	NL
	IT – Consiglio Nazionale dei Geologi (*National Council of Geologists)	IT(10)

7.1.4. Artificial Intelligence elements in the relevant policies and strategies

Q11: If you indicated ‘Yes’ to question 10, do the relevant document(s) address and elaborate on the use of Artificial Intelligence in the justice field?

A total of 16 (or 40% of all 40) replies were received to this question, where 8 (or 50% of the 16 replies) selected ‘Yes’, 6 (or 38% of the 16 replies) indicated ‘No’, and 2 (or 13% of the 16 replies) selected ‘Other’.

The number of stakeholders who did not reply to this question, is not taken into account for the calculation of the percentages represented in the chart below.

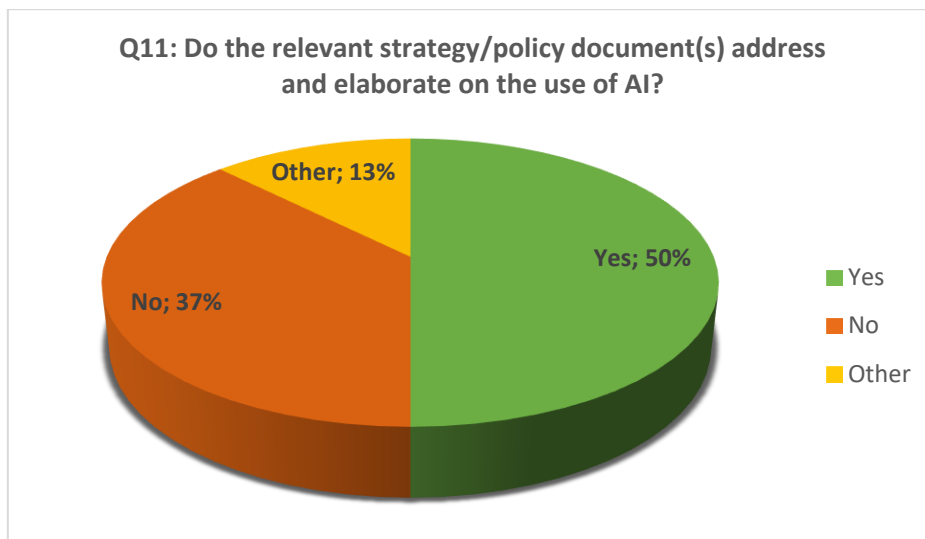


Table 7.1.4: Strategies and policies address and elaborate on the use of AI – replies

Reply	Respondent	Respondent code
Yes	ES – Consejo General de la Abogacía Española, Delegación en Bruselas (General Council of Spanish Lawyers)	ES
	SE – Simon Advokatbyrå AB	SE
	EU – Union européenne des huissiers de justice (UEHJ) + Fondation européenne des huissiers de justice (EUBF)) (European Union of Judicial Officers (UEHJ) + European Bailiffs’ Foundation (EUBF))	International
	CZ – Justiční akademie (Judicial Academy)	CZ(2)
	UK – The Law Society of England and Wales	UK
	IT – Studio Legale Guidarelli (*Law firm Guidarelli)	IT(3)
	IT – Consiglio Nazionale dell’Ordine dei Consulenti del Lavoro (*National Council of the Order of Labour Consultants)	IT(9)
	IT – Consiglio Nazionale del Notariato (National Council of Notaries)	IT(11)
No	AT – PHH Rechtsanwälte (*PHH Attorneys at law)	AT(1)
	FR – Cabinet Morelon Avocat Paris	FR
	IT – Avv. Silvia Maria Vercelloni	IT(2)
	IT – Studio legale Avv. Vincenzo Gandolfo (*Law firm Vincenzo Gandolfo)	IT(4)
	IT – Consiglio Nazionale Ordine degli Psicologi (*National Council of Psychologists)	IT(8)
	IT – CNPAPAL (*National College of Agricultural Experts and Graduated Agricultural Experts)	IT(12)
Other	AT – Österreichischer Rechtsanwaltskammertag (Austrian Bar)	AT(2)
	IT – Scuola Superiore Sant’Anna (LIDER-Lab of DIrpolis Institute) (Sant’Anna School of Advanced Studies – Pisa)	IT(13)

7.1.5. Blockchain/DLT elements in the relevant policies and strategies

Q16: If you indicated 'Yes' to question 10, do relevant documents elaborate on the use of the blockchain/DLT in the justice field?

A total of 12 (or 30% of all 40) replies were received to this question, where 4 (or 34% of the 12 replies) selected 'Yes', 7 (or 58% of the 12 replies) indicated 'No', and 1 (or 8% of the 12 replies) selected 'Other'.

The number of stakeholders who did not reply to this question, is not taken into account for the calculation of the percentages represented in the chart below.

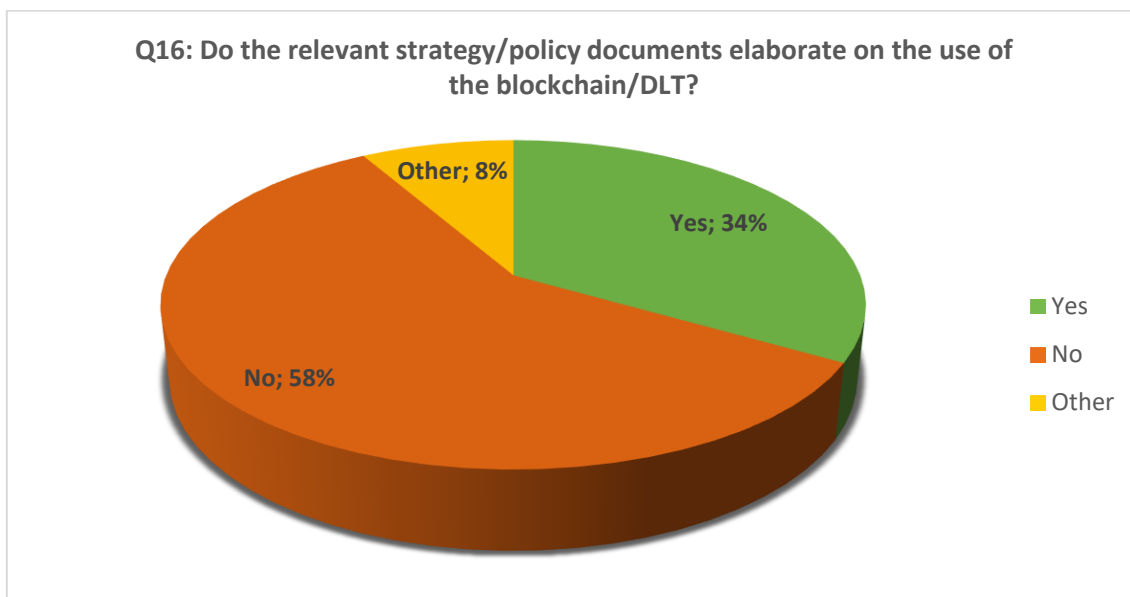


Table 7.1.5: Strategy and policies elaboration on the use of the blockchain/DLT – replies

Reply	Organisation	Respondent code
Yes	ES – Consejo General de la Abogacía Española, Delegación en Bruselas (General Council of Spanish Lawyers)	ES
	EU – Union européenne des huissiers de justice (UEHJ) + Fondation européenne des huissiers de justice (EUBF)) (European Union of Judicial Officers (UEHJ) + European Bailiffs’ Foundation (EUBF))	International
	UK – The Law Society of England and Wales	UK
	IT – Consiglio Nazionale del Notariato (National Council of Notaries)	IT(11)
No	SE – Simon Advokatbyrå AB	SE
	AT – PHH Rechtsanwaelte (*PHH Attorneys at law)	AT(1)
	FR – Cabinet Morelon Avocat Paris	FR
	IT – Avv. Silvia Maria Vercelloni	IT(2)
	IT – Studio legale Avv. Vincenzo Gandolfo (*Law firm Vincenzo Gandolfo)	IT(4)
	IT – Consiglio Nazionale Ordine degli Psicologi (*National Council of the Order of Psychologists)	IT(8)
	IT – CNPAPAL (*National College of Agricultural Experts and Graduated Agricultural Experts)	IT(12)

Other	AT – Österreichischer Rechtsanwaltskammertag (Austrian Bar)	AT(2)
-------	---	-------

7.1.6. Artificial Intelligence- a need for legal changes

Q21: Do you consider that legislative²²⁸ changes are necessary to address the use of AI solutions in the justice field?

A total of 30 (or 75% of all 40) replies were received to this question, where 14 (or 47% of the 30 replies) selected 'Yes', 4 (or 13% of the 30 replies) indicated 'No, the existing legal framework is sufficient', 9 (or 30% of the 30 replies) selected 'Don't know', and 3 (or 10% of the 30 replies) selected 'Other'.

The number of stakeholders who did not reply to this question, is not taken into account for the calculation of the percentages represented in the chart below.

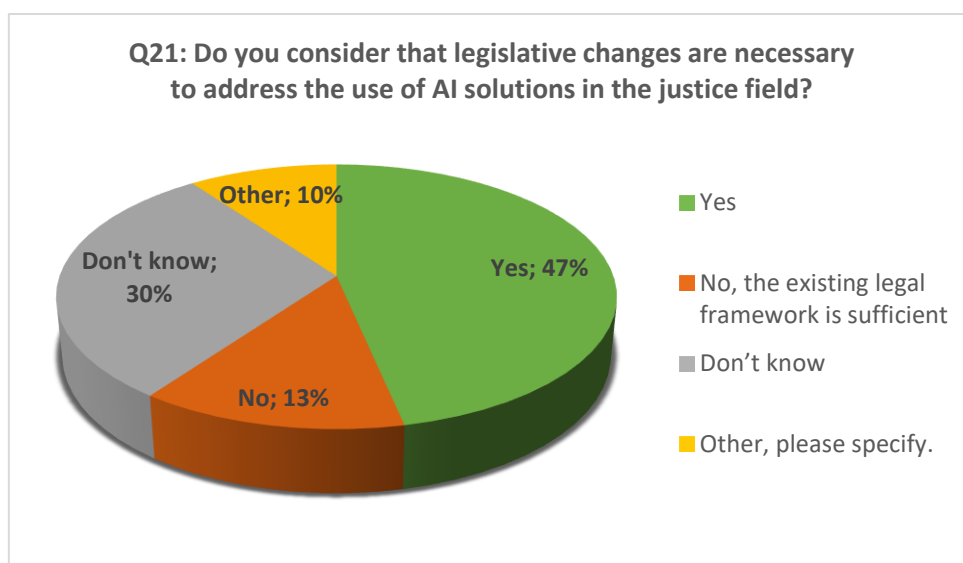


Table 7.1.6: Legislative changes necessary to address the use of AI – replies

Reply	Organisation	Respondent code
Yes	ES – Consejo General de la Abogacía Española, Delegación en Bruselas (General Council of Spanish Lawyers)	ES
	CY – Judicial Training School-Supreme Court	CY
	AT – PHH Rechtsanwalte (*PHH Attorneys at law)	AT(1)
	BE – Avocat Geoffrey Deliège	BE(2)
	IE – Judicial Studies Committee	IE
	DE – Bundesrechtsanwaltskammer (German Federal Bar)	DE(1)
	CZ – Czech Bar Association	CZ(1)

²²⁸ For the purposes of this study, 'legislation' or 'legislative framework' means constitutions, codes of law, laws and their implementing regulations, which are in force in the Member States, and which govern in their entirety or contain provisions that are directly or indirectly governing use of AI (and/or of DLT) and applicable to the justice field or related fields.

	EU – Union européenne des huissiers de justice (UEHJ) + Fondation européenne des huissiers de justice (EUBF)) (European Union of Judicial Officers (UEHJ) + European Bailiffs’ Foundation (EUBF))	International
	UK – The Law Society of England and Wales	UK
	DE – Deutscher Anwaltverein (German Bar Association)	DE(2)
	IT – Studio legale Avv. Vincenzo Gandolfo (*Law firm Vincenzo Gandolfo)	IT(4)
	LU – Kaufhold&Reveillaud, Advocates	LU
	IT – mls	IT(7)
	NL – SSR, Training and Study Centre for the Judiciary	NL
No, the existing legal framework is sufficient	SE – Simon Advokatbyrå AB	SE
	PL – Kancelaria Prawna (*Law firm)	PL(1)
	FR – Cabinet Morelon Avocat Paris	FR
	PL – The Polish Bar Council	PL(2)
Don’t know	SI – Bar Association of Slovenia	SI
	BE – Olivier Vajda	BE(1)
	EE – Estonian Bar Association	EE
	DK – The Danish Bar And Law Society	DK
	BE – European Judicial Training Network	BE(3)
	BE – Orde van Vlaamse Balies (Flemish Bar Association)	BE(4)
	IT – Studio legale Avv. Francesco Patruno (*Law firm Francesco Patruno)	IT(1)
	IT – Avv. Silvia Maria Vercelloni	IT(2)
	IT – Tagliabue Giulio Antonio	IT(5)
Other	PT – Centro de Estudos Judiciários (Centre for Judicial Studies)	PT
	AT – Österreichischer Rechtsanwaltskammertag (Austrian Bar)	AT(2)
	IT – Scuola Superiore Sant’Anna (LIDER-Lab of DIrpolis Institute) (Sant’Anna School of Advanced Studies – Pisa)	IT(13)

One respondent who replied ‘Yes’ - NL - SSR, Training and Study Centre for the Judiciary - clarified that they would need to reform the laws on the judicial organisation, the litigation of law in the various fields of law and check how to deal with it under the GDPR.

7.1.7. Blockchain/DLT – a need for legal changes

Q24: Do you consider that legislative changes are necessary to address the use of blockchain/DLT solutions in the justice field?

A total of 29 (or 73% of all 40) replies were received to this question, where 7 (or 24% of the 29 replies) selected ‘Yes’, 2 (or 7% of the 29 replies) indicated ‘No, the existing legal framework is sufficient’, 16 (or 55% of the 29 replies) indicated ‘Don’t know’, and 4 (or 14% of the 29 replies) selected ‘Other’.

The number of stakeholders who did not reply to this question, is not taken into account for the calculation of the percentages represented in the chart below.

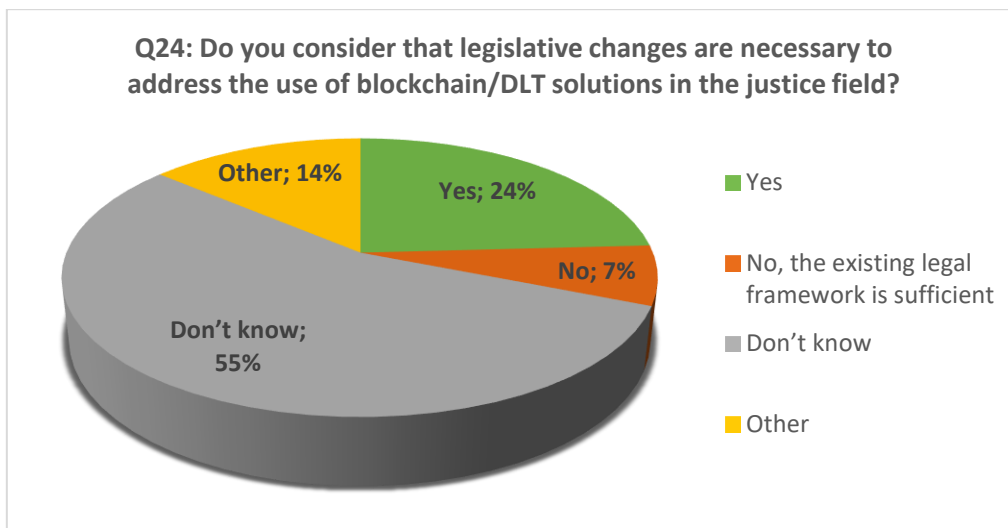


Table 7.1.7: Necessary legislative changes to address the use of blockchain/DLT solutions – replies

Reply	Organisation	Respondent code
Yes	CY – Judicial Training School-Supreme Court	CY
	AT – PHH Rechtsanwaelte (*PHH Attorneys at law)	AT(1)
	IE – Judicial Studies Committee	IE
	CZ – Czech Bar Association	CZ(1)
	EU – Union européenne des huissiers de justice (UEHJ) + Fondation européenne des huissiers de justice (EUBF)) (European Union of Judicial Officers (UEHJ) + European Bailiffs’ Foundation (EUBF))	International
	LU – Kaufhold&Reveillaud, Advocates	LU
	NL – SSR, Training and Study Centre for the Judiciary	NL
	No, the existing legal framework is sufficient	FR – Cabinet Morelon Avocat Paris
PL – The Polish Bar Council		PL(2)
Don't know	ES – Consejo General de la Abogacía Española, Delegación en Bruselas (General Council of Spanish Lawyers)	ES
	SE – Simon Advokatbyrå AB	SE
	SI – Bar Association of Slovenia	SI
	BE – Olivier Vajda	BE(1)
	PL – Kancelaria Prawna (*Law firm)	PL(1)
	BE – Avocat Geoffrey Deliége	BE(2)
	EE – Estonian Bar Association	EE
	DK – The Danish Bar And Law Society	DK
	DE – Bundesrechtsanwaltskammer (German Federal Bar)	DE(1)
	BE – European Judicial Training Network	BE(3)
	BE – Orde van Vlaamse Balies (Flemish Bar Association)	BE(4)
	IT – Studio legale Avv. Francesco Patruno (*Law firm Francesco Patruno)	IT(1)
	IT – Avv. Silvia Maria Vercelloni	IT(2)

	IT – Studio legale Avv. Vincenzo Gandolfo (*Law firm Vincenzo Gandolfo)	IT(4)
	IT – Tagliabue Giulio Antonio	IT(5)
	IT – mls	IT(7)
Other	PT – Centro de Estudos Judiciários (Centre for Judicial Studies)	PT
	AT – Österreichischer Rechtsanwaltskammertag (Austrian Bar)	AT(2)
	UK – The Law Society of England and Wales	UK
	DE – Deutscher Anwaltverein (German Bar Association)	DE(2)

One respondent who replied 'Yes' - NL - SSR, Training and Study Centre for the Judiciary - clarified that they would need to reform the law on the Judicial organisation, the litigation of law in the various fields of law and check how to deal with it under the GDPR.

7.1.8. Existing projects using innovative technologies

Q27: Is your organisation currently involved in projects/activities using innovative technology in the legal and/or justice field, including provision of legal services?

A total of 38 (or 95% of all 40) replies were received to this question, where 8 (or 21% of the 38 replies) selected 'Yes', 25 (or 66% of the 38 replies) indicated 'No', and 5 (or 13% of the 38 replies) indicated 'Other'.

The number of stakeholders who did not reply to this question, is not taken into account for the calculation of the percentages represented in the chart below.

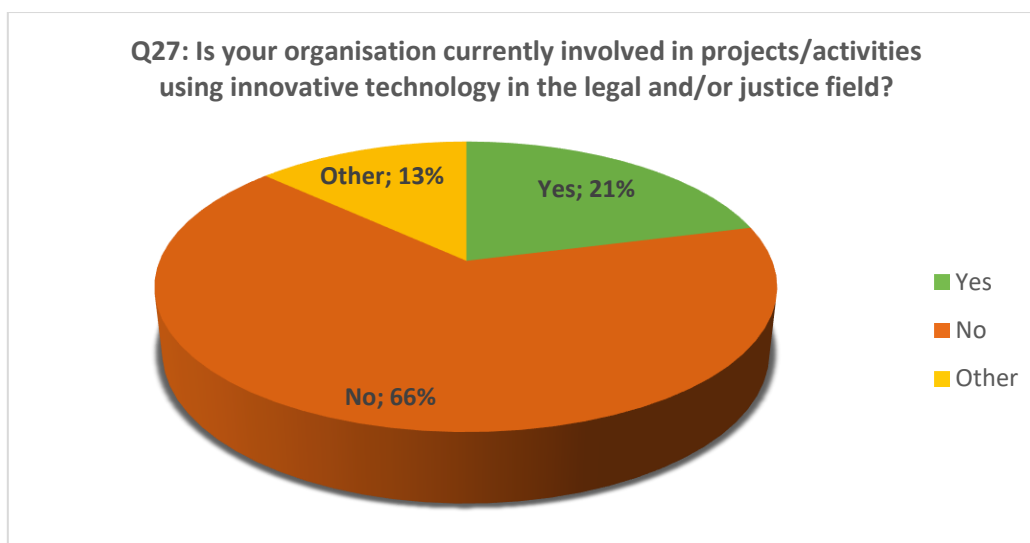


Table 7.1.8: Involvement in projects – replies

Reply	Organisation	Respondent code
Yes	BE – Avocat Geoffrey Deliège	BE(2)
	EU – Union européenne des huissiers de justice (UEHJ) + Fondation européenne des huissiers de justice (EUBF)) (European Union of Judicial Officers (UEHJ) + European Bailiffs’ Foundation (EUBF))	International
	CZ – Justiční akademie (Judicial Academy)	CZ(2)

	PL – The Polish Bar Council	PL(2)
	IT – Studio Legale Guidarelli (*Law firm Guidarelli)	IT(3)
	IT – Consiglio Nazionale del Notariato (National Council of Notaries)	IT(11)
	IT – CNPAPAL (*National College of Agricultural Experts and Graduated Agricultural Experts)	IT(12)
	IT – Scuola Superiore Sant’Anna (LIDER-Lab of DIrpolis Institute) (Sant’Anna School of Advanced Studies – Pisa)	IT(13)
No	SE – Simon Advokatbyrå AB	SE
	SI – Bar Association of Slovenia	SI
	RO – National Institute of Magistracy	RO
	BE – Olivier Vajda	BE(1)
	CY – Judicial Training School-Supreme Court	CY
	AT – PHH Rechtsanwaelte (*PHH Attorneys at law)	AT(1)
	PL – Kancelaria Prawna (*Law firm)	PL(1)
	IE – Judicial Studies Committee	IE
	EE – Estonian Bar Association	EE
	DK – The Danish Bar And Law Society	DK
	DE – Bundesrechtsanwaltskammer (German Federal Bar)	DE(1)
	BE – European Judicial Training Network	BE(3)
	FR – Cabinet Morelon Avocat Paris	FR
	BE – Orde van Vlaamse Balies (Flemish Bar Association)	BE(4)
	DE – Deutscher Anwaltverein (German Bar Association)	DE(2)
	IT – Studio legale Avv. Francesco Patruno (*Law firm Francesco Patruno)	IT(1)
	IT – Avv. Silvia Maria Vercelloni	IT(2)
	IT – Tagliabue Giulio Antonio	IT(5)
	LU – Kaufhold&Reveillaud, Advocates	LU
	IT – mls	IT(7)
	NL – SSR, Training and Study Centre for the Judiciary	NL
	IT – Consiglio Nazionale Ordine degli Psicologi (*National Council of the Order of Psychologists)	IT(8)
	IT – Consiglio Nazionale dell’Ordine dei Consulenti del Lavoro (*National Council of the Order of Labour Consultants)	IT(9)
	IT – Consiglio Nazionale dei Geologi (*National Council of Geologists)	IT(10)
	IT – Collegio Nazionale degli Agrotecnici e degli Agrotecnici Laureati (*National College of Agricultural Technicians and Graduated Agricultural Technicians)	IT(14)
Other	ES – Consejo General de la Abogacía Española, Delegación en Bruselas (General Council of Spanish Lawyers)	ES
	PT – Centro de Estudos Judiciários (Centre for Judicial Studies)	PT
	AT – Österreichischer Rechtsanwaltskammertag (Austrian Bar)	AT(2)
	CZ – Czech Bar Association	CZ(1)
	IT – Studio legale Avv. Vincenzo Gandolfo (*Law firm Vincenzo Gandolfo)	IT(4)

7.1.9. Artificial Intelligence- existing projects

Q28: If you indicated 'Yes' to question 27, please, indicate in how many projects, that are exploring or using **AI technology**, your organisation is currently involved?

A total of 8 (or 2% of all 40) replies were received to this question, where 2 (or 25% of the 8 replies) selected 'None', 4 (or 50% of the 8 replies) selected '1 – 3 projects', no respondent indicated to have '4 – 5 projects', and 2 (or 25% of the 8 replies) selected 'More than 5 projects'.

The number of stakeholders who did not reply to this question, is not taken into account for the calculation of the percentages represented in the chart below.

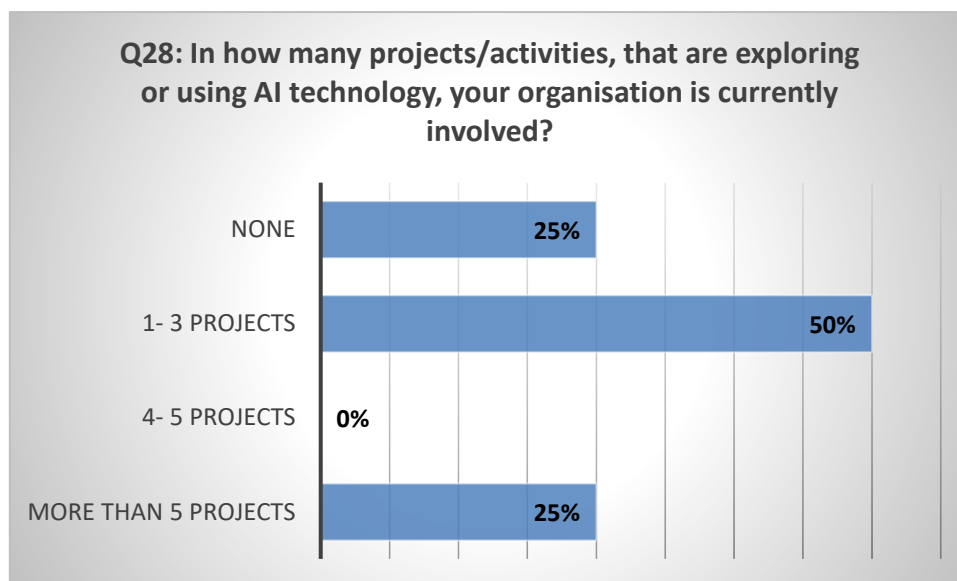


Table 7.1.9: Number of projects organisation is involved in – replies

Reply	Organisation	Respondent code
None	BE – Avocat Geoffrey Deliége	BE(2)
	PL – The Polish Bar Council	PL(2)
1- 3	CZ – Justiční akademie (Judicial Academy)	CZ(2)
	IT – Studio Legale Guidarelli (*Law firm Guidarelli)	IT(3)
	IT – Consiglio Nazionale del Notariato (National Council of Notaries)	IT(11)
	IT – CNPAPAL (*National College of Agricultural Experts and Graduated Agricultural Experts)	IT(12)
> 5	EU – Union européenne des huissiers de justice (UEHJ) + Fondation européenne des huissiers de justice (EUBF)) (European Union of Judicial Officers (UEHJ) + European Bailiffs’ Foundation (EUBF))	International
	IT – Scuola Superiore Sant’Anna (LIDER-Lab of DIrpolis Institute) (Sant’Anna School of Advanced Studies – Pisa)	IT(13)

7.1.10. Artificial Intelligence-elaborated projects in this study

Q29: In the context of this questionnaire, please indicate for how many projects/activities that are exploring or using AI technology, you would be able to provide information? If you

have information for more than 4 projects, please, indicate in the free text below and we will organise a dedicated interview with you.

A total of 6 (or 15% of all 40) replies were received to this question, where 3 (or 50% of the 6 replies) selected '1 Project', 2 (or 33% of the 6 replies) selected '2 Projects', and 1 (or 17% of the 6 replies) indicated 'Other'.

The number of stakeholders who did not reply to this question, is not taken into account for the calculation of the percentages represented in the chart below.

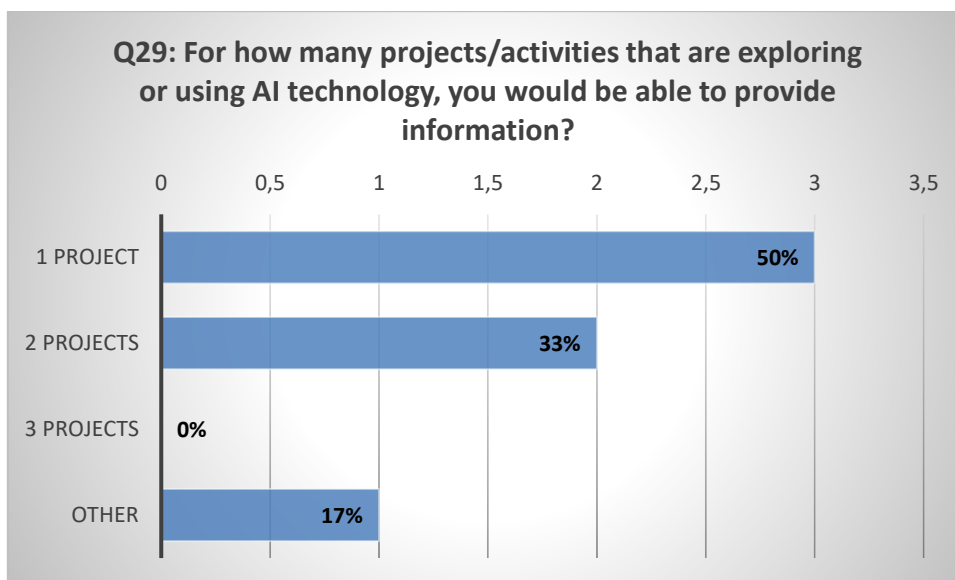


Table 7.1.10: Number of projects elaborated in this study – replies

Reply	Organisation	Respondent code
1 Project	CZ – Justiční akademie (Judicial Academy)	CZ(2)
	IT – Consiglio Nazionale del Notariato (National Council of Notaries)	IT(11)
	IT – CNPAPAL (*National College of Agricultural Experts and Graduated Agricultural Experts)	IT(12)
2 Projects	EU – Union européenne des huissiers de justice (UEHJ) + Fondation européenne des huissiers de justice (EUBF)) (European Union of Judicial Officers (UEHJ) + European Bailiffs’ Foundation (EUBF))	International
	IT – Studio Legale Guidarelli (*Law firm Guidarelli)	IT(3)
Other	IT – Scuola Superiore Sant’Anna (LIDER-Lab of D’Irpolis Institute) (Sant’Anna School of Advanced Studies – Pisa)	IT(13)

7.1.11. Blockchain/DLT – existing projects

Q30: If you indicated 'Yes' to question 27, please indicate in how many projects/activities, that are exploring or using blockchain/DLT, your organisation is currently involved?

A total of 7 (or 18% of all 40) replies were provided to this question, where 4 (or 57% of the 7 replies) selected 'None', and 3 (or 43% of the 7 replies) selected '1-3 projects'. No one indicated to be involved in more than 3 projects.

The number of stakeholders who did not reply to this question, is not taken into account for the calculation of the percentages represented in the chart below.

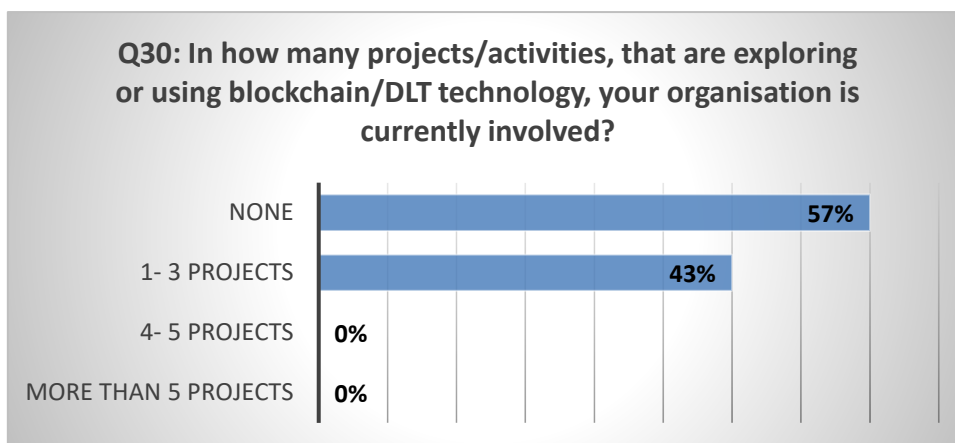


Table 7.1.11: Involvement in projects using blockchain/DLT – replies

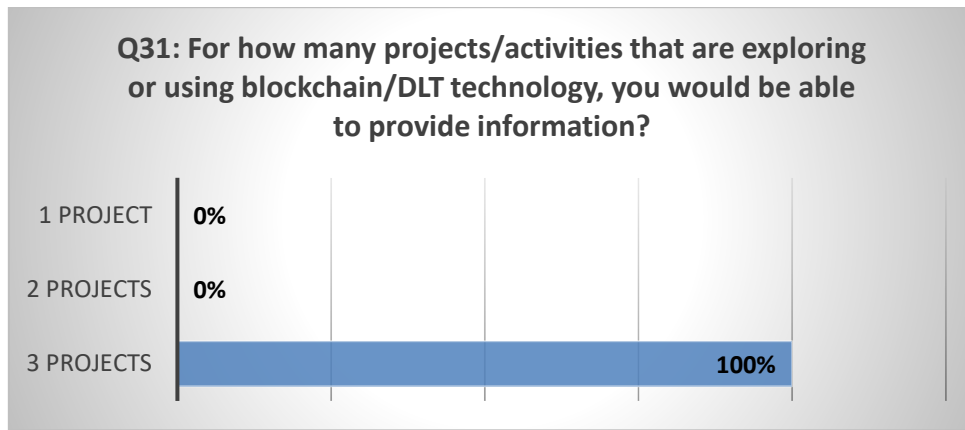
Reply	Organisation	Respondent code
None	BE – Avocat Geoffrey Deliége	BE(2)
	PL – The Polish Bar Council	PL(2)
	IT – CNPAPAL (*National College of Agricultural Experts and Graduated Agricultural Experts)	IT(12)
	IT – Scuola Superiore Sant’Anna (LIDER-Lab of DIrpolis Institute) (Sant’Anna School of Advanced Studies – Pisa)	IT(13)
1 – 3	EU – Union européenne des huissiers de justice (UEHJ) + Fondation européenne des huissiers de justice (EUBF)) (European Union of Judicial Officers (UEHJ) + European Bailiffs’ Foundation (EUBF))	International
	IT – Studio Legale Guidarelli (*Law firm Guidarelli)	IT(3)
	IT – Consiglio Nazionale del Notariato (National Council of Notaries)	IT(11)

7.1.12. Blockchain/DLT – elaborated projects in this study

Q31: In the context of this questionnaire, please indicate for how many projects/activities that are exploring or using blockchain/DLT, you would be able to provide information? If you have information for more than 4 projects, please, indicate in the free text below and we will organise a dedicated interview with you.

A total of 2 (or 5% of all 40) replies were received to this question, which indicated the possibility to elaborate on '3 Projects' – from the European Union of Judicial Officers (UEHJ) + European Bailiffs’ Foundation (EUBF)) and from IT – National Council of Notaries.

The number of stakeholders who did not reply to this question, is not taken into account for the calculation of the percentages represented in the chart below.



7.2. Overview of strategies, policies and analytical papers of the legal professional organisations

The table below represents information gathered about strategies and policies of the legal professional organisations based on the replies to the questionnaire and/or interviews with representatives of the respective legal professional organisations.

Table 7.2 - Strategies, policies and analytical papers of the legal professional organisations

No	Member State	Organisation	Strategy/ policy/paper	AI/DLT	Summary	Link
1.	International	UEHJ and UIHJ	Digital assets and enforcement	AI	<p>The objective of this book is to try to find ways to exploit the CEW in the areas of forced enforcement of court decisions. This is the first step of a major work on the digitalization of justice in the world of forced execution.</p> <p>From a more general point of view, to bailiffs, artificial intelligence has two objectives:</p> <ul style="list-style-type: none"> • to respond more quickly to users: plaintiff, defendant, creditor, debtor • help in the decision-making of bailiffs in their daily missions 	https://www.larcier.com/fr/avoir-s-dematerialises-et-execution-force-digital-assets-and-enforcement-2019-9782802764311.html
			Ethical Charter & Global Code of enforcement on digital assets	DLT	<p>UEHJ is setting up an Ethical Charter & Global Code of enforcement on digital assets.</p> <p>The important elements of this charter and code are as follows:</p> <ul style="list-style-type: none"> • establish minimum standards at European and global level 	

No	Member State	Organisation	Strategy/ policy/paper	AI/DLT	Summary	Link
					<ul style="list-style-type: none"> • put the bailiff at the centre of the digitalisation as a trusted third party • guarantee the elements that enter and leave the blockchain • create procedures using the blockchain to facilitate the practice of the trade while respecting the rights of the parties <p>Besides this, bailiffs are interested in the blockchain for two more reasons:</p> <ul style="list-style-type: none"> • the ability to create proof of anteriority • the mission of oracle which is a natural mission for the bailiff 	
2.	Austria	Austrian bar	Cf. summary	General	<p>There are several strategies with regard to the ongoing overall process of digitalisation, e.g. with regard to ensuring the secure communication between lawyers and their clients, but also with regard to software licences and applications which are used in lawyers' practices or in the administration of justice, including courts and law enforcement.</p> <p>Discussions are ongoing as to whether and if so, how to adapt the legal framework with regard to cloud services, including data</p>	

No	Member State	Organisation	Strategy/ policy/paper	AI/DLT	Summary	Link
					storage, but also collaborative working in the cloud, use of cloud-based translation services etc. With a view to technological developments this could well encompass AI.	
3.	Belgium	Avocat Geoffrey Deliege	"Ceci est une révolution (artificielle)", Opening speech, Verviers, 2017	AI	A speech which explains what is AI, its legal implications, functions and current state.	https://avocatdeliege.be/ceci-revolution-artificielle-discours-de-rentree-verviers-2017/
4.	Germany	German Bar Association		Both	<p>The German Bar Association is conducting an in-depth dialogue with its members, 63.000 lawyers, to analyse the current use and potential use of AI, but also with AI providers. In this context the DAV is also evaluating the eventual need to create a regulatory level playing field.</p> <p>With regard to the necessity for legislative amendments, according to the German Bar Association the use of blockchain/DLT technology stands in conflict with the following legal topics. However, it is not the blockchain/DLT technology itself that has these problems, but the application based on the blockchain/DLT technology:</p>	

No	Member State	Organisation	Strategy/ policy/paper	AI/DLT	Summary	Link
					<p>a) In individual cases there could be a violation of Art. 101 TFEU</p> <p>b) The protection of minors under §§ 107, 108 BGB would have to be extended</p> <p>c) Nullity, rescission and withdrawal from the contract (§ 346 BGB and) must be possible as "reverse transactions"</p> <p>d) The statutory provisions on the acquisition of the non-entitled party may have to be modified</p> <p>e) The correction, deletion (including the right to forget) and blocking of personal data (Art. 15, 16 and 17 GDPR) is not technically possible because all pre-transactions are interlinked.</p>	
5.		German Federal Bar		AI	There is a working group that has been dealing with possible consequences in great detail. This includes the legal framework. Options are changes in BRAO (act on the legal profession) and RDG (legal services act), currently it is not decided yet.	
6.	Italy	Saint Anna School of Advanced Studies, Pisa	Digital Transformation report of the team at the Prime Minister's Office	General	The ecosystem refers to the telematics proceedings (civil, criminal, and tax ones) together with the digital support for both judges and attorneys. It includes also the network of access points to enable authorised individuals/institutions to access	

No	Member State	Organisation	Strategy/ policy/paper	AI/DLT	Summary	Link
					digital services related to the administration of justice	
			Studies on the use of AI in the justice field	AI		https://docs.italia.it/italia/piano-triennale-ict/pianotriennale-ict-doc/en/stabile/index.html
7.		National Council of Notaries		DLT	The Simplification 2019 decree introduces the regulatory definition of technologies based on distributed registers (blockchain) and smart contracts. The decree also provides that the storage of an electronic document through the use of technologies based on distributed registers produces the legal effects of electronic time validation.	
8.	Luxembourg	Kaufhold & Reveillaud, Advocates	Smart contracts: Real Property	DLT	The study explores the blockchain technology in the field of smart contracts.	https://mattereum.com/upload/block/af8/mattereum_workingpaper.pdf
9.	United Kingdom	The Law Society of England and Wales	"Blockchain: The legal implications of distributed systems"	DLT	The paper is a horizon scanning piece on the legal implications on the uses of blockchain. It explores the potential use cases of blockchain, its challenges and opportunities, and what this might mean for solicitors.	https://www.lawsociety.org.uk/topics/research/blockchain
			Lawtech Adoption Research report	AI	We have policy positions and conducted research which examined: <ul style="list-style-type: none"> Using technology in the legal services sector and adoption rates 	https://www.lawsociety.org.uk/support-services/research-trends/lawtech-adoption-report/ https://www.lawsociety.org.uk/support-services/research-

No	Member State	Organisation	Strategy/ policy/paper	AI/DLT	Summary	Link
			Technology, access to justice and the rule of law report Algorithm use in the criminal justice system report		<ul style="list-style-type: none"> Technological innovation to unlock access to justice innovation Use of algorithms in criminal justice – legal and ethical implications 	trends/technology-access-to-justice-rule-of-law-report/ https://www.lawsociety.org.uk/support-services/research-trends/algorithm-use-in-the-criminal-justice-system-report/

7.3. Overview of projects of the legal professional organisations

The table below presents a global overview of projects for future implementation of AI and/or DLT, which have been discussed with the legal professional organisations during the interview consultations.

Table 7.3.1 – Overview of projects of legal professional organisations

Member State	Organisation/ Project Owner	Project title	AI/DLT domain	Status	Timeframe	Justice field ²²⁹	Short description ²³⁰	Project ref. No. in Annex III
EU/ International	European Union of Judicial Officers (UEHJ) and European Bailiffs'	Recovery of Uncontested Claims (RUC)	AI	Ongoing	2016 – ongoing	Civil Law, Contract and Commercial Law, Company Law	This project will result in a solution supporting the recovery of debts in B2B cases for uncontested claims. It will aim to avoid	3.2

²²⁹ For the replies that selected more than 3 sub-domains of the main justice domain, this is indicated as [All] in the table. For more detailed information about these sub-domains, please consult Annex III.

²³⁰ For a detailed description please see Annex III

Member State	Organisation/ Project Owner	Project title	AI/DLT domain	Status	Timeframe	Justice field ²²⁹	Short description ²³⁰	Project ref. No. in Annex III
	Foundation (EUBF)						<p>enforcement and find solutions between the debtor and the creditor. AI will be used to facilitate and accelerate the work.</p> <p>In Belgium, the judicial officers have, under certain conditions such as uncontested claims, the authority to provide a valid title with the help of Artificial Intelligence (central register).</p> <p>In terms of technology, the solution is based on expert and rules-based systems.</p>	
EU/ International	European Union of Judicial Officers (UEHJ) and European Bailiffs' Foundation (EUBF)	Online dispute Resolution (ODR) for Medicys-consommation.fr	AI	Ongoing	2017 – ongoing	Civil Law, Contract and Commercial Law, Company Law	<p>This project will create an ODR platform, which aims to solve disputes between consumers and professionals in an amicable way. The platform will provide automatic responses to users' recurring questions.</p> <p>In terms of technology, the solution is based on machine learning/deep learning and natural language processing.</p>	3.3
EU/ International	European Union of Judicial Officers (UEHJ) and European Bailiffs'	Alertcys.io	DLT	Ongoing	2018 – ongoing	Civil Law, Company Law	<p>This project aims to provide a safe environment to whistle-blowers, an accessible medium for companies</p>	3.4

Member State	Organisation/ Project Owner	Project title	AI/DLT domain	Status	Timeframe	Justice field ²²⁹	Short description ²³⁰	Project ref. No. in Annex III
	Foundation (EUBF)						obliged to get such a system and to open it to whistle-blowers. It will offer the national competent authorities the confidence into bailiffs. This system aims to remove the need to entrust the common platform to a central entity. In terms of technology, the blockchain is public and permission-less.	
EU/International	European Lawyers' Foundation ²³¹ and the Council of the Bars and Law Societies of Europe (CCBE)	AI4Lawyers ²³²	AI	Ongoing	1Q 2020 – 2022	Judicial training	The project aims to analyse the available IT capabilities of law firms in the EU, to identify possible uses of AI for the legal needs of small and medium enterprises (SMEs) and to draft guidelines for lawyers and law firms on the use of AI. The project aims to correspond to the priorities identified in the e-Justice Action Plan 2019-2023. The main objective is to inform lawyers in the broadest way possible about potential risks that AI may pose and in which	3.1

²³¹ <https://elf-fae.eu/>

²³² <https://elf-fae.eu/ai4lawyers/>

Member State	Organisation/ Project Owner	Project title	AI/DLT domain	Status	Timeframe	Justice field ²²⁹	Short description ²³⁰	Project ref. No. in Annex III
							business areas they might actually be able to use AI. Eventually the idea is to link the guidelines that will be drafted within the scope of the project to the EU training available on an EU training platform.	
Czech Republic	Judicial Academy	E-learning Education for the Judiciary	AI	Completed	2008–2011	Judicial training	<p>The main goal of the project was to enhance the education of employees of the Czech judiciary by using modern technologies.</p> <p>The project enabled the electronic systems of the Judicial Academy to interconnect into one seamless unit. The creation of an electronic platform, enabled <i>inter alia</i> the effective data administration, analysis and assessment.</p> <p>The platform uses AI in the field of advanced search (question answering systems and semantic search), the evaluation of training courses and identification of participants (semantic search engines and question answering systems).</p>	2.1
Italy	National Council of Notaries	Notaio Smart	AI	Ongoing	N/A	Administrative Law,	This AI project falls within the category of automatically creating	3.5

Member State	Organisation/ Project Owner	Project title	AI/DLT domain	Status	Timeframe	Justice field ²²⁹	Short description ²³⁰	Project ref. No. in Annex III
						Administrative Proceedings	documents, in particular contract reviews, aiming to enhance client satisfaction where client refers to all involved stakeholders in a case.	
Italy	National Council of Notaries	Notaio Smart	DLT	Ongoing PoC phase	N/A	Administrative Law, Administrative Proceedings	The main goal of the project is to optimise business processes. The blockchain technology is private/ consortium, permissioned, Hyperledger.	3.6
Italy	National College of Agricultural Experts and Graduated Agricultural Experts (CNPAPAL)	Desktop Assistance for end Users	AI	Ongoing	2020-2022	Agriculture field	This project will develop a tool to assist the end user by means of document filling, classification and a questions and answer system.	3.7
Italy	Sant'Anna School of Advanced Studies – Pisa (LIDER-Lab of DIrpolis Institute)	Predictive Jurisprudence	AI	Ongoing	Sept. 2019-Sept. 2022	Civil Law, Competition Law	This is a pilot project aiming to analyse court decisions by using files of trial courts according to the criteria and methodologies developed in the Observatory on Personal Injury Damage studies ²³³ . The algorithm aims to recreate and mimic the legal reasoning behind the judgments by making	3.8

²³³ <https://www.lider-lab.sssup.it/lider/odp/>

Member State	Organisation/ Project Owner	Project title	AI/DLT domain	Status	Timeframe	Justice field ²²⁹	Short description ²³⁰	Project ref. No. in Annex III
							<p>predictable subsequent decisions on the same subject.</p> <p>The project should also help explain the reasoning underlying different decisions. Additionally, the algorithm may contribute to the identification of criteria for awarding compensation to non-pecuniary losses beyond the current interpretations and attempt to standardise these highly subjective decisions.</p> <p>In terms of technology, the solution uses deep learning; expert systems and rule-based systems; algorithms for classification; algorithms for regression; optimisation.</p>	

The table below presents a global overview of **initiatives and ideas** for future implementation of AI and/or DLT, which have been discussed with the legal professional organisations during the interview consultations.

Table 7.3.2 – Overview of initiatives and ideas of the legal professional organisations

Member State	Organisation	AI/DLT domain	Technology cluster	Short description of initiative or idea
Germany	German Bar Association (GBA)	AI/BC	Creation of incubators	The GBA is making significant efforts to identify tools for practitioners, even though the German Bar Association does not invest in the development of these tools. However, it considers whether to support incubators in the future.
Luxembourg	Kaufhold & Reveillaud,	DLT	European Blockchain Platform	A European platform based on blockchain technology where different types of official documents, i.e. apostilles and official documents of the Ministry of Foreign Affairs can be stored and exchanged.
		AI	Billing system	An automated AI-based system for billing clients.
		AI	Legal documentation generation	Generating legal documentation, e.g. making contracts based on term sheets.
		AI	Search capabilities in case law and internal databases	Easy search in case law databases, search in internal databases for memos, documents, etc.
Spain	General Council of Spanish Lawyers (CGAE), Delegation in Brussels	DLT	Lawyers' Digital Certification	The CGAE is member of Alastria ²³⁴ . This is still an idea at a very early stage with no further project-related developments.

²³⁴ <https://alastria.io/>

8. ICT COMPANIES CONSULTATION RESULTS

8.1. Selected replies to the questionnaire

8.1.1. Country of organisation

Q1.2: What is the Country of your organisation?

A total of 15 (or 100% of all 15) stakeholders replied to this question, where it can be seen that the replies come from 9 Member States, and the United Kingdom.

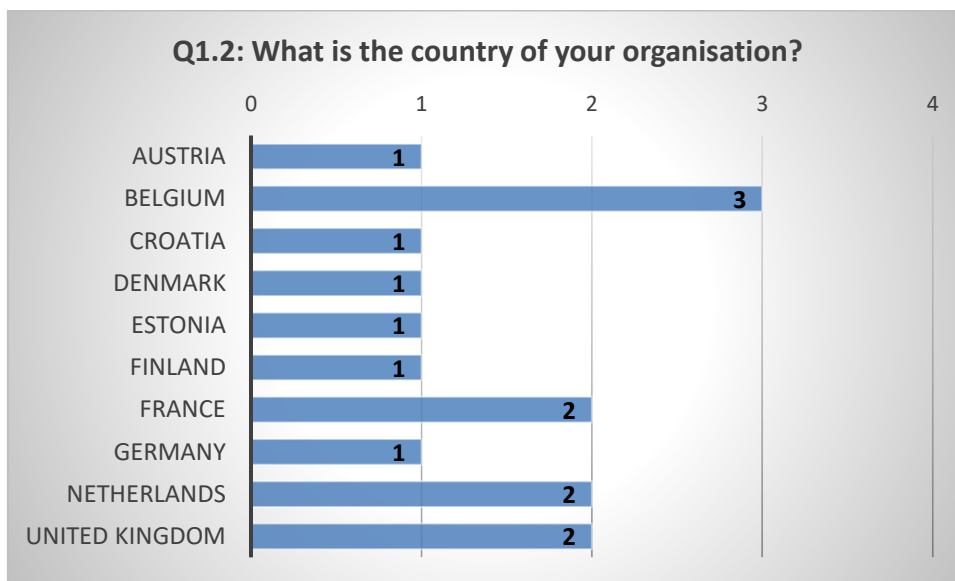


Table 8.1.1: Country of the organisation

Reply	No.	Respondent	Respondent code
Austria	1.	AT – m2n – consulting and development gmbh	Resp-10
Belgium	2.	BE – Deloitte	Resp-09
	3.	BE – Consono	Resp-14
	4.	BE – IBM	Resp-15
Croatia	5.	HR – Newton Technologies Adria	Resp-07
Denmark	6.	DK – Pentia A/S	Resp-05
Estonia	7.	EE – Guardtime	Resp-11
Finland	8.	FI – KnowIT Solutions Oy	Resp-13
France	9.	FR – Doctrine (Forseti SAS)	Resp-01
	10.	FR – Predice	Resp-02
Germany	11.	DE – Paradatec GmbH	Resp-12
Netherlands	12.	NL – LexIQ	Resp-04
	13.	NL – Microsoft	Resp-08
United Kingdom	14.	UK – PredPol Inc.	Resp-03
	15.	UK – VoiceScript Technologies Ltd	Resp-06

8.1.2. Field of services and products

Q1.8: Are your products/services in one or more of the fields below?

This is a question allowing selection of multiple replies. A total of 15 (or 100% of all 15) stakeholders replied to this question, where 12 (or 86% of the 15 replies) indicated that

their product or service is situated in the justice field, 9 (or 64% of the 15 replies) indicated their product or service is situated in the 'Law enforcement' field, 8 (or 57% of the 15 replies) said their product or service is situated in the 'Legislation' field, and 9 (or 64% of the 15 replies) selected 'Other'.

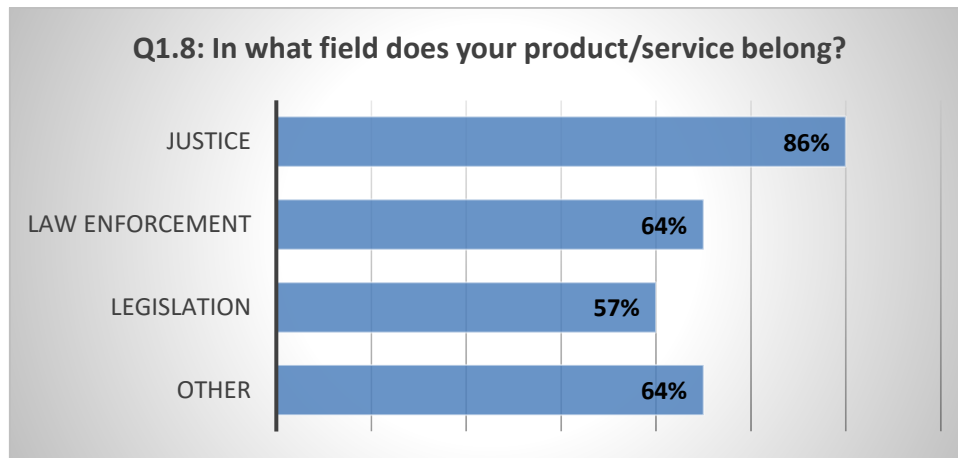


Table 8.1.2: Products and services of the company – replies

Reply	No.	Respondent	Respondent code
Justice	1.	AT – m2n – consulting and development gmbh	Resp-10
	2.	HR – Newton Technologies Adria	Resp-07
	3.	NL – Microsoft	Resp-08
	4.	BE – Consono	Resp-14
	5.	FR – Doctrine (Forseti SAS)	Resp-01
	6.	NL – LexIQ	Resp-04
	7.	FI – KnowIT Solutions Oy	Resp-13
	8.	FR – Predictice	Resp-02
	9.	EE – Guardtime	Resp-11
	10.	DE – Paradatac GmbH	Resp-12
	11.	UK – VoiceScript Technologies Ltd	Resp-06
	12.	BE – IBM	Resp-15
TOTAL: 12 replies			
Law enforcement	1.	AT – m2n – consulting and development gmbh	Resp-10
	2.	HR – Newton Technologies Adria	Resp-07
	3.	NL – Microsoft	Resp-08
	4.	BE – Consono	Resp-14
	5.	UK – PredPol Inc.	Resp-03
	6.	NL – LexIQ	Resp-04
	7.	UK – VoiceScript Technologies Ltd	Resp-06
	8.	FI – KnowIT Solutions Oy	Resp-13
	9.	BE – IBM	Resp-15
TOTAL: 9 replies			
Legislation	1.	FR – Doctrine (Forseti SAS)	Resp-01
	2.	NL – LexIQ	Resp-04
	3.	UK – VoiceScript Technologies Ltd	Resp-06
	4.	FI – KnowIT Solutions Oy	Resp-13
	5.	FR – Predictice	Resp-02
	6.	EE – Guardtime	Resp-11
	7.	BE – Deloitte	Resp-09
	8.	BE – IBM	Resp-15

TOTAL: 8 replies			
Other	1.	HR – Newton Technologies Adria	Resp-07
	2.	NL – Microsoft	Resp-08
	3.	BE – Consono	Resp-14
	4.	DE – Paradatac GmbH	Resp-12
	5.	FR – Predictice	Resp-02
	6.	EE – Guardtime	Resp-11
	7.	BE – Deloitte	Resp-09
	8.	DK – Pentia A/S	Resp-05
	9.	BE – IBM	Resp-15
TOTAL: 9 replies			

8.1.3. Existence of a policy or ethical framework on the provision of AI products and services

Q2: Does your organisation have in place a policy or ethical framework on the provision of AI products and services in the justice field?

A total of 15 (or 100% of all 15) stakeholders replied to this question, where 6 (or 40% of the 15 replies) selected 'Yes' there are policies, or an ethical framework in place for the use of AI, 5 (or 33% of the 15 replies) indicated 'No', and 4 (or 27% of the 15 replies) selected 'Other'.

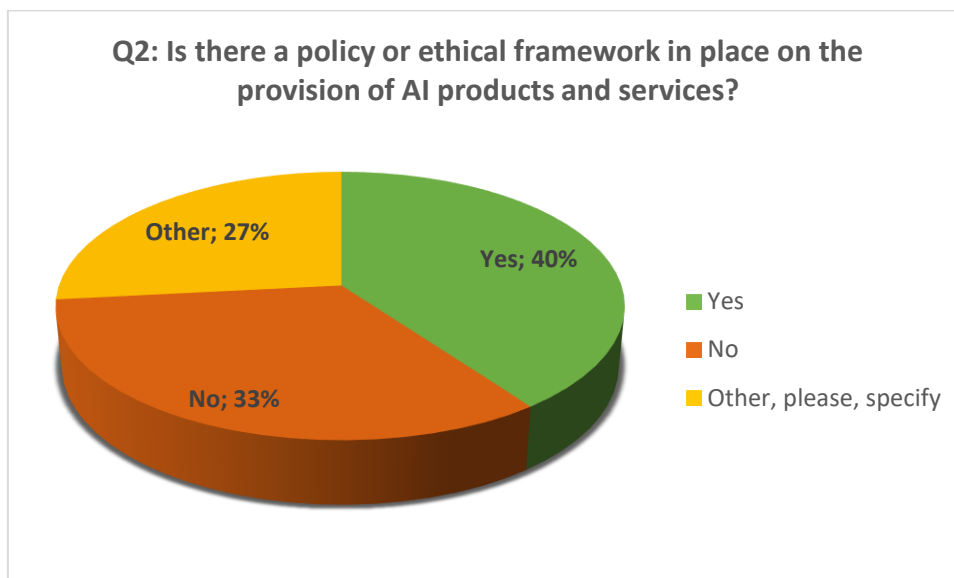


Table 8.1.3: Policy or ethical framework in place – replies

Reply	No.	Respondent	Respondent code
Yes	1.	FR – Doctrine (Forseti SAS)	Resp-01
	2.	FR – Predictice	Resp-02
	3.	UK – PredPol Inc.	Resp-03
	4.	NL – Microsoft	Resp-08
	5.	AT – m2n – consulting and development gmbh	Resp-10
	6.	BE – IBM	Resp-15
TOTAL: 6 replies			
No	1.	NL – LexIQ	Resp-04
	2.	DK – Pentia A/S	Resp-05

	3.	DE – Paradatec GmbH	Resp-12
	4.	FI – KnowIT Solutions Oy	Resp-13
	5.	BE – Consono	Resp-14
TOTAL: 5 replies			
Other	1.	UK – VoiceScript Technologies Ltd	Resp-06
	2.	HR – Newton Technologies Adria	Resp-07
	3.	BE – Deloitte	Resp-09
	4.	EE – Guardtime	Resp-11
TOTAL: 4 replies			

8.1.4. Existence of a policy or ethical framework on blockchain/DLT in the justice field

Q4: Does your organisation have in place a policy or ethical framework on blockchain/DLT in the justice field?

A total of 15 (or 100% of all 15) stakeholders replied to this question, where 1 (or 7% of the 15 replies) selected 'Yes' there are policies, or an ethical framework in place for the use of blockchain/DLT, 11 (or 73% of the 15 replies) indicated 'No', and 3 (or 20% of the 15 replies) selected 'Other'.

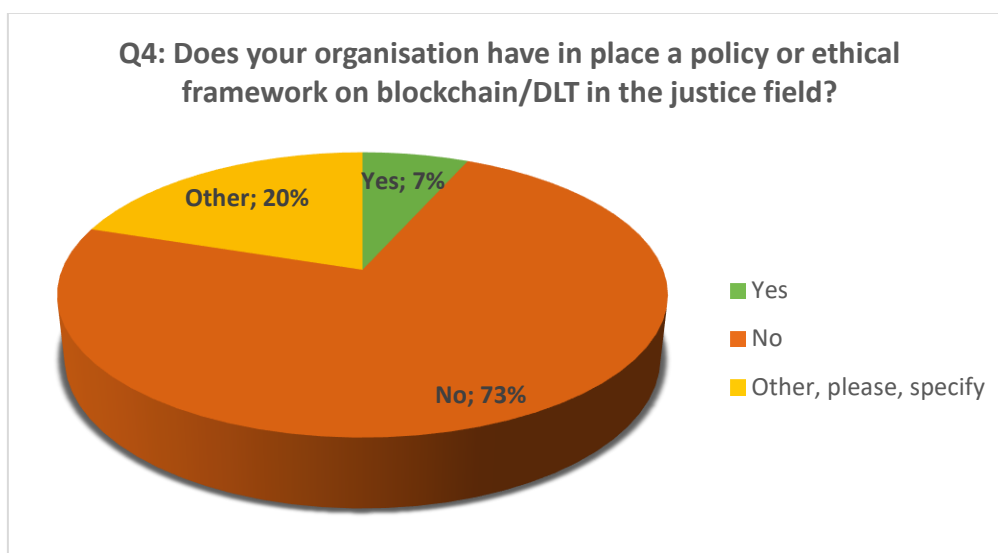


Table 8.1.4: Policy or ethical framework on the use of blockchain/DLT – replies

Reply	No.	Respondent	Respondent code
Yes	1.	NL – Microsoft	Resp-08
TOTAL: 1 reply			
No	1.	FR – Doctrine (Forseti SAS)	Resp-01
	2.	FR – Predictice	Resp-02
	3.	UK – PredPol Inc.	Resp-03
	4.	NL – LexIQ	Resp-04
	5.	DK – Pentia A/S	Resp-05
	6.	UK – VoiceScript Technologies Ltd	Resp-06
	7.	HR – Newton Technologies Adria	Resp-07
	8.	AT – m2n – consulting and development gmbh	Resp-10
	9.	DE – Paradatec GmbH	Resp-12
	10.	FI – KnowIT Solutions Oy	Resp-13

	11.	BE – Consono	Resp-14
TOTAL: 11 replies			
Other	1.	BE – Deloitte	Resp-09
	2.	EE – Guardtime	Resp-11
	3.	BE – IBM	Resp-15
TOTAL: 3 replies			

8.1.5. Artificial Intelligence-existing projects

Q6: Please indicate how many AI-related products/services your organisation provides, limited to the justice area:

A total of 15 (or 100% of all 15) stakeholders replied to this question, where 11 (or 73% of the 15 replies) indicated to provide '1-3' AI-related projects/services, 2 (or 13% of the 15 replies) indicated '4-6' projects/services, and 2 (or 13% of the 15 replies) selected to provide more than 6 projects/services.

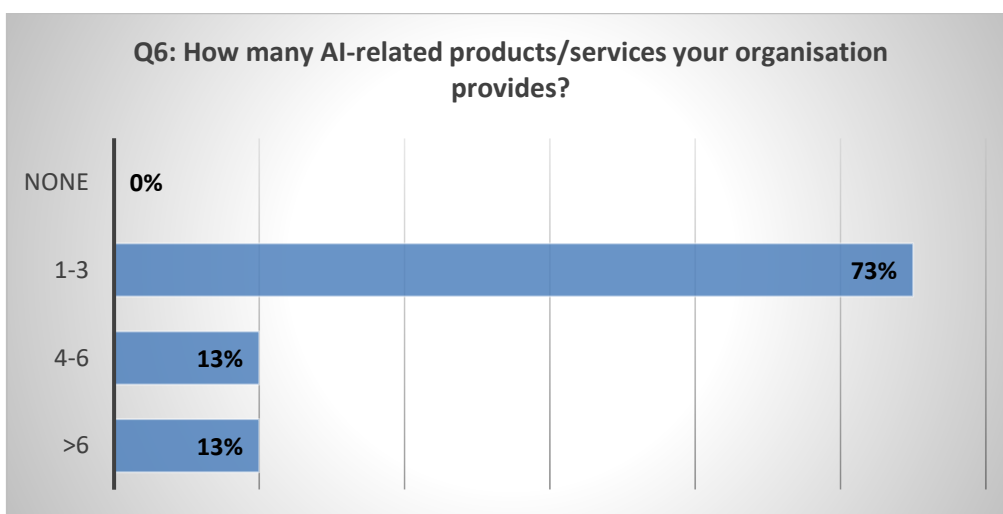


Table 8.1.5: AI-related products and services provided – replies

Reply	No.	Respondent	Respondent code
1-3	1.	FR – Doctrine (Forseti SAS)	Resp-01
	2.	FR – Predictice	Resp-02
	3.	UK – PredPol Inc.	Resp-03
	4.	NL – LexIQ	Resp-04
	5.	DK – Pentia A/S	Resp-05
	6.	HR – Newton Technologies Adria	Resp-07
	7.	BE – Deloitte	Resp-09
	8.	AT – m2n – consulting and development gmbh	Resp-10
	9.	EE – Guardtime	Resp-11
	10.	DE – Paradatac GmbH	Resp-12
	11.	BE – Consono	Resp-14
TOTAL: 11 replies			
4-6	1.	UK – VoiceScript Technologies Ltd	Resp-06
	2.	FI – KnowIT Solutions Oy	Resp-13
TOTAL: 2 replies			
>6	1.	NL – Microsoft	Resp-08
	2.	BE – IBM	Resp-15
TOTAL: 2 replies			

8.1.6. Blockchain/DLT-existing projects

Q23: Please indicate how many blockchain/DLT-related products/services your organisation provides, limited to the justice area:

A total of 13 (or 87% of all 15) stakeholders replied to this question, where 10 (or 77% of the 13 replies) indicated to provide 'No' DLT related projects/services, 2 (or 15% of the 13 replies) indicated to provide '1-3' DLT related projects/services, and 1 respondent (or 8% of the 13 replies) indicated to have more than 6 DLT related projects/services.

The number of stakeholders who did not reply to this question, is not taken into account for the calculation of the percentages represented in the chart below.

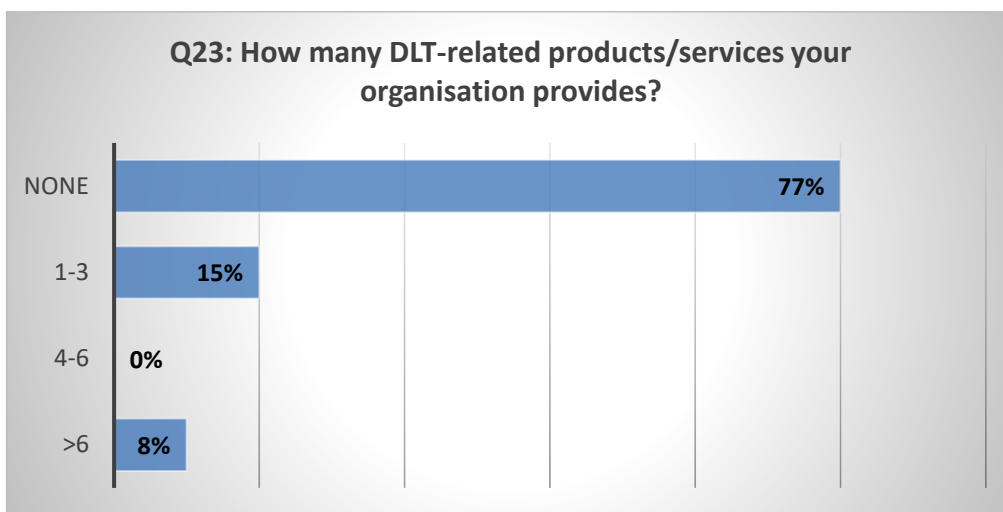


Table 8.1.6: Blockchain/DLT-related products and services provided – replies

Reply	No.	Respondent	Respondent code
None	1.	FR – Doctrine (Forseti SAS)	Resp-01
	2.	UK – PredPol Inc.	Resp-03
	3.	NL – LexIQ	Resp-04
	4.	DK – Pentia A/S	Resp-05
	5.	UK – VoiceScript Technologies Ltd	Resp-06
	6.	HR – Newton Technologies Adria	Resp-07
	7.	AT – m2n – consulting and development gmbh	Resp-10
	8.	DE – Paradatec GmbH	Resp-12
	9.	FI – KnowIT Solutions Oy	Resp-13
	10.	BE – Consono	Resp-14
TOTAL: 10 replies			
1-3	1.	NL – Microsoft	Resp-08
	2.	EE – Guardtime	Resp-11
TOTAL: 2 replies			
>6	1.	BE – IBM	Resp-15
TOTAL: 1 reply			

8.2. Overview of strategies and policies of the ICT companies

The table below represents information gathered about strategies and policies of the ICT companies regarding use of AI and blockchain/DLT based on the replies to the questionnaire and/or interviews with representatives of the respective companies.

Table 8.2 – Strategies and policies of the ICT companies

No	Member state	Company	Strategy/ policy or other clarifications	AI/DLT	Summary	Link
1.	Austria	m2N		AI	The specific developments for law enforcement and crime Investigation based on m2n system can be shared free of charge within Austrian public organisations engaged in these areas. Any usage that could hinder those tasks is not permitted. m2n is committed to meet ethical principles, especially when using AI technology (e.g. avoidance of technological bias, aspects of trust, accountability and transparency). Any kind of reasoning is always subject to interpretation by the investigation expert and is based on references of specific pieces of evidence.	
2.	Belgium	Deloitte	Shared values framework	General	Deloitte governs the ethncial use of our services and products via a Shared Values framework.	
3.		IBM	Everyday Ethics for Artificial Intelligence	AI	The document focuses on five Areas of Ethical Focus <ul style="list-style-type: none"> • Accountability • Value Alignment • Explainability • Fairness User Data Rights	https://www.ibm.com/watson/assets/duo/pdf/everydayethics.pdf

No	Member state	Company	Strategy/ policy or other clarifications	AI/ DLT	Summary	Link
			IBM ethics & integrity framework	DLT	N/A	https://www.ibm.org/responsibility/policies
4.	Estonia	Guardtime			Guardtime has no AI or DLT policy as they are not provisioning AI products/services themselves. However, their own R&D and solutions include tools to secure and control AI training and deployment. Guardtime's assured AI concept is safeguarding the AI training and ensuring that the models are not biased. Also, their solutions help to explain the AI's "black box" for regulators, users, etc. Their initial focus and first projects are in the healthcare sector as the AI solutions are the most developed and financed there so far. However, the same concepts can be easily applied to justice field AI projects. Guardtime's proprietary KSI blockchain is developed in close cooperation with states (Estonia) and leading enterprises (Lockheed Martin, Ericsson, etc.). Guardtime is highly emphasising the control, security and quality of the technology. eIDAS certified core technology.	
5.	France	Doctrine	Internal code of conduct	AI	The internal code of conduct ensures that Doctrine's activities are led according to certain values and principles such as transparency and loyalty of algorithms, ethical collection of data, protection of personal data, fair competition etc.	https://www.doctrine.fr/pdf/code de bonne conduite.pdf
6.		Predictice		AI		https://predictice.com/charte-de-la-justice-predictive
7.	Hungary	Newton Technologies Adria		AI	The product development processes adhere to legislation. Implementation of Newton's AI-based systems is designed to optimise work processes and society as a whole, with benefits for the system users, the organisations, and the end users of the service. The products are designed to be accessible and useful to everyone, and harmful to none. By using artificial intelligence in their systems, Newton indirectly enable users to exercise their fundamental human rights, i.e. the right to work, communication and education.	

No	Member state	Company	Strategy/ policy or other clarifications	AI/ DLT	Summary	Link
8.	The Netherlands	Microsoft	Responsible AI Principles	AI	6 ethical principles: <ul style="list-style-type: none"> • Fairness • Inclusiveness • Reliability & safety • Transparency • Privacy & Security Accountability	https://www.microsoft.com/en-us/AI/our-approach-to-ai)
				DLT	Security, privacy and compliancy for blockchain as it is a service provided through Microsoft Azure. The principles applied to Azure are in the link bellow.	https://www.microsoft.com/en-us/trust-center/product-overview
9.	United Kingdom	PredPol Inc.	PredPol's stance on privacy and civil rights	AI		http://blog.predpol.com/predpols-stance-on-privacy-civil-rights-transparency
10.		VoiceScript Technologies Ltd			Ethical frameworks are quite nascent and the entire landscape of AI services available in the justice field has few standards and even fewer policies that have an effective track-record of being applied successfully.	

8.3. An overview of ICT organisations' products/services and related projects/use cases

Table 8.3 – Overview of products/services and related projects/use cases of the ICT organisations

No.	Member State	ICT organisation	Product name/services	AI/DLT domain	Status	Short description ²³⁵	Project ref. No. in Annex IV- ICT projects
1.	Austria	m2n Consulting and Development	m2n Forensic Analysis Suite	AI	Available	<p>The tool supports for investigators in (criminal) prosecution in analysing big amounts of data, especially seized during in-house searches or gathered in the course of other investigation actions.</p> <p>This solution has been used by the Austrian Federal Ministry of Constitutional Affairs, Reforms, Deregulation and Justice for implementing their AI project for analysing investigative data as described in Annex II of this study. <i>See Annex II – MS explored projects, project no. 3.1.</i></p>	2.1
2.	Belgium	Consono	Dynizer	AI	Available	<p>The Dynizer tool enables organisations to connect structured or unstructured data from different data sources, to link them together, and to keep track of them. The solution facilitates access to the data for the users of the tool, in order to easily query the data. It can <i>inter alia</i> connect information about people, organisations and events from an unstructured data lake.</p> <p>This solution has been used by the University of Ghent for their project 'Database for storing and linking data from court judgments' as described in Annex IV of this report. <i>See Annex IV – ICT projects, project no. 2.2.</i></p>	2.2
3.	Belgium	Deloitte	RegExplorer	AI	Available	<p>The RegExplorer tool can be of help where combinations on subject matter are needed to analyse regulatory text and digesting. It also analyses, and understands links within a regulatory corpus and across institutions, where the data sources are big in volume and have complex regulatory frameworks and regimes. The tool also fills in the gaps where there is loss of institutional knowledge.</p>	2.3
4.	Belgium	IBM	Watson	AI	Available	<p>The solution can help with screening through a high volume of documents and coming up with recommendations.</p> <p>Different solutions within Watson are possible, such as:</p> <ul style="list-style-type: none"> • IBM Watson Studio • IBM Watson Machine Learning 	2.4.1 2.4.2 2.4.3 2.4.4 2.4.5

						<ul style="list-style-type: none"> • IBM Watson Open Scale • IBM Watson Assistant • IBM Watson Discovery • IBM Watson Knowledge Studio • IBM Watson Natural Language Understanding • Watson Assistant for Cloud Pak for Data • IBM Watson Care Manager <p>This Watson solution has been used by the Italian Ministry of Justice, Department of Justice Affairs for the implementation of their project Aut Dedere Aut Judicare as described in Annex II of this study. See Annex II – MS explored projects, project no 3.31.</p>	
5.	Belgium	IBM	IBM i2	AI	Available	This is a threat intelligence analysis platform for tackling critical missions across national security and defence, law enforcement, fraud, financial crime and cyber-threat hunting.	2.4.6
6.	Belgium	IBM	Blockchain Platform	DLT	Available	Business objectives differ a lot from use case to use case, especially in the public sector, i.e. from e-Voting, tax return, bond issuance, etc.	2.4.7
7.	Belgium	IBM	Garage	AI/DLT	Available (with minimum scope)	This project initiation methodology envisages to encourage enterprises to accelerate, break through, and work more like startups.	2.4.8
8.	Belgium	University of Ghent	Database for storing and linking data from court judgments	AI	Under development	The solution can be of help analyse big amounts of data, court judgments, and find links between them.	2.5
9.	Croatia	Newton Technologies Adria (NTA)	NEWTON Dictate	AI	Available	The Newton Dictate tool provides digital transformation through workflow optimisation and strengthening of the efficiency and quality of the judicial system. It operates in text and document generation, where big amounts of documents have to be created.	2.6

²³⁵ For a detailed description please see Annex IV- ICT projects description.

						This solution has been used by the Croatian Ministry of Justice for implementation of their project speech-to-text as described in Annex II of this study. <i>See Annex II – MS explored projects, project 2.2.</i>	
10.	Denmark	Pentia A/S	Digital legal diary	AI	Under Development	<p>The Digital Legal Diary system aims at improving efficiency in relation to the judicial administration and facility management and planning.</p> <p>This solution has been used by the Danish Attorney General (Rigsadvokaten) to implement their project 'Digital Court Planner' as described in Annex II of this study. <i>See Annex II – MS explored projects, project no. 3.9.</i></p>	2.7
11.	Estonia	Guardtime	Assured-AI	AI (uses DLT base)	Under Development	<p>The Assured-AI tool can be used where the regulator is demanding auditability and independent verification from AI service providers. Additionally, risk-mitigation and enhancing control/oversight is needed when deploying (third-party provided) AI-based solutions in the judicial field.</p> <p>This solution has been used by the Dutch Ministry of Justice and Security to implement their project 'DigiAkkoord' as described in Annex II of this study. <i>See Annex II – MS explored projects, project no. 3.39.</i></p>	2.8
12.	Finland	KnowIT	Intelligent process automation services	AI	Available	<p>The mainly addressed business problem is the need to reduce manual tasks. The solution could be automating business processes, in particular, legal workflow automation, and improving efficiency and accuracy.</p> <p>This solution has been used by the Finnish Ministry of Justice for the implementation of their project Sakkomaksujen kohdamisen automatisoint – Robot Process Automation (RPA) as described in Annex II of this study. <i>See Annex II – MS explored projects, project no. 2.3.</i></p>	2.9
13.	France	Doctrine	Doctrine	AI	Available	<p>Doctrine aims to improve efficiency, to provide earlier and more accurate risk assessment e.g. by detecting potentially contentious clauses in documents/contracts. It also aims to</p>	2.10

						increase accuracy and helps with acquiring insights from available data, reporting and visualisation. Doctrine helps users to focus more value-added activities (with AI automating low-value, routine activities).	
14.	France	Predictice	Predictice	AI	Available	Predictice aims to improve efficiency in justice which means achieving a faster time-to-trial. It enhances the 'turnover', e.g. number of cases processed, and provides earlier and more accurate risk assessment, e.g. by detecting potentially contentious clauses in documents/contracts. Predictice also enhances client satisfaction, where client refers to all involved stakeholders in a case; acquiring insights from available data, reporting and visualisation; and ability to focus on more value-added activities (with AI automating low-value, routine activities).	2.11
15.	France	Lefebvre Sarrut	Anonymisation of court decisions for the French Supreme Court	AI	Services Provider	<p>The personal data protection rules in France require high quality anonymisation of case law. At the beginning of 2019, Lefebvre Sarrut started collaborating with the French Supreme Court and the French administration in charge of IT and digitalisation – DINUM²³⁶ to do a proof of concept (PoC) on anonymisation of court decisions. The court chose to go with Flair²³⁷ from Zalando Research²³⁸. The project was completed and the conclusion is to go into production. This has not happened yet, as the Court is awaiting a decision from the Ministry of Justice.</p> <p>This solution has been used by the French Cour de Cassation (*Court of Cassation) to implement their project 'AI-driven pseudonymisation of court decisions' as described in Annex II of this study. <i>See Annex II – MS explored projects, project no. 3.16.</i></p>	2.12
16.	France	Lefebvre Sarrut	Anonymisation of court decisions for the	AI	Services Provider	Compared to the project with the French Supreme Court where Lefebvre Sarrut had more programming work, in Luxembourg	2.12 .1

²³⁶ In French, La direction interministérielle du numérique (DINUM).

²³⁷ <https://github.com/flairNLP/flair>

²³⁸ <https://research.zalando.com/>

			Luxembourgish Ministry of Justice			<p>their role was more of an advisory nature, since they assisted the Luxembourgish authorities to build the dataset with a PoC.</p> <p>This solution has been used by the Luxembourg Ministry of Justice for implementing their project 'Anonymisation of case law' as described in Annex II of this study. <i>See Annex II – MS explored projects, project no. 3.36.</i></p>	
17.	Germany	Paradatec	PROSAR-AIDA	AI	Available	<p>The PROSAR-AIDA tool can help where classification and data extraction is needed from unstructured and semi-structured documents, especially when the inherent logic of the documents is extremely complex.</p> <p>This solution has been used by the German Commission for information technology in the judiciary (workgroup use of cognitive systems in judiciary) for implementing their project 'Land register analysis component in the project Development of a federal database land register' as described in Annex II of this study. <i>See Annex II – MS explored projects, project no. 3.20.</i></p>	2.13
18.	Netherlands	LexIQ	Lexalyse	AI	Available	<p>The solution is aiming at automating business processes, in particular legal workflow automation, improving efficiency, applying accuracy, acquiring insights from available data, reporting and visualisation and having the ability to focus on more value-added activities (with AI automating low-value, routine activities).</p> <p>This solution has been used by the Dutch Ministry of Justice and Security for implementing their project 'Jurisprudentierobot' as described in Annex II of this report. <i>See: Annex II – MS explored projects, project no. 2.10.</i></p>	2.14
19.	Netherlands	Microsoft	Azure AI platform	AI	Available	<p>The solution is aiming at automating business processes, in particular, legal workflow automation. Furthermore, it assists in improving efficiency by achieving faster time-to-trial and enhancing turnover, e.g. number of cases processed. Additionally, it provides earlier and more accurate risk assessment, e.g. detecting potentially contentious clauses in documents/contracts, as well as enhances client satisfaction, where client refers to all involved stakeholders in a case. It</p>	2.15

						<p>improves accuracy in the sense of ensuring consistency in decisions (e.g. judgments).</p> <p>This solution has been used by the Portuguese Instituto dos Registos e do Notariado (*Institute of Registries and Notaries) for implementing their project Irene as described in Annex II of this study. See <i>Annex II – MS explored projects, project no. 2.11.</i></p>	
20.	Netherlands	University of Maastricht	Network analysis	AI	Research and innovation lab	This tool will allow network analysis on legal decisions for students and legal researchers to be carried out. Due to the ever-increasing volume of documents on various topics, it is impossible for humans to process them all. In this context, they use network analysis that helps the team identify relevance of decisions.	2.16
21.	Netherlands	University of Maastricht	Topic Modelling	AI	Research and innovation lab	Following the same principle of overly increased information, especially in the field of law and AI, the need to retrieve relevant information in order to avoid duplications is becoming an increasingly time-consuming task.	2.16.1
22.	Netherlands	University of Maastricht	Cross-border mobility	AI	Research and innovation lab	The project helps extract information from national registers on where companies are registered, what their business is; on the number of their employees, etc.	2.16.2
23.	Netherlands	University of Maastricht	Impact of social media on children.	AI	Research and innovation lab	The university lab is working on a project to identify how to protect minors on social media. It focuses on the evaluation of the harm social media could inflict.	2.16.3
24.	Netherlands	University of Maastricht	Identifying hate speech.	AI	Research and innovation lab	From a legal perspective point of view, the research is focusing on political topics, gender-related issues, fundamental rights-related topics, etc. in order to identify hate speech.	2.16.4
25.	Netherlands	University of Maastricht	Dark web – data breaches online	AI	Research and innovation lab	This projects aims to develop methods to track data breaches on the dark web.	2.16.5
26.	Sweden	Kairos Future	Proxies solution	DLT	Under Development	The solution uses a central registry or blockchain for encrypted and anonymised references to the proxies. In the case of authorisations within companies, no central registry or	2.17

						<p>blockchain is needed. This will facilitate the process of employees signing on behalf of their company. This solution will function as an independent authority validation tool.</p> <p>This solution has been used by the Swedish Skatteverket (*Swedish Tax Agency) for the investigation of their project 'Proxies', part of the project 'Blockchain-inspired technical solutions for accounting, auditing and taxation', as described in Annex II of this study. <i>See Annex II – MS explored projects, project no. 2.18.</i></p>	
27.	Sweden	Kairos Future	Invoices solution	DLT	Under Development	<p>The solution is used as an identification tool for invoices. The ambition is to secure data integrity, data security, and privacy. The tool would ensure that invoices are accepted from the seller and the buyer, that they are not possible to manipulate, cannot be used twice, and reduce the risk of fraud such as VAT fraud.</p> <p>This solution has been used by the Swedish Skatteverket (*Swedish Tax Agency) for the investigation of their project 'Invoices', part of the project, "Blockchain-inspired technical solutions for accounting, auditing and taxation", as described in Annex II of this study. <i>(See Annex II– MS explored projects, project no. 2.20.)</i></p>	2.17.1
28.	United Kingdom	VoiceScript Technologies Ltd	Automated, per user/speaker voice transcription and translation	AI	Available	<p>The key problems that the solution solves are that turnaround speeds are too slow, costs to prepare documents are too high, costs to organise and have 'the right thing ready at the right time' involved too much labour.</p> <p>The solution aims at improving efficiency such as time-to-trial, and enhancing the turnover, e.g. number of cases processed.</p>	2.18
29.	United Kingdom	PredPol	PredPol	AI	Available	<p>The PredPol platform achieves three things:</p> <ol style="list-style-type: none"> 1. Predict where and when specified crimes are most likely to occur. 2. Track and manage officer locations in real time to ensure target areas are being patrolled. 3. Provide crime and patrol operations analytics. 	2.19

9. ASSESSMENT OF EXPLORED PROJECTS IN TERMS OF BUSINESS PROBLEM CATEGORIES AND BUSINESS SOLUTIONS

Based on the information received from the Member State public authorities and the judiciary and the legal professional organisations on their projects with innovative technologies, the study assessed the business problems these projects aim to solve. It then grouped these problems in 8 business problem categories, as defined in the table below.

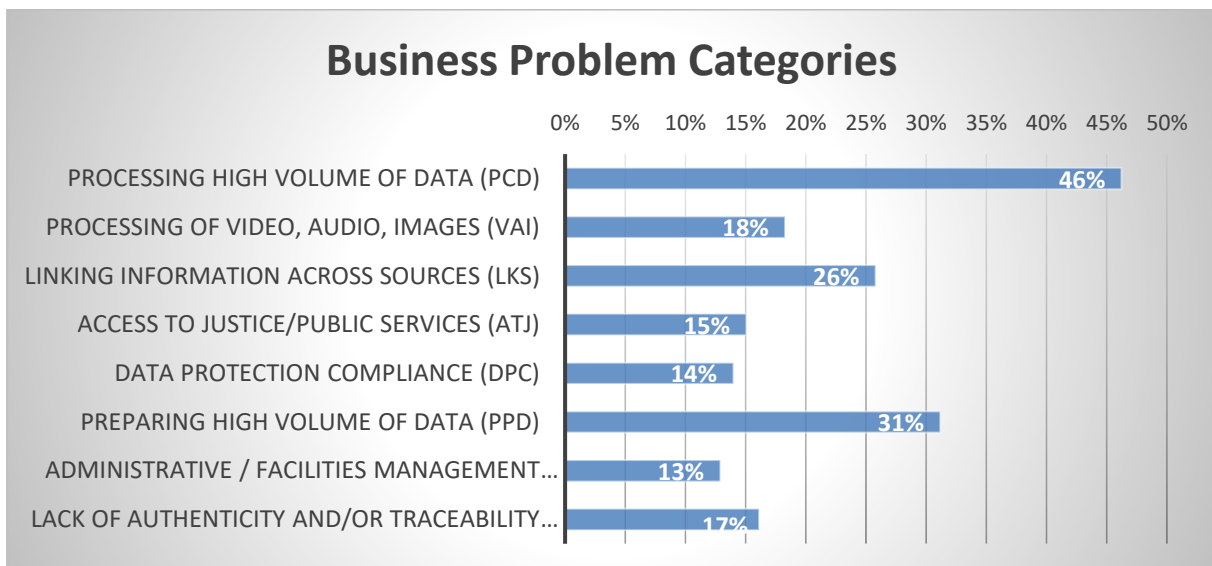
Table 9 – Business problem categories - Definitions

No	Business problem category	Definition of the business problems
1	Processing high volume of data (PCD)	The issue of processing high volumes of structured and unstructured data and documents manually or with simple digital tools, in order to make an analysis based on the content, for tasks such as: finding relevant information for the case, deducing patterns, searching for specific words or cases, classification and categorisation, etc.
2	Processing high volume of video, audio and images (VAI)	The issue of processing high volumes of video files, audio files and/or images in order to make an analysis of the content, for tasks such as: identification of persons/victims, or monitoring of behaviour, detecting illegal activities, detection of speech on audio-video recordings, etc.
3	Linking information across different sources (LKS)	The issue of looking for, extracting and analysing information from multiple sources (such as different databases, registers, systems, etc.) usually because they are not centralised, or connected, and there is no common interface or access point.
4	Access to justice/public services (ATJ)	The issue of not making judicial information or public services available to the citizens/the general public in a user-friendly and easily accessible way. It includes access to case law, case file information, legislation, treatment of citizens' questions, navigation through administrative procedures, etc.
5	Data protection compliance (DPC)	The issue of making documents (usually court judgments and decisions) compliant with the personal data protection legislation with the aim of making those documents publicly available.
6	Preparing high volume of data (PPD)	The issue of treating (high volumes of) data manually, or with simple digital tools, in order to obtain a final output e.g. in preparation of court hearings and in conducting court administration tasks, and/or other judicial tasks. This involves tasks such as: translation of documents, typing of protocols in court hearings or interviews, preparation of contracts, judicial decisions and anonymised versions thereof, manually signing documents, etc.
7	Administrative/facilities management (AFM)	The issue of managing the court administration processes performed by the judicial personnel (clerks, judges, lawyers, etc.), with tasks such as planning of the agendas, court hearings, booking and allocation of court rooms and infrastructure, organising interviews and doing the facility management.
8	Lack of authenticity and traceability (LAT)	The issue of having an insufficient level of traceability regarding actions to be taken by different actors related to data and documents during their process flows

	(e.g. invoices, diplomas, proxies etc.) , so that the information can be stored and/or transferred with a sufficient level of authenticity, trust and integrity.
--	--

9.1. Overview of projects of the Member State authorities and the judiciary per business problem and solution category

Given that one project may solve more than one business problem as per the identified business problem category, out of the 93 completed, ongoing and planned projects, 43 (or 46%) aim to solve a problem in the category of PCD, 17 (or 18%) – in the category of VAI, 24 (or 26%) – in the category of LKS, 14 (or 15%) – in the category of ATJ, 13 (or 14%) – in the category of DPC, 29 (or 31%) – in the category of PPD, 12 (or 13%) – in the category of AFM and 16 (or 1%) – in the category of LAT, as shown below:



More detailed information on the respective projects that fall under each business problem category is provided in the following sections.

Finally, the study mapped the business problem categories to 8 business solutions that the projects using AI or blockchain technologies aim to achieve. These business solution categories are defined below:

Table 9.1.1 – Business solution categories - Definitions

No	Business solution category	Definition of the business solution
1	Anonymisation and pseudonymisation	A solution to business problems in the categories of processing high volumes of data (PCD), preparing high volumes of data (PPD) and data protection compliance (DPC) using AI technology to automate the manual identification and removal of personal data (and/or other sensitive data). Such solution is typically used to ensure compliance with the data protection legislation.

2	Data authenticity and traceability	A solution to business problems primarily in the categories of LAT, PPD, ATJ and LKS ²³⁹ , typically using blockchain/DLT for digital signatures, smart contracts, registers, etc., to perform data validation and enhance traceability, ensure integrity.
3	Digital assistance	A solution to business problems in the categories of ATJ, using AI technology, such as chatbots, to improve citizens' access to information and navigate them through administrative processes.
4	Facial and/or object recognition	A solution to business problems in the category of VAI, typically using AI technology to detect, identify and verify a person or an object from a digital image or video footage, by specific facial or other features. Such solutions, for example, are used in criminal justice and law enforcement to improve victim identification from pictorial material or detect abnormal behaviour of inmates in prisons.
5	Predictive analytics	A solution to business problems in the categories of LKS, PCD and PPD, using AI technology to analyse current and historical facts to make predictions about the future or and/or identify risks and opportunities. In the justice field, such solutions are typically referred to as "predictive justice" and are used to help the judiciary in the decision-making process.
6	Process automation	A solution to business problems primarily in the categories of PCD, PPD, LKS and AFM ²⁴⁰ , typically using AI technology and robot process automation to automate processes such as organisation, planning and facilities management, prioritisation, categorisation and allocation of documents and tasks. In the justice field process automation is usually used to improve efficiency by automating manual and repetitive tasks such as analysing case-related information (e.g. data collected from house searches), payment of fines by citizens, etc.
7	Search optimisation	A solution to business problems primarily in the categories of PCD, LKS and ATJ ²⁴¹ , typically using AI technology to expedite and facilitate searches in relevant case law, registers and digital libraries, as well as usually creating semantic links and possibilities for document annotation.
8	Speech/text-to-text/speech	A solution to business problems in the categories of PPD and VAI, using AI technology, such as voice recognition and machine translation. In the justice field, such solution is typically used to modernise court rooms and facilitate court hearings by replacing the manual typing of court minutes and other documents or the interpretations from foreign languages.

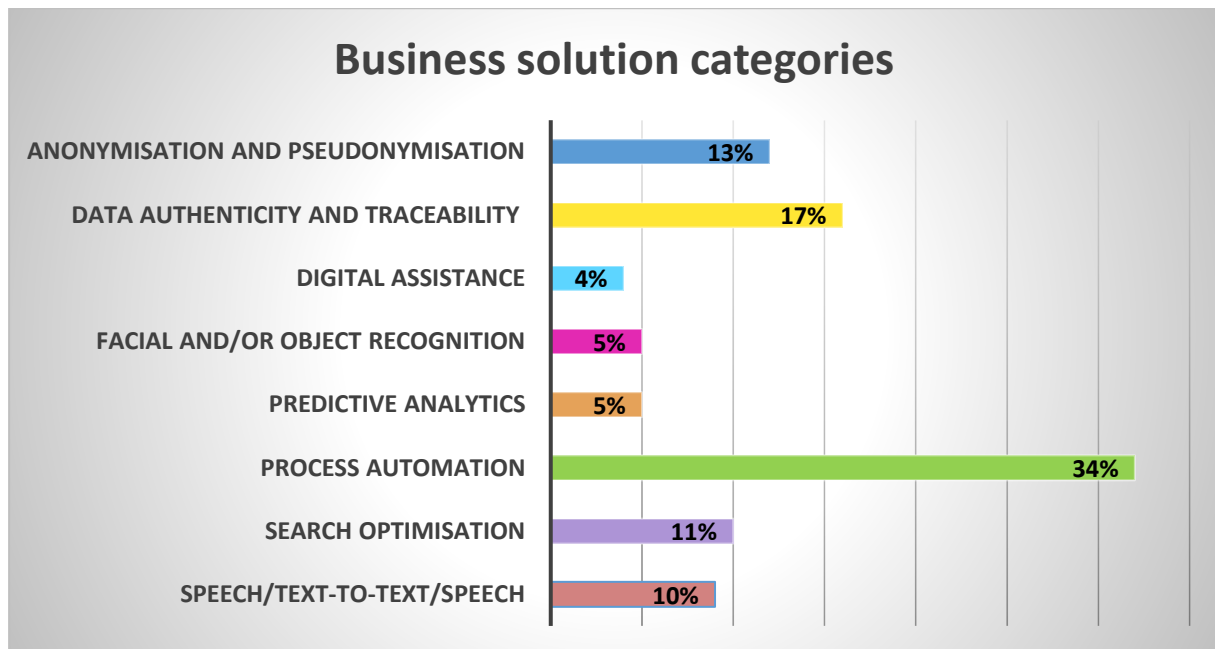
²³⁹ The majority of the projects fall under the enumerated business problem categories. However, the "Data authenticity and traceability" solution could solve business problems in other categories as shown on the image below.

²⁴⁰ The majority of the projects fall under the enumerated business problem categories. However, the "Process automation" solution could solve business problems in other categories as shown on the image below.

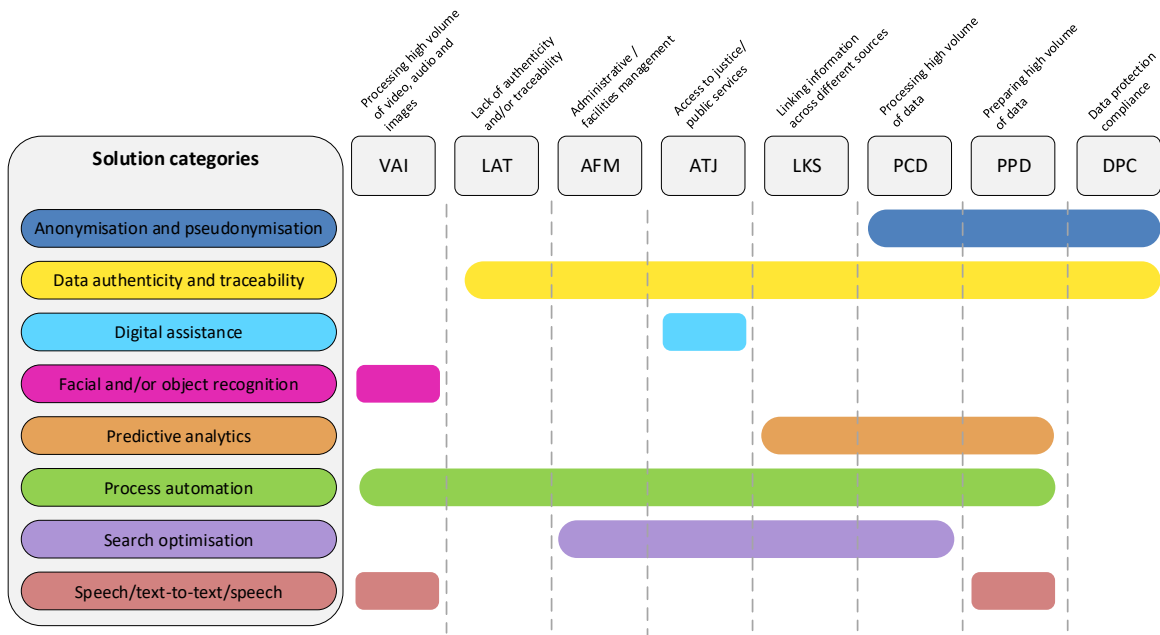
²⁴¹ Idem

Given that one business solution may solve business problems from more than one business problem category:

- Anonymisation and pseudonymisation is a solution used in 12 projects (or 13% of all 93 projects)
- Data authenticity and traceability is a solution used in 16 projects (or 17%)
- Digital assistance is a solution used in 4 projects (or 4%)
- Facial and/or object recognition is a solution used in 5 projects (or 5%)
- Predictive analytics is a solution used in 5 projects (or 5 %)
- Process automation is a solution used in 32 projects (or 34 %)
- Search optimisation is a solution used in 10 projects (or 11 %)
- Speech/text-to-text/speech is a solution used in 9 projects (or 10%)



The image below demonstrates the business problems each solution aims to tackle under the different business problem categories.



The table below proposes an overview of (1) the business problem categories in which the explored projects of the Member State authorities and the judiciary fall; (2) the business solutions; and (3) the type of AI (ML, NLP, Expert systems, Computer vision) or blockchain/DLT technology (public-permissioned or private) used (if indicated by the stakeholders).

Table 9.1.2 – Overview of Member States authorities projects per business problem and solution category

No.	Member State	Organisation/Project owner	Project	Business problem category	Solution category	Solution description	Technology used
1.	Austria	Federal Ministry of Justice	AI for analysis of investigative data	Processing high-volume of data	Process automation	Automate the manual processing of large amounts of data and documents collected through house searches.	Machine learning/deep learning Expert systems and rule-based systems; Natural language processing; Computer vision
2.	Austria	Federal Ministry of Justice	Anonymisation of court decisions	Processing high-volume data; Preparing high volume of data; Data protection compliance	Anonymisation and pseudonymisation	Anonymise or pseudonymise data. Automate the manual identification and removal of personal data (and/or other sensitive data) from court decisions.	Machine learning/deep learning; Natural language processing
3.	Austria	Federal Ministry of Justice	Automated allocation and processing of incoming documents	Processing high-volume data; Administrative/facilities management	Process automation	Automate the manual management of incoming documents.	Machine learning/deep learning; Natural language processing
4.	Austria	Federal Ministry of Justice	Searchable case law	Linking information across different data sources; Administrative/facilities management	Search optimisation	Expedite and facilitate searches in relevant case law and other necessary information; creating semantic links, annotating possibilities in the documents.	Machine learning/deep learning; Natural language processing

No.	Member State	Organisation/Project owner	Project	Business problem category	Solution category	Solution description	Technology used
5.	Austria	Federal Ministry of Justice	Facial recognition for inmates	Processing high volume of video, audio and images	Facial and/or recognition	Identify and detect abnormal situations (e.g. violence) and take preventive actions based on video material from cameras in prisons. Overcome challenge of insufficient human resources (security desks) and capacities for detecting such situations	
6.	Austria	Federal Ministry of Justice	Chatbot on a citizen service portal	Access to justice/public services	Digital assistance	Assist citizens by providing them with the possibility to inspect online their files at every stage of the proceedings.	Machine learning/deep learning; Natural language processing
7.	Croatia	Ministry of Justice	Speech-to-Text	Preparing high volume of data; Processing high volume of video, audio and images	Speech/text-to-text/speech	Automate the manual preparation of documents, i.e. court hearing minutes, as well as addressing the need for an overall modernisation of the court rooms.	Machine learning/deep learning; Speech recognition;
8.	Croatia	Ministry of Justice	Project for anonymisation	Processing high-volume data; Preparing high volume of data; Data protection compliance	Anonymisation and pseudonymisation	Anonymise or pseudonymise data. Automate the manual identification and removal of personal data (and/or other sensitive data) from court decisions.	

No.	Member State	Organisation/Project owner	Project	Business problem category	Solution category	Solution description	Technology used
9.	Czech Republic	Ministry of Justice	Judicial Anonymisation Tool	Processing high-volume data; Preparing high volume of data; Data protection compliance	Anonymisation and pseudonymisation	Anonymise or pseudonymise data. Automate the manual identification and removal of personal data (and/or other sensitive data) from court decisions.	Expert systems and rule-based systems; Natural language processing
10.	Denmark	Court Administration (Domstolsstyrelsen)	Domsdatabase	Processing high-volume data; Preparing high volume of data; Data protection compliance	Anonymisation and pseudonymisation	Anonymise or pseudonymise data. Automate the manual identification and removal of personal data (and/or other sensitive data) from court decisions.	Machine learning/deep learning;
11.	Denmark	Attorney General (Rigsadvokaten)	Digital Court Planner	Administrative/facilities management	Process automation	Automate and improve the meeting planning process, including prioritisation of important meetings. Otherwise, the planning requires a lot of human effort.	
12.	Denmark	Attorney General (Rigsadvokaten)	Anonymise personal and personal sensitive information in organisations' documents	Processing high-volume data; Preparing high volume of data; Data protection compliance	Anonymisation and pseudonymisation	Anonymise or pseudonymise data. Automate the manual identification and removal of personal data (and/or other sensitive data) from organisation documents.	

No.	Member State	Organisation/Project owner	Project	Business problem category	Solution category	Solution description	Technology used
13.	Denmark	Danish National Police	Exploring the use of face recognition technology for victim identification across pictorial material of child abuse	Processing high-volume of video, audio and images	Facial and /or object recognition	Identify victims based on pictorial material in child abuse investigations.	
14.	Denmark	Danish National Police	Small-scale projects (1): perceptual hashing	Processing high-volume data of video, audio and images	Process automation	Automate the processing of large volumes of investigative material (such as videos) that investigators need to quickly analyse, in order to have success in the fight against sexual assault and/or child abuse.	
15.	Denmark	Danish National Police	Small-scale projects (2): Prioritisation	Processing high volume of data; Administrative/facilities management	Process automation	Automate case-related activities like prioritisation of the most urgent cases amongst the high volume of material related to sexual abuse of children.	Machine learning/deep learning;
16.	Estonia	Ministry of Justice on behalf of Estonian courts	Automated transcription of courts minutes	Processing high-volume of video, audio and images; Preparing high volume of data;	Speech/text-to-text/speech	Detect and recognise voice and automate the time-consuming manual transcription of court hearings minutes.	Machine learning/deep learning; Natural language processing; speech recognition
17.	Finland	Ministry of Justice	Automatic anonymisation and content description of documents containing	Processing high-volume data;	Anonymisation and pseudonymisation	Anonymise or pseudonymise data. Automate the manual identification and removal of personal data (and/or other	Expert systems and rule-based systems; Natural

No.	Member State	Organisation/Project owner	Project	Business problem category	Solution category	Solution description	Technology used
			personal data (Anoppi)	Preparing high volume of data; Data protection compliance		sensitive data) from court decisions.	language processing
18.	Finland	Ministry of Justice	Robot process automation (RPA)	Linking information across different data sources	Process automation	Automate the process of payment of fines. Overcome of challenges in linking a payment of a fine to the fine itself, in the cases when the payer omits to provide the reference number of the fine in the payment order. This is important in cases of overpayment, double payment or incorrect payment of fines.	
19.	Finland	Ministry of Justice	Chatbot-service for divorce/separation situations (part of Aurora project)	Access to justice/public services	Digital assistance	Assist couples facing divorce/separation to find the most suitable local services.	Expert systems and rule-based systems; Natural language processing (NLP)
20.	France	Ministry of Justice	DataJust	Linking information across different data sources	Predictive analytics	Predict and evaluate amount of damages based on historic court rulings and data provided by the injured party. Reduce the time needed for compensating damages by helping victims evaluate the amount of indemnities they could claim. Facilitate involvement of legal professionals in the process. Help in the drafting	Machine learning/deep learning; Natural language processing (NLP)

No.	Member State	Organisation/Project owner	Project	Business problem category	Solution category	Solution description	Technology used
						of impact studies accompanying adoption of legal norms.	
21.	France	Ministry of Interior	PreNIUM	Administrative/facilities management	Data authenticity and traceability	Explore and communicate how innovative technologies can be used by the administration and to demonstrate how blockchain/DLT can be further used across administrations.	
22.	France	Cour de Cassation (Court of Cassation)	AI-driven pseudonymisation of court decisions	Processing high-volume data; Preparing high volume of data; Data protection compliance;	Anonymisation and pseudonymisation	Anonymise or pseudonymise data. Automate the manual identification and removal of personal data (and/or other sensitive data) from court decisions.	Machine learning/deep learning; Natural language processing (NLP)
23.	Germany	Commission for information technology in the judiciary	Land register analysis component in the project Development of a federal database land register	Processing high-volume data	Process automation	Automate processes of analysing unstructured data (in PDF format). Provide digital and structured information for the land registry.	Expert systems and rule-based systems
24.	Germany	Commission for information technology in the judiciary	Use of blockchain technology in the area of the land register database	Lack of authenticity and/or traceability	Data authenticity and traceability	Increase land register data authenticity, integrity and traceability.	Public but permissioned;

No.	Member State	Organisation/Project owner	Project	Business problem category	Solution category	Solution description	Technology used
25.	Germany	Commission for information technology in the judiciary	Automated Anonymisation of Court Decisions	Processing high-volume data; Preparing high volume of data; Data protection compliance	Anonymisation and pseudonymisation	Anonymise or pseudonymise data. Automate the manual identification and removal of personal data (and/or other sensitive data) from court decisions.	Expert systems and rule-based systems; Natural language processing
26.	Germany	Commission for information technology in the judiciary	Legal Translation Machine Service	Preparing high volume of data	Speech/text-to-text/speech	Automate translation activities in view of improving the efficiency. Improve insights from available data, reporting and visualisation.	Machine learning/deep learning; Expert systems and rule-based systems;
27.	Germany	Commission for information technology in the judiciary	Cognitive systems at the prosecutor's office	Preparing high volume of data; Processing high volume of data	Process automation	Automate simple, routine activities. Address the identified needs to improve efficiency and increase productivity.	Expert systems and rule-based systems; Natural language processing
28.	Germany	Commission for information technology in the judiciary	Potentials of blockchain regarding an electronic validity register	Access to justice/public services; Lack of authenticity and/or traceability	Data authenticity and traceability	Ensure the validity of documents and improve efficiency in a secure way.	Public but permissioned;
29.	Germany	Central Cybercrime Department of North-Rhine-Westphalia	Research project to fight child pornography with methods of AI	Processing high-volume data of video, audio and images	Facial and /or object recognition	Identify and distinguish child pornography pictures from other pictorial material to reduce the time needed for manual image review	Machine learning/deep learning; Computer vision

No.	Member State	Organisation/Project owner	Project	Business problem category	Solution category	Solution description	Technology used
30.	Germany	Central Cybercrime Department of North-Rhine-Westphalia	Identification of hate crime on social media	Processing high-volume data	Process automation	Automate the process of screening and categorising hate comments and hate news (hate posts) in social media.	Machine learning/deep learning
31.	Germany	Central Cybercrime Department of North-Rhine-Westphalia	Future criminal court room	Preparing high volume of data Processing high-volume of video, audio and images	Speech-to-text solutions	Modernise court rooms. This would include automated management of court hearings, automated transcription of court documents/court hearing minutes, video recording.	
32.	Hungary	National Office for the Judiciary	Speech recognition and transcription project	Preparing high volume of data; Processing high-volume of video, audio and images	Speech/text-to-text/speech	Modernise court rooms. Automate the typing and transcription of court decisions/court hearing minutes.	
33.	Ireland	Department of Justice and Equality	Automatic Number Plate Recognition (ANPR)	Processing high-volume of video, audio and images	Facial and /or object recognition	Identify vehicles by plate number; decrease high levels of energy consumption of devices	OCR
34.	Ireland	Department of Justice and Equality	Evaluate the potential of facial matching technologies as an aid to the intelligence gathering process	Processing high - volume of video, audio and images	Facial and /or object recognition	Identify persons via facial recognition	

No.	Member State	Organisation/Project owner	Project	Business problem category	Solution category	Solution description	Technology used
35.	Italy	Court of Appeal, Brescia	Predictive justice – a database to provide predictable guidelines and timing in particular areas	Processing high volume of data; Linking information across different sources	Predictive analytics	Predict jurisprudence based on predictive guidelines. Easily acquire insights from available data, reporting and visualisation, as well as to ensure consistency (predictability) in the decisions taken. Prepare reliable forecasts of the timing of court procedures.	Expert systems and rule-based systems; Natural language processing
36.	Italy	Court of Appeal, Milano	GAM – Giustizia Antitrust Milanese (*Milan Antitrust Justice) (knowledge management AI system)	Processing high volume of data; Linking information across different sources; Administrative/facilities management	Process automation	Automate and facilitate case law reviews in the field of competition law. Digitalise civil and criminal proceedings as well as administrative requests to fund justice expenses. Reduce the length of court proceedings so as to ensure that a larger number of cases can be handled. Acquire insights from available data, reporting and visualisation.	Expert systems and rule-based systems; Natural language processing (NLP)
37.	Italy	Tribunale di Bologna	Convention	Linking information across different data sources	Process automation	Automate and facilitate processes related to quantification of harm and damages. Reduce the length of court proceedings so as to ensure that a larger number of cases can be handled. Increase the consistency (repeatability/reproducibility) of court decisions. Improve insights from available data,	

No.	Member State	Organisation/Project owner	Project	Business problem category	Solution category	Solution description	Technology used
						reporting and visualisation, increased productivity by automating simple, routine activities.	
38.	Italy	Court of Appeal Salerno	AI in management system of courtrooms	Preparing high volume of data; Administrative/facilities management	Process automation	Automate processes related to management of court hearings and allocation of court rooms.	Expert systems and rule-based systems
39.	Italy	Corte Suprema di Cassazione	New monitoring system for the IT infrastructure of Cassation court	Administrative/facilities management	Process automation	Automate and expedite court proceedings and enhance efficiency.	Machine learning/deep learning; Natural language processing
40.	Italy	Tribunale Firenze	The city of simple justice: simplification and reduction of administrative burdens in the context of the resolution of civil disputes	Processing high volume of data; Administrative/facilities management	Process automation	Automate processes and improve the management of mediation cases.	Machine learning/deep learning; Natural language processing (NLP); Speech recognition; Computer vision; Optimisation
41.	Italy	Tribunale di Genova	Predictive Algorithms and Judicial Decisions	Processing high volume of data; Linking information across different sources	Predictive analytics	Predict outcome of court decisions. Enhance efficiency by expediting the handling of court proceedings. Acquire insights from available data, reporting and visualisation.	

No.	Member State	Organisation/Project owner	Project	Business problem category	Solution category	Solution description	Technology used
42.	Italy	Tribunale di Milano; AGI avvocati giuslavoristi italiani (Italian labour lawyers)	Portale giurisprudenza del lavoro (*Labour case law portal)	Linking information across different sources; Access to justice/public services	Search optimisation	Improve search in case law. Acquire insights from available data, reporting and visualisation in order to improve consistency between court decisions.	Expert systems and rule-based systems; Natural language processing
43.	Italy	Court of Ravenna	Processo Civile Telematico – PCT (*Digital civil trial)	Access to justice/public services	Process automation	Automate routine activities related to court proceedings. Improve and increase productivity.	Machine learning/deep learning; Computer vision
44.	Italy	Court of Ravenna	Digital signature	Preparing high volume of data Lack of authenticity and/or traceability	Data authenticity and traceability	Increase data authenticity, integrity and traceability and reduce paper burden related to manually signing documents. Facilitate document management.	Private/consortium, permissioned
45.	Italy	Department of Justice Affairs, Ministry of Justice	<i>Aut Dedere Aut Judicare</i>	Processing high- volume of data	Process automation	Automate processes related to document analysis. Improve the possibilities of acquiring insights from high amounts of available data; Improve statistics regarding international cooperation in criminal matters like information stemming from arrest warrants, transfers, extraditions, rogatories, etc.	Expert systems and rule-based systems
46.	Italy	Ministry of Justice	Semi-automated anonymisation of sensible named	Processing high- volume of data;	Anonymisation and pseudonymisation	Anonymise or pseudonymise data. Semi-automate the manual identification and	Machine learning/deep learning; Expert systems and rule- based systems;

No.	Member State	Organisation/Project owner	Project	Business problem category	Solution category	Solution description	Technology used
			entities in text documents	Preparing high volume of data; Data protection compliance		removal of sensible named entities from documents.	Natural language processing;
47.	Italy	Procura della Repubblica c/o Tribunale di Cosenza	Giustizia penale e intelligenza artificiale (*Criminal justice and AI)	Preparing high volume of data; Linking information across different sources	Process automation	Automate repetitive and time-consuming processes, in particular, legal workflow automation, as well as to improve the possibility to acquire insights from high-volume available data, reporting and visualisation.	Machine learning/deep learning; Natural language processing; Optimisation;
48.	Italy	Governmental Legal Service	Avvocatura 2020	Processing high volume of data; Linking information across different sources	Process automation	Automate repetitive and time-consuming processes through the implementation of a case management system (CMS) with collaboration, document management, search and other features.	Machine learning/deep learning; Natural language processing
49.	Italy	Procura della Repubblica presso il Tribunale di Monza	Digital signature	Preparing high volume of data; Lack of authenticity and/or traceability	Data authenticity and traceability	Increase data authenticity and traceability and reduce paper burden related to manually signing documents. Facilitate document management.	Private/consortium, permissioned
50.	Latvia	Prosecutor General's Office	Voice recognition	Preparing high volume of data	Speech/text-to-text/speech	Modernise court rooms. Automate the transcription of administrative documents.	

No.	Member State	Organisation/Project owner	Project	Business problem category	Solution category	Solution description	Technology used
				Processing high-volume of video, audio and images			
51.	Lithuania	Forensic Science Centre of Lithuania	Real-time network, text, and speaker analytics for combating organised crime – ROXANNE	Processing high-volume data; Linking information across different sources; Processing high volume of video, audio and images	Process automation	Automate the complex and time-consuming activity of visualisation of organised crime networks.	Machine learning/deep learning; Natural language processing; Speech recognition
52.	Luxembourg	Ministry of Justice and the judicial authorities	Anonymisation of the case law	Processing high-volume data Preparing high volume of data; Data protection compliance	Anonymisation and pseudonymisation	Anonymise or pseudonymise data. Automate the manual identification and removal of personal data (and/or other sensitive data) from court decisions.	Machine learning/deep learning; Natural language processing
53.	Malta	Notary to the government	Notarypedia	Processing high-volume data	Search optimisation	Provide notaries with the possibility to perform more versatile searches in digital libraries of historic manuscript notarial deeds.	Machine learning/deep learning; Natural language processing
54.	Malta	Department of Justice	Semantics4Courts	Linking information across different sources; Access to justice/public services	Search optimisation	Expedite and simplify the possibility to search for relevant case law and other information in multiple databases.	Machine learning/deep learning; Natural language processing

No.	Member State	Organisation/Project owner	Project	Business problem category	Solution category	Solution description	Technology used
55.	Malta	Department of Justice	Lawyers' Register	Lack of authenticity and/or traceability; Linking information across different sources	Data authenticity and traceability	Increase authenticity, integrity and traceability. Ensure immutable, secure, transparent and decentralised way of data sharing between parties.	Private/consortium, permissioned;
56.	The Netherlands	Ministry of Justice and Security	Jurisprudentierobot (Jurisprudence-robot)	Access to justice/public services	Search optimisation	Expedite and simplify the possibility to search for relevant jurisprudence and other information.	AI – Machine learning/deep learning; Natural Language Processing
57.	The Netherlands	Ministry of Justice and Security	DigiAkkoord	Processing high volume of data; Administrative/facilities management	Process automation	Automate the approval process of documents, workflows and transactions.	Public but permissioned
58.	The Netherlands	Ministry of Justice and Security	The financial emergency brake	Data protection compliance; Lack of authenticity and/or traceability; Access to justice/administration	Data authenticity and traceability	Increase data authenticity, integrity and traceability. Ensure secure, transparent and data protection compliant way of handling the declaration of payment inability by citizens.	Private/consortium, permissioned
59.	The Netherlands	Ministry of Justice and Security	Known Traveller Digital Identity Pilot Project (KTDI)	Processing high volume of video, audio and images;	Process automation	Automate identity checks and processing of passenger data.	Private/consortium, permissioned ledger

No.	Member State	Organisation/Project owner	Project	Business problem category	Solution category	Solution description	Technology used
				Processing high volume of data			
60.	Portugal	Instituto dos Registos e do Notariado (*Institute of Registries and Notaries)	IReNe – Web Personal Assistant	Access to justice/public services	Digital assistance	Assist citizens by reducing the workload and assist citizens, who need the support of IRN.	Machine learning/deep learning; Natural language processing
61.	Portugal	General Public Prosecutor’s Office	AI technology for evidence analysis	Processing high-volume data	Process automation	Automate processes related to time-consuming manual analysis of evidence.	
62.	Portugal	Ministry of Justice	Balcão Único Do Prério Lab (BUPi) Lab AI/ Unique hotpoint for citizens	Linking information across different data sources; Access to justice/public services; Lack of authenticity and/or traceability	Process automation	Automate processes related to identification of owners of unregistered, delineation of the lands. Facilitate land purchase transactions.	Machine learning/deep learning; Expert systems and rule-based systems; Computer vision
63.	Portugal	Ministry of Justice	BALCAT – Project on ballistics analysis	Linking information across different sources; Processing high-volume data	Process automation	Automate processes related to ballistic analysis. Expedite and reduce the human effort behind ballistics analysis.	
64.	Portugal	Ministry of Justice	Modelação, Predição e Decisão em Contexto de Jurisprudência (Modelling, Prediction and Decision-making in	Preparing high volume of data; Processing high volume of data	Predictive analytics	Predict outcome of court decisions. Expedite court proceedings and improving efficiency.	

No.	Member State	Organisation/Project owner	Project	Business problem category	Solution category	Solution description	Technology used
			the Context of Jurisprudence*)				
65.	Portugal	Ministry of Justice	Magistratos	Linking information across different sources	Search optimisation	Enhance and expedite the possibilities to search for relevant case law and other information by providing semantic links, annotating documents, etc.	
66.	Portugal	Instituto Nacional da Propriedade Industrial (National Institute of Industrial Property (NIIP))	Intelligent Patent e-filing and processing system	Processing high-volume data; Access to justice/administration; Administrative/facilities management	Process automation	Automating processes of patent application filings. Reduce the risk of duplicating patents.	Machine learning/deep learning; Natural language processing, Computer vision
67.	Portugal	Instituto Nacional da Propriedade Industrial (National Institute of Industrial Property (NIIP))	Experimentation and testing of Blockchain in IP	Lack of authenticity and/or traceability	Data authenticity and traceability	Explore possible use cases where blockchain could be used, i.e. industrial property data.	
68.	Slovenia	Supreme Court of the Republic of Slovenia	Return Service Data Handwriting Recognition	Processing high volume of video, audio and images	Process automation	Automate processes related to manual and time-consuming document review. Digitalise official documents and enable effective document management.	OCR
69.	Slovenia	Supreme Court of the Republic of Slovenia	COVL – Central Department for Enforcement on the basis of	Processing high volume of data;	Process automation	Automate document and process management. Facilitate document enforcement. Improve efficiency of enforcement	OCR

No.	Member State	Organisation/Project owner	Project	Business problem category	Solution category	Solution description	Technology used
			Authentic Documents	Linking information across different sources		procedures and to reduce existing backlogs.	
70.	Spain	Ministry of Justice	Textualisation of audio-visual media	Processing high volume of video, audio and images	Speech/text-to-text/speech	Increase productivity and efficiency by automating simple, routine activities.	Machine learning/deep learning
71.	Spain	Ministry of Justice	Automated document classification	Processing high volume of data; Administrative/facilities management	Process automation	Automate simple and repetitive activities, which would allow early and accurate risk assessment, e.g. detect potentially contentious clauses in documents and contracts. Acquire insights from available data, reporting and visualisation.	Machine learning/deep learning; Natural language processing
72.	Spain	Ministry of Justice	Biometrics for personalities	Access to justice/public services Lack of authenticity and/or traceability	Data authenticity and traceability	Increase data authenticity, integrity and traceability Enhance client satisfaction, where client refers to all involved stakeholders in a case; Acquire insights from available data, reporting and visualisation.	Machine learning/deep learning; Computer vision
73.	Spain	Centro de Documentación Judicial (Judicial Documentation Centre [CENDOJ])	Automated sentences classification	Processing high-volume data; Linking information across different sources	Search optimisation	Improve search results to support the work of the administration to use it to link one sentence with other documents (other sentences, legislation, publications) that are related to the same subject.	Machine learning/deep learning; Natural language processing

No.	Member State	Organisation/Project owner	Project	Business problem category	Solution category	Solution description	Technology used
74.	Spain	Centro de Documentación Judicial (Judicial Documentation Centre [CENDOJ])	Creation of structured data	Processing high volume of data; Linking information across different sources	Search optimisation	Create structured data to improve accuracy of search results in support of the work of the administration accurate.	Machine learning/deep learning; expert systems and rule-based systems; Natural language processing
75.	Spain	Centro de Documentación Judicial (Judicial Documentation Centre [CENDOJ])	Business Intelligence	Processing high volume of data; Linking information across different sources	Search optimisation	Acquire insights into relevant data by further developing existing search tools. Obtain knowledge about the use of the applications as well as about the content of documents as sentences, legislation, publications and prosecutor's documents.	Machine learning/deep learning; optimisation
76.	Spain	Centro de Documentación Judicial (Judicial Documentation Centre [CENDOJ])	Automated sentences pseudonymisation	Processing high volume of data; Preparing high volume of data; Data protection compliance	Anonymisation and pseudonymisation	Anonymise or pseudonymise data. Automate the manual identification and removal of personal data (and/or other sensitive data) from court decisions.	Machine learning/deep learning; Expert systems and rule-based systems; Natural language processing
77.	Sweden	Bolagsverket (The Swedish Companies Registration Office)	Tool to choose company name	Processing high volume of data; Access to justice/public services	Process automation	Automate process of application for a company registration by addressing the challenge of choosing a company name that is not likely to be rejected.	Machine learning/deep learning; Natural language processing (NLP)
78.	Sweden	Skatteverket (Swedish Tax Agency)	Legal guidance with AI support	Processing high volume of data	Search optimisation	Facilitate document search processes.	Machine learning/deep learning; Natural

No.	Member State	Organisation/Project owner	Project	Business problem category	Solution category	Solution description	Technology used
							language processing (NLP)
79.	Sweden	Skatteverket (Swedish Tax Agency)	Digital receipt processing	Lack of authenticity and/or traceability	Data authenticity and traceability	Increase data authenticity, integrity and traceability. Digitalise receipts in order to reduce administrative burdens related to reporting and archiving.	
80.	Sweden	Skatteverket (Swedish Tax Agency)	Personnel registers	Lack of authenticity and/or traceability	Data authenticity and traceability	Increase data authenticity, integrity and traceability. Trace illegally employed persons.	
81.	Sweden	Skatteverket (Swedish Tax Agency)	Real-time/SINK	Lack of authenticity and/or traceability; Linking information across different sources	Data authenticity and traceability	Increase data authenticity, integrity and traceability. Facilitate real-time transaction accounting and tax payment.	
82.	Sweden	Skatteverket (Swedish Tax Agency)	Proxies	Lack of authenticity and/or traceability; Preparing high volume of data	Data authenticity and traceability	Increase data authenticity, integrity and traceability. Digitalise "signed" authorisations for employees.	
83.	Sweden	Skatteverket (Swedish Tax Agency)	Company information services	Linking information across different sources; Lack of authenticity and/or traceability;	Data authenticity and traceability	Increase data authenticity, integrity and traceability. Provide company information in a standardised and digital form.	

No.	Member State	Organisation/Project owner	Project	Business problem category	Solution category	Solution description	Technology used
84.	Sweden	Skatteverket (Swedish Tax Agency)	Invoices	Linking information across different sources; Lack of authenticity and/or traceability	Data authenticity and traceability	Increase data authenticity, integrity and traceability. Avoid risk of fraud against taxation rules related to paper invoices.	
85.	Sweden	Skatteverket (Swedish Tax Agency)	Smart contracts for land Registries	Lack of authenticity and/or traceability Preparing high volume of data; Processing high volume of data	Data authenticity and traceability	Increase data authenticity, integrity and traceability. Digitalise the administrative processes related to the sale, purchase and registration of property.	Public but permissioned
86.	Sweden	Tullverket (*Swedish Customs Service)	PROFILE (work package on fiscal risk management, illegal waste transport and fraud in fish-trade)	Linking information across different sources; Processing high-volume data	Predictive analytics	Early and accurate risk assessment, e.g. detecting potentially contentious clauses in documents and contracts, as well as for acquiring insights from available data, reporting and visualisation.	Machine learning/deep learning; Natural language processing
87.	Sweden	Swedish Competition Authority	Enhancing the Efficiency of Investigative Work by the Swedish Competition Authority's Enforcement Units	Processing high-volume data;	Process automation	Automate the processing of documents and e-mails (identification, selection and classification of relevant information collected in an antitrust investigation).	
88.	Sweden	Swedish Consumer Agency	Test Balloon	Processing high-volume of data;	Process automation	Automate the screening of web pages.	

No.	Member State	Organisation/Project owner	Project	Business problem category	Solution category	Solution description	Technology used
				Processing high volume of video, audio and images			
89.	Sweden	Domstolsverket (Swedish National Courts Administration)	Automatic transcription	Processing high volume of video, audio and-images; Preparing high volume of data	Speech/text-to-text/speech	Modernise court rooms. Automate the transcription of recorded or live speech-to-text.	Machine learning/deep learning; speech recognition
90.	Sweden	Domstolsverket (Swedish National Courts Administration)	Translation	Preparing high volume of data	Speech/text-to-text/speech	Automate the translation of existing court decisions.	Machine learning/deep learning; Natural language processing
91.	Sweden	Domstolsverket (Swedish National Courts Administration)	Anonymisation of court decisions	Processing high volume of data Preparing high volume of data Data protection compliance	Anonymisation and pseudonymisation	Anonymise and pseudonymise data. Automate the identification and removal of personal data (and/or other sensitive data) from court decisions.	Machine learning/deep learning; Natural language processing
92.	Sweden	Domstolsverket (Swedish National Courts Administration)	Chatbots	Access to justice/public services	Digital assistance	Assist citizens in improving their access to information.	Machine Learning; Natural language processing
93.	Sweden	Domstolsverket (Swedish National Courts Administration)	Decision-making	Preparing high volume of data	Process automation	Automate processes to improve decision-making in courts.	Machine Learning

The contractor evaluated the projects based on several criteria:

- Maturity level (if the project has been reported as 'Completed' or 'Ongoing', marked in green and blue respectively)
- Level of expectations (if during the stakeholder consultations the stakeholders replied that their project exceeds, meets, partially meets or does not meet their expectations).

The contractor suggests that projects which have been assessed as 'Exceeds expectations/Very positive results/Very satisfied'^{242/243} may serve as basis for the exchange of good practices²⁴⁴ among stakeholders in other Member States..

9.1.1. Business problem category: Processing high volume of data

Out of the 93 identified projects, 43 (or 46% of all 93 projects) aim to solve a business problem in the category of processing high volume of data. Out of these 43 projects, 6 have been reported as completed and 31 – as ongoing as shown in the table below. The table also indicates the level of expectations, as reported by the stakeholders.

Table 9.1.3 – Ongoing and completed projects in category PCD

Processing high volume of data				
No.	Member State	Organisation/Project owner	Project title	Level of expectations
1.	Austria	Federal Ministry of Justice	Automated allocation and processing of incoming documents	Meets expectations
2.	Italy	Court of Appeal, Milano	GAM – Giustizia Antitrust Milanese (*Milan Antitrust Justice) (Knowledge management AI system)	Meets expectations
3.	Slovenia	Supreme Court of the Republic of Slovenia	COVL – Central Department for Enforcement on the basis of Authentic Documents.	Meets expectations
4.	Sweden	Skatteverket (Swedish Tax Agency)	Legal guidance with AI support.	Meets expectations
5.	Sweden	Skatteverket (Swedish Tax Agency)	Smart contracts for land Registries.	N/I
6.	Sweden	Swedish Consumer Agency	Test Balloon	Positive results; Meets expectations
7.	Austria	Federal Ministry of Justice*	Anonymisation of court decisions	Meets expectations

²⁴² As indicated by the stakeholders in their questionnaire replies or during the interviews.

²⁴³ RGB=204-192-117

²⁴⁴ In the context of this study, 'good practices' regarding a project may relate to activities of preparation, development and implementation of the project and overcoming challenges encountered, in an optimal way, such as to achieve the project objectives and solve the business problem to an extent that exceeds or meets the expectations.

Processing high volume of data				
No.	Member State	Organisation/Project owner	Project title	Level of expectations
8.	Austria	Federal Ministry of Justice*	AI for analysis of investigative data	Exceeds expectations
9.	Croatia	Ministry of Justice*	Project for anonymisation	Meets expectations ²⁴⁵
10.	Czech Republic	Ministry of Justice	Judicial Anonymisation Tool	Meets expectations
11.	Denmark	Court Administration (Domstolsstyrelsen)*	Domsdatabase	N/I
12.	Denmark	Danish National Police	Small-scale projects (2): Prioritisation	N/I
13.	Finland	Ministry of Justice*	Automatic anonymisation and content description of documents containing personal data (Anoppi)	N/I
14.	France	Court of Cassation	AI-driven pseudonymisation of court decisions	Meets expectations
15.	Germany	Commission for information technology in the judiciary	Land register analysis component in the project Development of a federal database land register	N/I
16.	Germany	Commission for information technology in the judiciary	Cognitive systems at the prosecutor's office	Partially meets expectations
17.	Germany	Central Cybercrime Department of North-Rhine-Westphalia	Identification of hate crime on social media	N/I
18.	Italy	Court of Appeal, Brescia	Predictive justice – a database to provide predictable guidelines and timing in particular areas	Meets expectations
19.	Italy	Tribunale Firenze	The city of simple justice: simplification and reduction of administrative burdens in the context of the resolution of civil disputes	N/I
20.	Italy	Tribunale di Genova	Predictive Algorithms and Judicial Decisions	N/I
21.	Italy	Department of Justice Affairs, Ministry of Justice	Aut Dedere Aut Judicare	Meets expectations
22.	Italy	Governmental Legal Service	Avvocatura 2020	N/I

²⁴⁵ Assumption as it is in POC phase and implementation is considered

Processing high volume of data				
No.	Member State	Organisation/Project owner	Project title	Level of expectations
23.	Italy	Ministry of Justice	Semi-automated anonymisation of sensible named entities in text documents	N/I
24.	Lithuania	Forensic Science Centre of Lithuania	Real-time network, text, and speaker analytics for combating organised crime – ROXANNE	N/I
25.	Luxembourg	Ministry of Justice* and the judicial authorities	Anonymisation of the case law	N/I
26.	Malta	Notary to the government	Notarypedia	Exceeds expectations
27.	The Netherlands	Ministry of Justice and Security	DigiAkkoord	Meets expectations (first results)
28.	The Netherlands	Ministry of Justice and Security	Known Traveller Digital Identity Pilot Project (KTDI)	N/I
29.	Portugal	General Public Prosecutor's Office	AI technology for evidence analysis	N/I
30.	Spain	Ministry of Justice	Automated document classification	Meets expectations
31.	Spain	Centro de Documentación Judicial (Judicial Documentation Centre (CENDOJ))	Automated sentences pseudonymisation	N/I
32.	Spain	Centro de Documentación Judicial (Judicial Documentation Centre [CENDOJ])	Automated sentences classification	Partially meet expectations
33.	Spain	Centro de Documentación Judicial (Judicial Documentation Centre [CENDOJ])	Creation of Structured Data	N/I
34.	Spain	Centro de Documentación Judicial (Judicial Documentation Centre [CENDOJ])	Business Intelligence	Meets expectations
35.	Sweden	Domstolsverket (Swedish National Courts Administration)*	Anonymisation of court decisions	Meets expectations ²⁴⁶
36.	Sweden	Bolagsverket (The Swedish Companies Registration Office)	Tool to choose company name	N/I

²⁴⁶ Assumption as it is foreseen to go in production

Processing high volume of data				
No.	Member State	Organisation/Project owner	Project title	Level of expectations
37.	Sweden	Tullverket (*Swedish Customs Service)	PROFILE (work package on fiscal risk management, illegal waste transport and fraud in fish-trade)	N/I

9.1.2. Business problem category: Processing high volume of video, audio and images

Out of the 93 identified projects, 17 (or 18% of all 93 projects) aim to solve a business problem in the category of processing high volume of video, audio and images. Out of these 15 projects, 5 are completed and 11 are ongoing as shown in the table below. The table also indicates the level of expectations, as reported by the stakeholders.

Table 9.1.4 – Ongoing and completed projects in category VAI

Processing high volume of video, audio and images				
No	Member State	Organisation/Project owner	Project title	Level of expectations
1.	Croatia	Ministry of Justice*	Speech-to-Text	Meets expectations
2.	Ireland	Department of Justice and Equality	Automatic Number Plate Recognition (ANPR)	N/I
3.	Sweden	Swedish Consumer Agency	Test Balloon	Positive results; Meets expectations
4.	Sweden	Domstolsverket (Swedish National Courts Administration)	Automatic transcription	Very positive results; Exceeds expectations
5.	Latvia	Prosecutor General's Office*	Voice recognition	N/I
6.	Denmark	Danish National Police	Exploring the use of face recognition technology for victim identification across pictorial material of child abuse	N/I
7.	Denmark	Danish National Police	Small-scale projects (1): perceptual hashing	N/I
8.	Estonia	Ministry of Justice on behalf of Estonian courts	Automated transcription of courts minutes	N/I

Processing high volume of video, audio and images				
No	Member State	Organisation/Project owner	Project title	Level of expectations
9.	Germany	Central Cybercrime Department of North-Rhine-Westphalia	Future criminal court room	N/I
10.	Germany	Central Cybercrime Department of North-Rhine-Westphalia	Research project to fight child pornography with methods of AI	Meets expectations
11.	Hungary	National Office for the Judiciary	Speech recognition and transcription project	Meets expectations ²⁴⁷
12.	Ireland	Department of Justice and Equality	Evaluate the potential of facial matching technologies as an aid to the intelligence gathering process	N/I
13.	Lithuania	Forensic Science Centre of Lithuania	Real-time network, text, and speaker analytics for combating organised crime – ROXANNE	N/I; Project has just started
14.	The Netherlands	Ministry of Justice and Security	Known Traveller Digital Identity Pilot Project (KTDI)	N/I; Project has just started
15.	Slovenia	Supreme Court of the Republic of Slovenia	Return Service Data Handwriting Recognition	Exceeds expectations (high satisfaction rate of 90%)
16.	Spain	Ministry of Justice	Textualisation of audio-visual media	Partially meet expectations

9.1.3. Business problem category: Linking information across different sources

Out of the 93 identified projects, 24 (or 26% of all 93 projects) aim to solve a business problem in the category of linking information across different sources. Out of these 24

²⁴⁷ Assumption as over 700 softwares were bought for the courts

projects, 8 are completed and 13 are ongoing as shown in the table below. The table also indicates the level of expectations, as reported by the stakeholders.

Table 9.1.5 – Ongoing and completed projects in category LKS

Linking information across different sources				
No	Member State	Organisation/Project owner	Project title	Level of expectations
1.	Finland	Ministry of Justice	Robot process automation (RPA)	Exceeds expectations; Very satisfied
2.	Italy	Court of Appeal, Milano	GAM – Giustizia Antitrust Milanese (*Milan Antitrust Justice) (knowledge management AI system)	Meets expectations
3.	Malta	Department of Justice	Lawyers' Register	N/I
4.	Portugal	Ministry of Justice	Balcão Único Do Prério Lab (BUPi) Lab AI/ Unique hotpoint for citizens	Exceeds expectations
5.	Slovenia	Supreme Court of the Republic of Slovenia	COVL – Central Department for Enforcement on the basis of Authentic Documents	Meets expectations
6.	Sweden	Skatteverket (Swedish Tax Agency)	Real-time/SINK	Exceeds expectations
7.	Sweden	Skatteverket (Swedish Tax Agency)	Company information services	Exceeds expectations
8.	Sweden	Skatteverket (Swedish Tax Agency)	Invoices	N/I
9.	Austria	Federal Ministry of Justice*	Searchable case law	Meets expectations ²⁴⁸
10.	France	Ministry of Justice*	DataJust	N/I
11.	Italy	Procura della Repubblica c/o Tribunale di Cosenza	Giustizia penale e intelligenza artificiale	N/I

²⁴⁸ Assumption as it is extended to other civil courts

			(*Criminal justice and AI)	
12.	Italy	Court of Appeal, Brescia	Predictive justice – a database to provide predictable guidelines and timing in particular areas	Meets expectations
13.	Italy	Tribunale di Genova	Predictive Algorithms and Judicial Decisions	N/I
14.	Italy	Governmental Legal Service*	Avvocatura 2020	N/I
15.	Lithuania	Forensic Science Centre of Lithuania	Real-time network, text, and speaker analytics for combating organised crime – ROXANNE	N/I
16.	Malta	Department of Justice*	Semantics4Courts	N/I
17.	Portugal	Ministry of Justice	Magistratos	N/I
18.	Spain	Centro de Documentación Judicial (Judicial Documentation Centre [CENDOJ])	Automated sentences classification	Partially meet expectations
19.	Spain	Centro de Documentación Judicial (Judicial Documentation Centre [CENDOJ])	Creation of Structured Data	N/I
20.	Spain	Centro de Documentación Judicial (Judicial Documentation Centre [CENDOJ])	Business Intelligence	Meets expectations
21.	Sweden	Tullverket (*Swedish Customs Service)	PROFILE (work package on fiscal risk management, illegal waste transport and fraud in fish-trade)	N/I

9.1.4. Business problem category: Access to justice/public services

Out of the 93 identified projects, 14 (or 15% of all 93 projects) aim to solve a business problem in the category of access to justice/public services. Out of these 14 projects, 6 have been reported as completed and 5 as ongoing, as shown in the table below. The table also indicates the level of expectations, as reported by the stakeholders.

Table 9.1.6 – Ongoing and completed projects in category ATJ

Access to justice/public services				
No	Member State	Organisation/Project owner	Project title	Level of expectations
1.	Finland	Ministry of Justice	Chatbot-service for divorce/separation situations (part of Aurora project)	N/I
2.	Germany	Commission for information technology in the judiciary	Potentials of blockchain regarding an electronic validity register	N/I
3.	The Netherlands	Ministry of Justice and Security	Jurisprudentierobot (Jurisprudence-robot)	Exceeds expectations
4.	Portugal	Instituto dos Registos e do Notariado (*Institute of Registries and Notaries)	IReNe – Web Personal Assistant	Meets expectations
5.	Portugal	Ministry of Justice	Balcão Único Do Prério Lab (BUPi) Lab AI/ Unique hotpoint for citizens	Exceeds expectations
6.	Sweden	Domstolsverket (Swedish National Courts Administration)	Chatbots	Meets expectations
7.	Austria	Federal Ministry of Justice	Chatbot on a citizen service portal	Meets expectations ²⁴⁹
8.	Italy	Court of Ravenna	Processo Civile Telematico – PCT (*Digital Civil Trial)	Partially meet expectations
9.	Malta	Department of Justice	Semantics4Courts	N/I
10.	Netherlands	Ministry of Justice and Security	The financial emergency brake	Meets expectations
11.	Sweden	Bolagsverket (The Swedish Companies Registration Office)	Tool to choose company name	N/I

9.1.5. Business problem category: Administrative/Facilities management

Out of the 93 identified projects, 12 (or 14% of all 93 projects) aim to solve a business problem in the category of administrative/facilities management. Out of these 12 projects,

²⁴⁹ Assumption as it is planned to be launched soon

2 have been reported as completed and 7 as ongoing as shown in the table below. The table also indicates the level of expectations, as reported by the stakeholder.

Table 9.1.7 – Ongoing and completed projects in category AFM

Administrative/Facilities management				
No	Member State	Organisation/Project owner	Project title	Level of expectations
1.	Austria	Federal Ministry of Justice*	Automated allocation and processing of incoming documents	Meets expectations
2.	Italy	Court of Appeal, Milano	GAM – Giustizia Antitrust Milanese (*Milan Antitrust Justice) (knowledge management AI system)	Meets expectations
3.	Austria	Federal Ministry of Justice	Searchable case law	Meets expectations
4.	Denmark	Attorney General (Rigsadvokaten)	Digital Court Planner	N/I
5.	Denmark	Danish National Police	Small-scale projects (2): Prioritisation	N/I
6.	France	Ministry of Interior	PreNIUM	N/I
7.	Italy	Tribunale Firenze	The city of simple justice: simplification and reduction of administrative burdens in the context of the resolution of civil disputes	N/I
8.	Netherlands	Ministry of Justice and Security	DigiAkkoord	Meets expectations
9.	Spain	Ministry of Justice	Automated document classification	Meets expectations

9.1.6. Business problem category: Data protection compliance

Out of the 93 identified projects, 13 (or 14% of all 93 projects) aim to solve a business problem in the category of data protection compliance. Out of these 13 projects, 11 are ongoing and none is completed, as shown in the table below. The table also indicates the level of expectations, as reported by the stakeholders.

Table 9.1.8 – Ongoing and completed projects in category DPC

Data protection compliance				
No	Member State	Organisation/Project owner	Project title	Level of expectations
1.	Austria	Federal Ministry of Justice	Anonymisation of court decisions	Meets expectations
2.	Croatia	Ministry of Justice	Project for anonymisation	Meets expectations
3.	Czech Republic	Ministry of Justice	Judicial Anonymisation Tool	Meets expectations
4.	Denmark	Court Administration (Domstolsstyrelsen)	Domsdatabase	N/I
5.	Finland	Ministry of Justice	Automatic anonymisation and content description of documents containing personal data (Anoppi)	N/I
6.	France	Cour de Cassation (Court of Cassation)	AI-driven pseudonymisation of court decisions	Meets expectations; Extremely accurate
7.	Italy	Ministry of Justice	Semi-automated anonymisation of sensible named entities in text documents	N/I
8.	Luxembourg	Ministry of Justice and the judicial authorities	Anonymisation of the case law	N/I
9.	Netherlands	Ministry of Justice and Security	The financial emergency brake	Meets expectations
10.	Spain	Centro de Documentación Judicial (Judicial Documentation Centre [CENDOJ])	Automated sentences pseudonymisation	Partially meet expectations
11.	Sweden	Domstolsverket (Swedish National Courts Administration)	Anonymisation of court decisions	Meets expectations (positive results received, foreseen to go in production)

9.1.7. Business problem category: Preparing high volumes of data

Out of the 93 identified projects, 29 (or 31% of all 93 projects) aim to solve a business problem in the category of preparing high volume of data. Out of these 29 projects, 5 are completed and 20 are ongoing, as shown in the table below. The table also indicates the level of expectations, as reported by the stakeholders.

Table 9.1.9 – Ongoing and completed projects in category PPD

Preparing high volume of data				
No	Member State	Organisation/Project owner	Project title	Level of expectations
1.	Croatia	Ministry of Justice	Speech-to-Text	Meets expectations
2.	Latvia	Prosecutor General's Office	Voice recognition	N/I
3.	Sweden	Skatteverket (Swedish Tax Agency)	Proxies	Exceeds expectations
4.	Sweden	Skatteverket (Swedish Tax Agency)	Smart contracts for land Registries	N/I
5.	Sweden	Domstolsverket (Swedish National Courts Administration)	Automatic transcription	Very positive results; Exceeds expectations
6.	Austria	Federal Ministry of Justice	Anonymisation of court decisions	Exceeds expectations
7.	Croatia	Ministry of Justice	Project for anonymisation	N/I
8.	Czech Republic	Ministry of Justice	Judicial Anonymisation Tool	Meets expectations
9.	Denmark	Court Administration (Domstolsstyrelsen)	Domsdatabase	N/I
10.	Estonia	Ministry of Justice on behalf of Estonian courts	Automated transcription of courts minutes	N/I
11.	Finland	Ministry of Justice	Automatic anonymisation and content description of documents containing personal data (Anoppi)	N/I
12.	France	Cour de Cassation (Court of Cassation)*	AI-driven pseudonymisation of court decisions	Meets expectations
13.	Germany	Commission for information technology in the judiciary	Legal Translation Machine Service	Meets expectations
14.	Germany	Central Cybercrime Department of North-Rhine-Westphalia	Future criminal court room	N/I

Preparing high volume of data				
No	Member State	Organisation/Project owner	Project title	Level of expectations
15.	Germany	Commission for information technology in the judiciary	Cognitive systems at the prosecutor's office	Partially meet expectations
16.	Hungary	National Office for the Judiciary	Speech recognition and transcription project	Meets expectations
17.	Italy	Court of Ravenna	Digital Signature	Partially meet expectations
18.	Italy	Ministry of Justice	Semi-automated anonymisation of sensible named entities in text documents	N/I
19.	Italy	Procura della Repubblica c/o Tribunale di Cosenza	Giustizia penale e intelligenza artificiale (*Criminal justice and AI)	N/I
20.	Italy	Procura della Repubblica presso il Tribunale di Monza	Digital Signature	N/I
21.	Luxembourg	Ministry of Justice and the judicial authorities	Anonymisation of the case law	N/I
22.	Spain	Centro de Documentación Judicial (Judicial Documentation Centre [CENDOJ])	Automated sentences pseudonymisation	Partially meets expectations
23.	Sweden	Domstolsverket (Swedish National Courts Administration)	Anonymisation of court decisions	Meets expectations
24.	Sweden	Domstolsverket (Swedish National Courts Administration)	Translation	Meets expectations
25.	Sweden	Domstolsverket (Swedish National Courts Administration)	Decision-making	N/I

9.1.8. Business problem category: Lack of authenticity and/or traceability

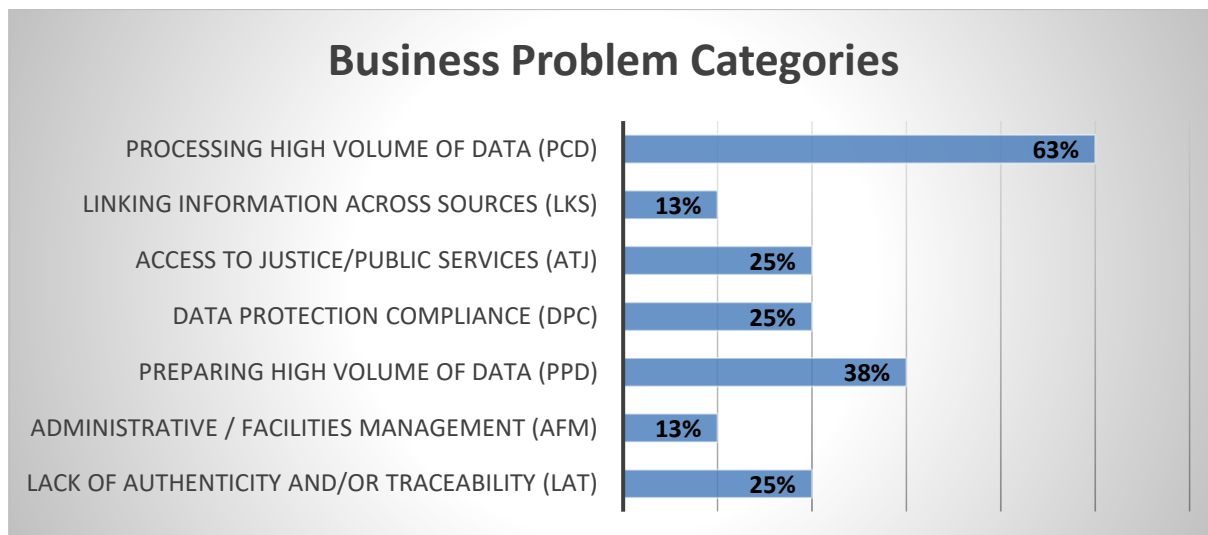
Out of the 93 identified projects, 16 (or 17% of all 93 projects) aim to solve a business problem in the category of lack of authenticity and/or traceability. Out of these 16 projects, 11 have been reported as completed and 3 as ongoing, as shown in the table below. The table also indicates the level of expectations, as reported by the stakeholders.

Table 9.1.10 – Ongoing and completed projects in category LAT

Lack of authenticity and/or traceability				
No	Member State	Organisation/Project owner	Project title	Level of expectations
1.	Germany	Commission for information technology in the judiciary	Use of blockchain technology in the area of the database land register	Meets expectations
2.	Germany	Commission for information technology in the judiciary	Potentials of blockchain regarding an electronic validity register	
3.	Malta	Department of Justice	Lawyers' Register	N/I
4.	Portugal	Ministry of Justice	Balcão Único Do Prério Lab (BUPi) Lab AI/ Unique hotpoint for citizens	Exceeds expectations
5.	Sweden	Skatteverket (Swedish Tax Agency)	Digital receipt processing	Exceeds expectations
6.	Sweden	Skatteverket (Swedish Tax Agency)	Personnel registers	Exceeds expectations
7.	Sweden	Skatteverket (Swedish Tax Agency)	Real-time/SINK	Exceeds expectations
8.	Sweden	Skatteverket (Swedish Tax Agency)	Proxies	Exceeds expectations
9.	Sweden	Skatteverket (Swedish Tax Agency)	Invoices	N/I
10.	Sweden	Skatteverket (Swedish Tax Agency)	Smart contracts for land Registries	N/I
11.	Sweden	Skatteverket (Swedish Tax Agency)	Company information services	Exceeds expectations
12.	Italy	Court of Ravenna	Digital Signature	
13.	Italy	Procura della Repubblica presso il Tribunale di Monza	Digital Signature	
14.	The Netherlands	Ministry of Justice and Security	The financial emergency brake	Meets expectations

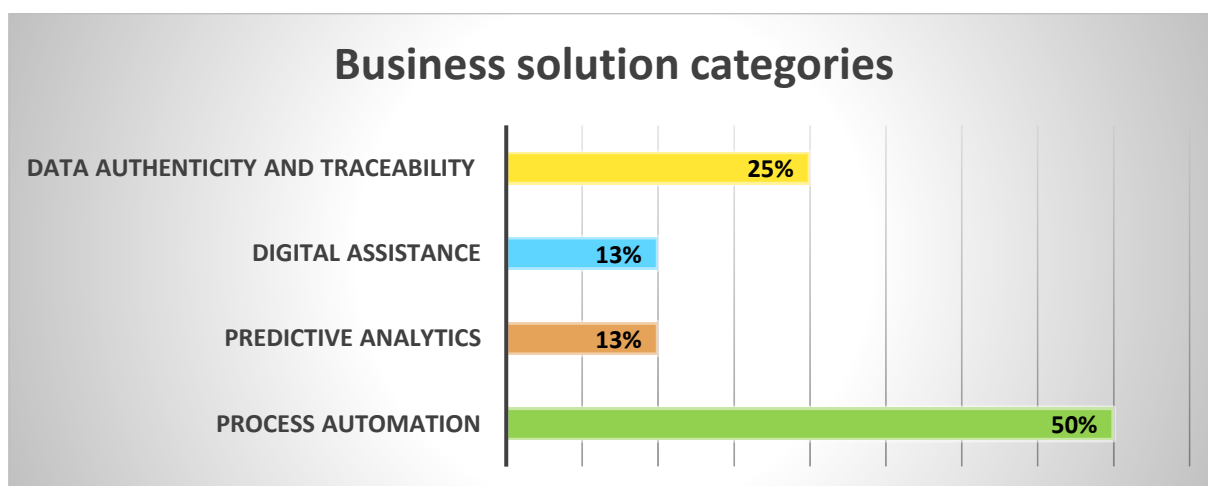
9.2. Overview of projects of the legal professional organisations per business problem and solution category

Given that one project may solve more than one business problem as per the identified business problem categories, out of 8 completed and ongoing projects, 5 (or 63%) aim to solve a problem in the category of PCD, 1 (or 13%) – in the category of LKS, 2 (or 25%) – in the category of ATJ, 2 (or 25%) – in the category of DPC, 3 (or 38%) – in the category of PPD, 1 (or 13%) – in the category of AFM and 2 (or 25%) – in the category of LAT, as shown below:

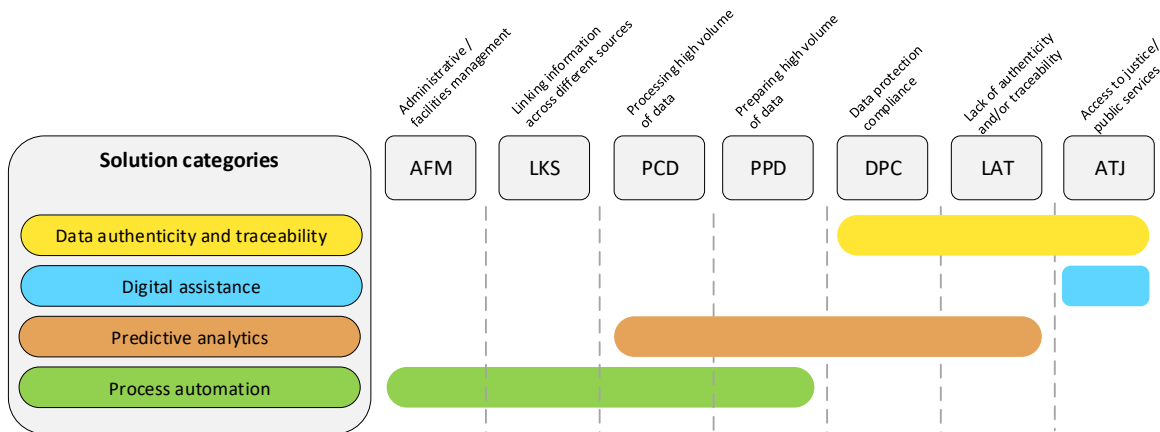


Given that one business solution may solve more than one business problem as per the identified business problem categories:

- Data authenticity and traceability is a solution used in 2 projects (or 25%)
- Digital assistance is a solution used in 1 project (or 13%)
- Predictive analytics is a solution used in 1 project (or 13 %)
- Process automation is a solution used in 4 projects (or 50 %)



The image below demonstrates the business problems each solution aims to tackle under the different business problem categories.



The table below proposes an overview of the business problem categories in which the explored projects²⁵⁰ of the legal professional organisations fall, the business solutions aiming to address these problems and the type of AI technology (ML, NLP, Expert systems, Computer vision) or blockchain/DLT (public permissioned or private) which is used (if this is indicated by the stakeholders).

Table 9.2.1– Overview of projects of the legal professional organisations per business problem and solution category

²⁵⁰ The project AI4Lawyers is not included in the table, as it is a study and not a technology exploring or implementing project.

No.	Member State	Organisation/Project owner	Project	Business problem category	Solution category	Solution description	Technology used
1.	International	European Union of Judicial Officers (UEHJ) and European Bailiffs' Foundation (EUBF)	Recovery of Uncontested Claims (RUC)	Processing high-volume of data; Preparing high volume of data; Administrative/facilities management	Process automation	Automate the process of collection of uncontested money debts between companies and analyse data related thereto.	Expert systems and rule-based systems
2.	International	European Union of Judicial Officers (UEHJ) and European Bailiffs' Foundation (EUBF)	Online dispute Resolution (ODR) for Medicys-consommation.fr	Access to justice/public services	Digital assistance	Assist citizens by expediting the lengthy and time-consuming litigation procedures.	Machine learning/deep learning; Natural language processing
3.	International	European Union of Judicial Officers (UEHJ) and European Bailiffs' Foundation (EUBF)	Alertcys.io	Access to justice/public services; Lack of authenticity and/or traceability; Data protection compliance	Data authenticity and traceability	Facilitate disintermediation (i.e. removing or reducing the need to entrust the common platform to a "central" entity); Data integrity; Traceability.	Public, permission-less

4.	Czech Republic	Judicial Academy	E-learning Education for the Judiciary	Processing high-volume of data; Linking information across different sources	Process automation	Automate learning activities for the judiciary. Analyse and administrate available information in an accurate, efficient and centralised way in order to facilitate the acquisition of insights. Provide training in a more efficient way.	Machine learning/deep learning; Natural language processing
5.	Italy	CNPAPAL	Desktop Assistance for end Users	Processing high volume of data; Preparing high volume of data	Process automation	Automate lengthy and time-consuming manual case administration processes such as pre-filling, reviewing and classifying documents in order to provide assistance to the user.	AI

6.	Italy	Sant'Anna School of Advanced Studies (LIDER-Lab of DIRpolis Institute), Pisa	Predictive Jurisprudence	Processing high-volume of data; Preparing high volume of data; Data protection compliance	Predictive analytics	Predict subsequent decisions on the same subject by recreating and mimic the legal reasoning behind the solution(s) adopted in the judgments. Explain the reasoning underlying each decision. Analyse, classify and annotate court decisions, case files and other documents, as well as extracting information from documents.	Deep Learning; Expert systems and rule-based systems; Algorithms for Classification; Algorithms for Regression Optimisation
7.	Italy	National Council of Notaries	Notaio Smart	Processing high volume of data	Process automation	Automate time-consuming process of manual review of contracts by notaries	Expert systems and rule-based systems; Natural language processing
8.	Italy	National Council of Notaries	Notaio Smart	Lack of authenticity and/or traceability	Data authenticity and traceability	Increase data security, integrity and traceability by reducing paper burden in handling notarial documents.	Private/consortium, permissioned

The contractor evaluated the projects based on several criteria:

- Maturity level (if the project has been reported as 'Completed' or 'Ongoing', marked in respectively green or blue)
- Level of expectations (if during stakeholder consultations the stakeholders replied that their project exceeds, meets, partially meets or does not meet their expectations).

Projects that have an indicated level of satisfaction 'Exceeds expectations/Very positive results/Very satisfied'²⁵¹ may serve as basis for the exchange of good practices among stakeholders in the respective categories.

9.2.1. Business problem category: Processing high volume of data

Out of the 8 identified projects, 5 (or 63% of all 8 projects) aim to solve a business problem in the category of processing high volume of data. Out of these 5 projects, 1 has been reported as completed and 4 – as ongoing as shown in the table below. The table also indicates the level of expectations, as reported by the stakeholders.

Table 9.2.2 – Ongoing and completed projects in category PCD

Processing high volume of data				
No	Member State	Organisation/Project owner	Project title	Level of expectations
1.	Czech Republic	Judicial Academy	E-learning Education for the Judiciary	Meets expectations
2.	EU/International	European Union of Judicial Officers (UEHJ) and European Bailiffs' Foundation (EUBF)	Recovery of Uncontested Claims (RUC)	Exceeds expectations
3.	Italy	CNPAPAL	Desktop Assistance for end Users	Meets expectations
4.	Italy	Sant'Anna School of Advanced Studies (LIDER-Lab of DIRpolis Institute), Pisa	Predictive Jurisprudence	N/I
5.	Italy	National Council of Notaries	Notaio Smart (AI)	Partially meet expectations

²⁵¹ RGB=204-192-117

9.2.2. Business problem category: Processing high volume of video, audio and images

Out of the 8 identified projects, none aim to solve a business problem in the category of processing high volume of video, audio and images.

9.2.3. Business problem category: Linking information across different sources

Out of the 8 identified projects, 1 (or 13% of all 8 projects) aims to solve a business problem in the category of linking information across different sources. This project is completed as shown in the table below. The table also indicates the satisfaction level, as reported by the stakeholder.

Table 9.2.3 – Ongoing and completed projects in category LKS

Linking information across different sources				
No	Member State	Organisation/Project owner	Project title	Level of expectations
1.	Czech Republic	Judicial Academy	E-learning Education for the Judiciary	Meets expectations

9.2.4. Business problem category: Access to justice/public services

Out of the 8 identified projects, 2 (or 25% of all 8 projects) aim to solve a business problem in the category of access to justice/public services. The two projects are ongoing as shown in the table below. The table also indicates the satisfaction level, as reported by the stakeholders.

Table 9.2.4 – Ongoing and completed projects in category ATJ

Access to justice/public services				
No	Member State	Organisation/Project owner	Project title	Level of expectations
1.	EU/International	European Union of Judicial Officers (UEHJ) and European Bailiffs Foundation (EUBF)	Online dispute Resolution (ODR) for Medicys-consommation.fr	Exceeds expectations
2.	EU/International	European Union of Judicial Officers (UEHJ) and European Bailiffs' Foundation (EUBF)	Alertcys.io	N/I

9.2.5. Business problem category: Administrative/Facilities management

Out of the 8 identified projects, 1 (or 13% of all 8 projects) aims to solve a business problem in the category of administrative and facilities management. This project is ongoing as shown in the table below. The table also indicates the satisfaction level, as reported by the stakeholder.

Table 9.2.5 – Ongoing and completed projects in category AFM

Administrative/facilities management				
No	Member State	Organisation/Project owner	Project title	Level of expectations
1.	EU/International	European Union of Judicial Officers (UEHJ) and European Bailiffs' Foundation (EUBF)	Recovery of Uncontested Claims (RUC)	Exceeds expectations

9.2.6. Business problem category: Data protection compliance

Out of the 8 identified projects, 2 (or 25% of all 8 projects) aim to solve a business problem in the category of data protection compliance. The project is ongoing as shown in the table below. The table also indicates the satisfaction level, as reported by the stakeholders.

Table 9.2.6 – Ongoing and completed projects in category DPC

Data protection compliance				
No	Member State	Organisation/Project owner	Project title	Level of expectations
1.	EU/International	European Union of Judicial Officers (UEHJ) and European Bailiffs' Foundation (EUBF)	Alertcys.io	N/I
2.	Italy	Sant'Anna School of Advanced Studies (LIDER-Lab of DIrpolis Institute), Pisa	Predictive Jurisprudence	N/I

9.2.7. Business problem category: Preparing high volume of data

Out of the 8 identified projects, 3 (or 38% of all 8 projects) aim to solve a business problem in the category of preparing high volume of data. All 3 projects are ongoing as shown in the table below. The table also indicates the satisfaction level, as reported by the stakeholders.

Table 9.2.7 – Ongoing and completed projects in category VAI

Preparing high volume of data				
No	Member State	Organisation/Project owner	Project title	Level of expectations
1.	EU/International	European Union of Judicial Officers (UEHJ) and European Bailiffs' Foundation (EUBF)	Recovery of Uncontested Claims (RUC)	Exceeds expectations
2.	Italy	CNPAPAL	Desktop Assistance for end Users	Meets expectations

Preparing high volume of data				
No	Member State	Organisation/Project owner	Project title	Level of expectations
3.	Italy	Sant'Anna School of Advanced Studies (LIDER-Lab of DIRpolis Institute), Pisa	Predictive Jurisprudence	N/I

9.2.8. Business problem category: Lack of authenticity and traceability

Out of the 8 identified projects, 2 (or 25% of all 8 projects) aim to solve a business problem in the category of lack of authenticity and/or traceability. Both projects are ongoing as shown in the table below. The table also indicates the satisfaction level, as reported by the stakeholders.

Table 9.2.8 – Ongoing and completed projects in category LTT

Lack of authenticity and/or traceability				
No	Member State	Organisation/Project owner	Project title	Level of expectations
1.	EU/International	European Union of Judicial Officers (UEHJ) and European Bailiffs' Foundation (EUBF)	Alertcys.io	N/I
2.	Italy	National Council of Notaries	Notaio Smart (DLT)	Partially meet expectations

10. WAY FORWARD

The Member States' public authorities and judiciary and the legal professional organisations indicated if their projects 'exceed', 'meet', 'partially meet' or 'do not meet' their expectations. This expectations level assessment only takes into regard the **completed** and the **ongoing projects** (i.e. 80 projects of the Member State authorities and judiciary and 8 of the legal professional organisations).

In this context, projects which 'exceed' and 'meet' expectations may serve as basis for exchange of **good practices**²⁵² among stakeholders in other countries. Such projects concern areas such as, *inter alia*, anonymisation of documents (e.g. court decisions); speech-to-text and transcription; introduction of chatbots for strengthening the access to justice and public services, and Robot Process Automation (RPA) for increasing efficiency and minimising errors in repetitive tasks. Nevertheless, other projects assessed as 'partially meet' or 'do not meet' expectations may serve as an inspiration or useful experience in terms of approach taken and lessons learned.

The following recommendations are drawn horizontally, including suggestions for exchange of good practices on the identified projects and cutting across several points observed in this study:

- **Coordination at EU level of the efforts and activities.** The study identified a number of projects in the Member States with similar objectives, business problems and technologies used to solve them. Therefore, in order to avoid duplication of effort and to ensure semantic and organisational interoperability, there is a need for coordination of and improved communication on the intended project objectives and activities at EU level.
- **Collaboration and experience sharing about projects on a regular basis.** There are a number of ongoing and planned projects, along with initiatives at European and Member State level. Establishment of a mechanism with focus on innovative technologies in the justice field would facilitate experience sharing between the EU institutions, national public authorities, the judiciary and legal professional organisations and compilation of lessons learned.
- **Strengthening existing partnerships and networks.** Existing partnerships between European and MS organisations, such as the AI4EU observatory²⁵³ or EU blockchain observatory and forum²⁵⁴, should be further strengthened with larger involvement of experts in the justice field. This would contribute to raising awareness about the benefits of innovative technologies and better understanding how these can help in solving specific problems.
- **Recommendation for establishing a supporting mechanism for legal professional organisations.** Defining a supporting mechanism for legal professional organisations to facilitate the preparation and implementation of proof of concepts (PoC) as 'quick wins' that would demonstrate the added value and the benefits of the innovative technologies for the practitioners.

These actions and mechanisms may include creation of network and knowledge sharing platforms to engage the stakeholders from the public and the private sector into dialogue (including with EU institutions, bodies and agencies), to support them in finding information on current projects involving innovative technologies (in their Member State or elsewhere) and to assist them throughout the project lifecycle by identifying partners and funding opportunities and preparing PoCs.

²⁵² In the context of this study, 'good practices' regarding a project may relate to activities of preparation, development and implementation of the project and overcoming challenges encountered, in an optimal way, such as to achieve the project objectives and solve the business problem to an extent that exceeds or meets the expectations.

²⁵³ <https://www.ai4eu.eu/observatory>

²⁵⁴ <https://www.eublockchainforum.eu/>

11. LIST OF ANNEXES

Annex I - List of References

Annex II - Explored projects and use cases of the Member States' authorities

Annex III - Explored projects and use cases of Legal professional organisations

Annex IV – ICT companies projects/services

STUDY ON THE USE OF INNOVATIVE TECHNOLOGIES IN THE JUSTICE FIELD

ANNEX I: LIST OF REFERENCES

September 2020

This Report has been prepared by TRASYS International, part of the NRB Group, under the ABC IV – Lot 3 Framework Contract, for the DG for Justice and Consumers.

Project manager: Dijana SPASOJEVIC, Head of Business Consulting

Email: dijana.spasojevic@nrb.be

Tel.: +32 478 490 240

Report prepared by: Miglena VUCHEVA, Margarida ROCHA, Robrecht RENARD, Dimitrios STASINOPOULOS

Disclaimer: The information and views set out in this report are those of the author(s) and do not necessarily reflect the official opinion of the European Commission. Any person acting on the Commission behalf may be held responsible for the use which may be made of the information contained therein.

Contents

1.	Introduction.....	3
2.	Review of identified references.....	4
3.	Summaries of references.....	74
3.1.	References categorised as part of the horizontal framework on innovative technologies	74
3.2.	References discussing Artificial Intelligence.....	86
3.3.	References discussing blockchain/DLT.....	109

1. Introduction

The document provides an overview of 117 references, reviewed by the contractor in the context of the study on the Use of innovative technologies in the justice field, commissioned by Directorate-General Justice and Consumers of the European Commission.

Some of the references in the present document contain an abstract. For those, which do not contain one, the contractor drafted a brief summary.

All reviewed references are represented in the table in Section 2 of this document. The contractor attributed three levels of relevance to them references – High, Medium and Low, as defined below:

- **High =>** The high-level relevance references are part of the legal and/or policy framework of the European Union (EU) and the EU Member States, which set horizontal strategic priorities, rules and principles with regard to the use of AI and/or blockchain/DLT. In addition, these references include academic papers and studies conducted by different bodies and organisations, which discuss use cases and business problems directly connected to the justice field and/or propose an analysis of the ethical and legal issues arising out of the uses of these technologies.
- **Medium =>** The medium-level relevance references include academic papers and studies which discuss use cases of innovative technologies in other fields, however, due to the applicability of these technologies to multiple fields, could 'inspire' their potential use in the domain of justice.
- **Low =>** The low-level relevance references do not discuss uses of innovative technologies in the justice field or other fields, however, they put forward some important considerations, primarily of technical nature, that could have an impact on future AI or blockchain/DLT projects implemented by Member States' authorities.

The reviewed references that were evaluated as not relevant to the study, are also included in the table for completeness.

The reviewed references are categorised in the following categories (one reference may fall in multiple categories):

- References, pertaining to a horizontal legal and political framework (**'Horizontal framework'**)
- References, discussing and/or describing use cases of AI and/or blockchain/DLT in the justice field or related fields (**'Use cases'**)
References, discussing legal and ethical aspects and requirements related to the implementation of AI and/or blockchain/DLT (**'Legal and ethical implications'**)
- References, discussing personal data protection and AI and/or blockchain/DLT (**'Personal data protection'**)
- Other, references that do not fall within either of the categories above, e.g. references discussing technical aspects, approaches, decision-making, digital evidence etc. (**'Other'**)

2. Review of identified references

No	Reference	Abstract/Summary	Relevance	Reasoning	Category	AI/DLT
1.	Consolidated Version of the Treaty on European Union (TEU) [2012], OJ C 326/13, art 2 and art 19(1).	<p>Art. 2 (TEU) 'The Union is founded on the values of respect for human dignity, freedom, democracy, equality, the rule of law and respect for human rights, including the rights of persons belonging to minorities. These values are common to the Member States in a society in which pluralism, non-discrimination, tolerance, justice, solidarity and equality between women and men prevail.'</p> <p>Art. 19(1) TEU 'The Court of Justice of the European Union shall include the Court of Justice, the General Court and specialised courts. It shall ensure that in the interpretation and application of the Treaties the law is observed. Member States shall provide remedies sufficient to ensure effective legal protection in the fields covered by Union law.'</p>	High	The use of innovation technologies in the justice field must respect the common values of the European Union, as stated in Art. 2 TEU and abide by the principle of effective legal protection laid down in Art. 19(1) TEU.	Horizontal framework	AI
2.	Charter of Fundamental Rights of the European Union (CFR) [2012], OJ C 326/391, Title III and VI.	Enshrines through a range of personal, civil, political,	High	The use of innovation technologies in the justice field must respect the fundamental rights inherent to	Horizontal framework; Legal and ethical implications	AI

		economic and social rights in the EU. ²⁵⁵		freedoms, equality and justice as defined in the Charter.		
3.	Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 (GDPR), [2019], OJ L 119/1.	The GDPR is part of the EU data protection reform package. It is applicable to all data controllers / processors including those not established in the EU, but they for instance offer goods or services to data subjects in the EU. It sets six principles according to which personal data should be processed. The GDPR imposes an obligation to data controllers / processors to process the data securely, by implementing 'appropriate technical and organisational measures'. In addition, the data controllers or data processors need to ensure that processing operations comply with the principle of data protection by design and by default. The GDPR also stipulates the conditions, which need to be fulfilled in order for a data controller / processor to be allowed to process personal data, such as freely given, specific, informed and unambiguous consent of the data subject, compliance with a legal obligation, performance of a task in the public interest, etc.	High	In its Communication on Artificial Intelligence for Europe, the Commission states that it will closely follow the application of the GDPR in the context of AI and calls on the national data protection authorities and the European Data Protection Board to do the same. GDPR contains provisions on decision-making, based solely on automated processing, including profiling. In such cases, data subjects have the right to be provided with meaningful information about the logic involved in the decision and the right not to be	Horizontal framework; Personal data protection	AI

²⁵⁵ Summary prepared by the contractor.

		It provides a number of guarantees for the respect of the data subject's rights under its provisions, e.g. by stipulating the obligation for some data controllers or processors to appoint data protection officers. The GDPR guarantees a range of data protection rights (such as the right to be informed, right of access, right to erasure etc.), which aim to give individuals more control over the data they provide. ²⁵⁶		subject solely to automated decision-making, except in a strict list of situations. A number of papers referenced herein, discuss trustworthy AI, based on principles such as transparency, robustness, security, and accountability. GDPR establishes a number of measures to guarantee these principles.		
4.	Directive (EU) 2016/680 of the European Parliament and of the Council of 27 April 2016 [2016], OJ L 119/89.	The Law Enforcement Directive (LED) is part of the EU data protection reform package. The LED regulates the processing of personal data, including profiling, by competent authorities (as defined in Art. 3(7) thereof) and establishes mechanisms and measures to guarantee the principles of transparency and explainability, accountability, security and robustness of the data processing. ²⁵⁷	High	<i>Ut supra</i>	Horizontal framework; Personal data protection	AI
5.	Regulation (EU) 2018/1725 of the European Parliament and of the Council of	Lays down rules on how EU institutions, bodies, offices and agencies should treat the personal data they hold on	High	<i>Ut supra</i>	Horizontal framework; Personal data protection	AI

²⁵⁶ Summary prepared by the contractor.

²⁵⁷ Summary prepared by the contractor.

	23 October 2018 [2018], OJ L 295/39.	individuals. It upholds an individual's fundamental rights to protection of personal data. It also aligns the rules for EU institutions, bodies, offices and agencies with those of the General Data Protection Regulation (GDPR) and of Directive (EU) 2016/680. ²⁵⁸				
6.	Commission Implementing Decision (EU) 2016/1250 of 12 July 2016 pursuant to Directive 95/46/EC of the European Parliament and of the Council on the adequacy of the protection provided by the EU-U.S. Privacy Shield [2016], OJ L 207/1.	Based on this adequacy Decision the EU-US Privacy Shield framework became operational on 1 August 2016. It includes strong data protection obligations on US companies receiving personal data from the EU and safeguards on US government access to data. In addition, it guarantees effective protection and redress for anyone from the EU.	High	<i>Ut supra</i>	Horizontal framework; Personal data protection	AI
7.	CEPEJ, 'European Ethical Charter on the Use of Artificial Intelligence in Judicial Systems and their environment', adopted at the 31st plenary meeting of the CEPEJ (Strasbourg, 3-4 December 2018).	The document elaborates five principles on the use of artificial intelligence in the judicial systems: respect of fundamental rights; non-discrimination; quality and security; transparency, impartiality and fairness; and 'under user control'. The Charter also analyses 'predictive justice' mechanisms and characteristics of the 'machine learning' as well as use cases of AI in the justice field. ²⁵⁹	High	The document is specifically dedicated to the analysis of the use of AI in the justice field and gives specific examples of use cases in the Member States.	Horizontal framework; Legal and ethical implications; Use cases	AI

²⁵⁸ Summary prepared by the contractor.

²⁵⁹ Summary prepared by the contractor.

8.	CEPEJ, <i>'L'intelligence artificielle au service du pouvoir judiciaire'</i> , 26 September 2018, Round Table, CEPEJ General Administration of Lithuania.	The paper is part of the round table discussion of the European Commission for the Efficiency of Justice (CEPEJ) and explores the state of play in France in terms of predictive justice tools in place and the concept of 'open data judicial decisions.	High	The paper discusses the ongoing situation in France with regard to 'predictive justice' and the prerequisites, the risks and the expectations related to its implementation in the French judicial system.	Legal and ethical implications; Use cases	AI
9.	High-Level Expert Group on AI (AI HLEG), <i>'Ethics Guidelines for Trustworthy AI'</i> , 8 April 2019.	Trustworthy AI has three components, which should be met throughout the system's entire life cycle: it should be (1) lawful, (2) ethical and (3) robust. The Guidelines set out the framework of a trustworthy AI, fostering and securing its ethical aspects and its robustness. In addition, they give examples of opportunities and critical concerns raised by AI. ²⁶⁰	High	The Guidelines are prepared by a High-Level Expert Group set up by the European Commission and may be considered as part of the horizontal legal and policy framework on AI at EU level establishing key principles in the use of AI.	Horizontal framework; Legal and ethical implications	AI
10.	OECD, <i>Recommendation of the Council on Artificial Intelligence</i> , OECD/LEGAL/0449.	The Recommendation aims to foster innovation and trust in AI by promoting the responsible stewardship of trustworthy AI while ensuring respect for human rights and democratic values. It identifies five complementary value-based principles for the responsible stewardship of trustworthy AI: inclusive growth, sustainable	High	The document is an official OECD Legal Instrument and is the first intergovernmental recommendation on AI.	Horizontal framework; Legal and ethical implications	AI

²⁶⁰ Idem.

		<p>development and well-being; human-centred values and fairness; transparency and explainability; robustness, security and safety; and accountability.</p> <p>In addition, the Recommendation provides five recommendations to policymakers pertaining to national policies and international cooperation for trustworthy AI, namely: investing in AI research and development; fostering a digital ecosystem for AI; shaping and enabling policy environment for AI; building human capacity and preparing for labour market transformation; and international cooperation for trustworthy AI.²⁶¹</p>				
11.	<p>Communication from the Commission to the European Parliament, the Council, the European Economic and social Committee and the Committee of the regions, '<i>Building Trust in Human-Centric Artificial Intelligence</i>', 8 April 2019, COM(2019) 168 final.</p>	<p>With the focus on a more human-centric AI in Europe, new challenges have emerged for AI technologies. The learning capabilities of these digital machines enables them to take and implement decisions without human intervention. To avoid unintended harm, AI technology should be developed in a way that puts people at its centre and is thus worthy of the public's trust – compliant with law and with the ethical</p>	High	<p>The Communication refers to the Ethics Guidelines for Trustworthy AI and may be considered as part of the horizontal legal and policy framework on AI at EU level.</p>	<p>Horizontal framework; Legal and ethical implications</p>	AI

²⁶¹ Summary prepared by the contractor.

		principles. The document refers to the Ethics Guidelines on AI of the AI HLEG, which elaborates on seven principles of a trustworthy AI. ²⁶²				
12.	Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions, ' <i>Artificial Intelligence for Europe</i> ', 25 April 2018, COM(2018) 237 final.	The Strategy on AI for Europe places people at the centre of the development of AI (human-centric AI). It is a three-pronged approach: to boost the EU's research and industrial capacity and AI uptake across the economy, to prepare for socio-economic changes, and to ensure an appropriate ethical and legal framework. The Strategy identifies the necessity of coordinated actions and common efforts in order for the EU to stay at the forefront of the AI uptake and to ensure that EU values are respected. These actions should include, among others, increased investments in AI, research and innovation, increased data availability, increased trainings and digital awareness. ²⁶³	High	The document is part of the horizontal legal and policy framework on AI at EU level.	Horizontal framework	AI
13.	Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions, ' <i>Coordinated</i>	Delivering on the Strategy on AI for Europe, adopted in April 2018, the Commission presented a coordinated plan for joint actions between the Commission and the Member States. The Coordinated plan sets as its main objectives: the promotion of the common	High	The document may be considered as part of the horizontal legal and policy framework on AI at EU level.	Horizontal framework	AI

²⁶² Summary prepared by the contractor.

²⁶³ Summary prepared by the contractor.

	<i>Plan on Artificial Intelligence</i> , 7 December 2018, COM(2018) 795 final.	efforts of the Member States (e.g. in adopting national strategies); the fostering of public-private partnerships; and the financing of start-ups and innovation enterprises. It also focuses on security-related aspects of the AI applications and infrastructure. ²⁶⁴				
14.	Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions ' <i>Towards a common European data space</i> ', 25 April 2018 COM(2018) 232 final.	The article presents a package of measures proposed by the Commission, in view of establishing a common data space in the EU. These measures include: the re-use of public sector information; update of the Recommendation on access to and preservation of scientific information; and guidance on sharing private sector data. ²⁶⁵	High	The document is a part of the horizontal legal and policy framework on innovative technologies at EU level and has been adopted in parallel with COM (2018) 237 final. It recognised data as an increasingly critical asset for the development of new technologies such as AI and the Internet of Things.	Horizontal framework	AI/DLT
15.	European Commission White Paper on Artificial Intelligence - A European approach to excellence and trust.	The White Paper on Artificial Intelligence and the European data strategy are the first pillars of the new digital strategy of the Commission. They are fully aligned with the need to put people first in developing technology, as well as with the need to defend and promote European values and rights in how we design, make and	High	The White Paper is part of the horizontal framework of the EU on Artificial Intelligence.	Horizontal framework	AI

²⁶⁴ Summary prepared by the contractor.

²⁶⁵ Idem.

		deploy technology in the real economy and how we improve the services of the public sector towards the citizens.				
16.	Committee of experts on internet intermediaries (MSI-NET), ' <i>Study on the Human Rights Dimensions of Automated Data Processing Techniques (in Particular Algorithms) and Possible Regulatory Implications</i> ', as finalised on 6 October 2017.	The document discusses the impacts of algorithms on human rights, such as the right of fair trial and due process (in particular in criminal offences), right of privacy and data protection, freedom of expression etc. Additionally, it also analyses the regulatory implications of the use of automated processing techniques and algorithms. Finally, the authors offer a set of conclusions, mainly addressing actions to be taken by public entities, such as supporting more research and studies to better understand the human rights, ethical and legal implications of algorithmic decision-making and better and effective monitoring of technological advances. It also looks into potentially negative impacts of technology on human rights and underlines the importance of raising public awareness about these impacts. The Council of Europe is the forum to further explore these impacts. ²⁶⁶	High	The document elaborates on the developments in the new technologies – especially on the increase of the automated data processing and decision-making systems - and its potential impact on human rights.	Horizontal framework; Legal and ethical aspects; Personal data protection	AI

²⁶⁶ Summary prepared by the contractor.

17.	Federal Government of Germany, <i>National Artificial Intelligence Strategy</i> , November 2018.	The document is a national strategy on how the use of AI and its implications (legal, ethical etc.) should be approached in Germany. ²⁶⁷	High	The document is a strategy on how the use of AI and its implications (legal, ethical etc.) should be approached. Although it does not specifically discuss implications related to the use of AI in the justice field, it is part of the horizontal framework and is therefore of high relevance to this study.	Horizontal framework	AI
18.	Danish Government, <i>National Strategy for Artificial Intelligence</i> , March 2019.	The document is a national strategy on how the use of AI and its implications (legal, ethical etc.) should be approached in Denmark.	High	<i>Ut supra</i>	Horizontal framework	AI
19.	Ministry of Economic Affairs and Employment Ministry of Finland, <i>Finland's Age of Artificial Intelligence</i> , 2017.	The document is a strategy on how the use of AI and its implications (legal, ethical etc.) should be approached in Finland. It targets the importance of Artificial Intelligence for Finland and describes the steps taken towards making Finland highly advanced in AI. It lists the actions taken so far and the plans for the future. It further analyses the current and the future position of Finland in the competitive international landscape and elaborates on the	High	<i>Ut supra</i>	Horizontal framework	AI

²⁶⁷ Summary prepared by the contractor.

		impact of AI on both the public and private sectors. There are 11 key actions that cover business use cases of AI in domains of work and competitiveness, data and security awareness to human-centric orientation.				
20.	Government offices of Sweden, Ministry of Enterprise and Innovation, <i>National approach to artificial intelligence</i> , 2017.	<p>The document is a strategy towards how the use of AI and its implications (legal, ethical etc.) should be approached in Sweden.</p> <p>The Swedish national approach on AI aims to confirm Sweden's vanguard position on potentialising the opportunities offered by digital transformation and use of innovative technologies. Consequently, this document acknowledges the benefits of introducing the use of AI in multiple areas with the aim of increasing economic and social sustainable growth or overcoming environmental challenges. Furthermore, the Strategy establishes key conditions for the use of AI in Sweden via a solid framework and infrastructure that encompasses three main areas: Education and Training, Research and Innovation and Use.</p>	High	<i>Ut supra</i>	Horizontal framework	AI
21.	National Artificial Intelligence Strategy of the Czech Republic.	The document is a national strategy on how the use of AI and its implications (legal, ethical etc.) should be	High	The document is a strategy on how the use of AI and its implications (legal,	Horizontal framework	AI

		approached in the Czech Republic.		ethical etc.) should be approached. Although, it does not specifically discuss implications related to the use of AI in the justice field, it is part of the horizontal framework and is therefore of high relevance to this study.		
22.	Spanish RDI Strategy in Artificial Intelligence.	The IA Strategy in RDI in Spain establishes a series of priorities that will be framed within the new Spanish Strategy for Science, Technology and Innovation (EECTI) 2021-2028 and that will have to be developed in initiatives and activities defined and financed through the Science, Technology and Innovation Stares Plans (PECTI), mobilising the synergies between the different levels of public administration and through the co-development of the public and private sectors. It is a condition in the development of technologies and applications of AI linked to this Strategy to avoid the negative bias and prejudices of our society, such as gender, race or other forms of discrimination, and of which the decision-making systems of AI should be free. It also includes a series of recommendations that	High	Cf. Summary	Horizontal framework	AI

		transcend R&D and demand the presence of other sectors and ministerial departments due to the multidisciplinary and transversal nature of AI and the technological and social revolution it implies.				
23.	AI Portugal 2030 – Portuguese National Initiative on digital skills. An innovation and growth strategy to foster Artificial Intelligence in Portugal in the European context.	This strategy is fully aligned with the Coordinated Action plan of the EU and the Member States and is included in INCoDe.2030, the Portuguese initiative to foster digital skills. It considers and promotes a coordinated approach at European level encouraging the use of this powerful technology to help solve the world’s biggest challenges, from health to climate, from transport to agriculture, and from cybersecurity to industry in general. The current text is the result of a long dialogue over the last two years and should continuously evolve as a dynamic and collective effort with annual reviews and a systematic process of mobilising citizens at large, and key stake holders in particular. The main general objectives include added economic growth, scientific excellence, and human development increasing dramatically the qualifications of the labour force, particularly its technological qualifications, while promoting inclusion and awareness at all levels of education. But it should be clear	High	Cf. Summary	Horizontal framework	AI

		that the growing usage of AI must also strengthen societal robustness by building a clear vision of the impacts of AI in democracy, privacy, security, fairness, the labour market, governmental and commercial transparency, and equity. Although AI is highly disruptive in all these dimensions, it also provides, when it is made ethical-by-design, a set of powerful tools to actually improve society and democracy.				
24.	National artificial intelligence strategy of Estonia, 2019–2021.	Following the adoption of the national strategy on AI, the Estonian Government planned an investment of EUR 10 million between 2019-2021 reinforcing its leading role on supporting the use of AI in both public and private sector. Since October 2019, Estonia has deployed up to 23 AI solutions in its public sector and set its objective to have 50 use cases by the end of 2020. At the same time, the private sector is also already using AI in multiple business areas. From a legal perspective, there is no indication on the relevant adaptation to current legislation as Kratts (AI in Estonian) will be clearly human-centric oriented. For the Estonian government, the benefits of the use of AI will be on the development of e-governance and attract new investments in innovation activities.	High	Cf. Summary	Horizontal framework	AI

25.	Strategic Action Plan for Artificial Intelligence of the Netherlands (October 2019).	The Strategic Action Plan establishes the Dutch intention and principles to be at the forefront of the use of AI, while protecting the public interest. The mentioned main goal of this Strategy is organised in three main tracks. The first track encompasses the creation of numerous public-private partnerships, especially with the Dutch AI Coalition ²⁶⁸ with the main objective of capitalising on societal and economic opportunities. A second track aims to guarantee the preconditions for a <i>favourable AI climate in the economy and society at large</i> . The third track focuses on <i>strengthening foundations</i> , which is concerned to the safeguard of human fundamental rights and ensure proper legal and ethical frameworks. Finally, these 3 tracks incorporate 11 objectives that provide guidelines and support the national Strategy.	High	Cf. summary	Horizontal framework	AI
26.	eJustiz-Strategie der österreichischen Justiz 2018–2022 Langversion (Austria Strategy).	The document is a national e-Justice strategy on how the use of innovative technologies and its implications (legal, ethical etc.) should be approached in Austria.	High	Cf. summary	Horizontal	AI/DLT
27.	Digital Malta – National Digital Strategy 2014–2020.	The Strategy puts forward a suite of guiding principles and actions for ICT to be used for socio-economic development. It	High	Cf. Summary	Horizontal framework	Digital transformation/ Innovation

²⁶⁸ Official website of the Dutch AI Coalition: <https://nlaic.com/>

		sets out how ICT can make a difference in areas such as the economy, employment, industry and small businesses, and how it can be used for national development, to empower citizens and transform government. The strategy acknowledges innovation in ICT as a key factor in the digital transformation. It encourages everyone to reap the benefits that ICT can bring better education, stronger businesses, efficient government, sustainable economic growth and much more. Truly, it can provide a better quality of life for the Maltese. It is essential that the benefits of this nation's knowledge society are enjoyed by every citizen irrespective of age, gender, sexual orientation, disability, education, economic means or race. This will be achieved through intervention to circumvent obstacles. There will be action to enhance digital literacy and social equality, increase access for all and stimulate local content.				
28.	2030 Digital Transformation Strategy for Slovakia.	The <i>2030 Digital Transformation Strategy for Slovakia</i> (the Strategy) represents the Slovakian perception of the need for transformation from an industrial society into an information society. Furthermore, this Strategy, which is mainly coordinated by the Office of the Deputy Prime	High	Cf. Summary	Horizontal framework	Digital transformation/ AI

		Minister of the Slovak Republic for Investment and Informatisation, follows the EU agenda of a single digital market and the priority of a broad digital transformation. For the period from 2019-2030, the Strategy will emphasise and in a certain way prioritise the use of innovative technologies such as AI, in order to pursue <i>economic and sustainable growth</i> and to increase citizens' quality of life.				
29.	Resolution 1281 of the Government of the Republic of Lithuania, ' <i>The Lithuanian Innovation development programme 2014-2020</i> '. Approved 18 December 2013.	This document presents a view on state resources mobilisation aiming to improve innovation, development and competitiveness of the Lithuanian economy, based on high levels of knowledge, technology and human resources.	High	Cf. Summary	Horizontal framework	AI
30.	Informatīvais ziņojums ' <i>Par mākslīgā intelekta risinājumu attīstību</i> ' ²⁶⁹²⁷⁰ Announced in July 2019.	Document not available in English.	High	National strategy of Latvia	Horizontal framework	AI
31.	E. F. Villaronga, P. Kieseberg, and T. Li, ' <i>Humans forget, machines remember: Artificial intelligence and the Right to Be</i>	This article examines the problem of AI memory and the 'right to be forgotten' (RTBF). First, this article analyses the legal background of the right to be forgotten, in order to	High	The paper explores the applicability of GDPR and the right to be forgotten in combination with AI. It is closely	Personal data protection	AI

²⁶⁹ Contractors' translation: Information report 'On the development of artificial intelligence solutions'.

²⁷⁰ Document available on the official website of the Cabinet of Ministers of the Republic of Latvia: <http://tap.mk.gov.lv/lv/mk/tap/?pid=40475479>

	<p>Forgotten,' <i>Comput. Law Secur. Rev.</i>, vol. 34, no. 2, pp. 304–313, Apr. 2018.</p>	<p>understand its potential applicability to AI, including a discussion on the antagonism between the values of privacy and transparency under current EU privacy law. Next, the authors explore whether the right to be forgotten is practicable or beneficial in an AI/machine learning context, in order to understand whether and how the law should address the right to be forgotten in a post-AI world. The authors discuss the technical problems faced when adhering to strict interpretation of data deletion requirements under the right to be forgotten, ultimately concluding that it may be impossible to fulfil the legal aims of the right to be forgotten in artificial intelligence environments. Finally, this article addresses the core issue at the heart of the AI and right to be forgotten problem: the unfortunate dearth of interdisciplinary scholarship supporting privacy law and regulation.</p>		<p>related to the study since any solutions, products and initiatives will have to provide clarity on this topic.</p>		
32.	<p>M. G. Stawa, 'How is Austria approaching AI integration into judicial policies.'</p>	<p>The document describes the steps taken by Austria to integrate artificial intelligence into processes such as analysing incoming mail, digital file management, analysis of investigation data, anonymisation of court decisions and others.</p>	High	<p>Closely related to this study. The paper analyses the introduction of AI in the justice field by a Member State.</p>	Use cases	AI

33.	A. Ponce, 'A Law on Robotics and Artificial Intelligence in the EU?' <i>SSRN Electron. J.</i> , Jun. 2018.	This paper discusses the European Parliament's Resolution of 16 February 2017 with recommendations to the Commission on Civil Law Rules on Robotics (European Parliament 2017). It provides a brief summary of the content of the Resolution and looks at its basic principles and <i>raison d'être</i> . It also touches on the issue of defining robots and their liability. In so doing, it suggests a twofold shift in the rationale of Parliament's recommendations. Using a prospective approach and taking into consideration the views of scholars who are specialised in analysing robotics and artificial intelligence, this paper proposes that Parliament's recommendations could go further by addressing a much broader spectrum of artificial agents and artificial intelligence, instead of focusing on specific categories of robots. It then looks at the responsibility, visibility and liability of those who have decision-making powers over the design, development and deployment of robots and artificial intelligence, including designers and developers."	High	The article discusses the possible ways for proliferation of Artificial Intelligence (AI) technologies within the society and analyses possible impacts. Furthermore, it address key challenges regarding possible regulation of new technologies.	Legal and ethical implications	AI
34.	K. S. Gill, 'Data to Decision and Judgment Making – a Question of Wisdom,' <i>IFAC-PapersOnLine</i> , vol. 51,	The technological waves of super artificial intelligence, big data, algorithms, and machine learning continue to impact our thinking and actions, thereby	High	The paper is important from the ethical aspect of societies. It provides a	Legal and ethical implications	AI

	no. 30, pp. 733–738, Jan. 2018.	affecting the ways individuals, professions and institutions make judgments. On the one hand, there is an argument that more data and knowledge together with the cyber physical system of industry4.0 will automatically push society along some track toward a better world for all. On the other hand, we hear worrying voices of the imponderable downsides of powerful new cyber-, bio-, Nano-technologies, and synthetic biology. In the age of uncertainties, big data and the algorithm, how is the decision and judgment making process being affected?		perspective, which could be considered in the design of an AI project related to the justice field. It involves the data handling aspects during a decision and judgement making process.		
35.	M. Doumpos and C. Zopounidis, 'Computational Intelligence Techniques for Multicriteria Decision Aiding: An Overview,' in <i>Multicriteria Decision Aid and Artificial Intelligence</i> , John Wiley and Sons, 2013, pp. 1–23.	This chapter focuses on computational intelligence, which has emerged as a distinct sub-field of artificial intelligence involved in the study of adaptive mechanisms aiming to enable intelligent behaviour in complex and changing environments. It provides an overview of the main contributions of popular computational intelligence approaches in multicriteria decision aid (MCDA), covering areas such as multiobjective optimisation, preference modelling, and model building through preference disaggregation. The first section of the chapter presents an introduction to the MCDA paradigm, its main concepts and methodological streams.	High	The paper is important from the perspective of providing insight on the aspects of decision-making from intelligent systems. The Multicriteria Decision Aid and artificial intelligence even though not directly coupled with the justice field, it could be considered as a reference in discussions and furthering the research.	Use cases	AI

		The second section is devoted to the overview of the connections between MCDA and computational intelligence, focusing on three main fields of computational intelligence, namely statistical learning/data mining, fuzzy set theory, and metaheuristics. The chapter concludes with some future research directions.				
36.	D. Carneiro, P. Novais, and J. Neves, 'Using Artificial Intelligence in Online Dispute Resolution,' 2014, pp. 61–96.	Artificial intelligence is currently an umbrella for a wide range of scientific sub-fields, with application domains that span many different areas such as aviation, city planning, traffic management or disease diagnosis, just to name a few. Knowledge-based domains are especially suited to be dealt with by approaches from artificial intelligence that enable to learn, infer or reason in an automated way. Thus, the intersection of artificial intelligence and the law comes as no surprise. This chapter is dedicated to this intersection. It starts by analysing a large number of classical artificial intelligence sub-fields, pointing out how each one can or could improve the current state of affairs in conflict resolution. Then, it focuses on one particularly interesting yet unexplored sub-field: ambient intelligence. A scenario of its potential uses is laid out and clearly points out the innovation considered. The	High	Directly related in the field of justice and AI.	Use cases	AI

		chapter ends with a critical analysis of the current state of affairs in the intersection of artificial intelligence and the law.				
37.	M. Butterworth, 'The ICO and artificial intelligence: The role of fairness in the GDPR framework,' <i>Comput. Law Secur. Rev.</i> , vol. 34, no. 2, pp. 257-268, Apr. 2018.	The year 2017 has seen many EU and UK legislative initiatives and proposals to consider and address the impact of artificial intelligence on society, covering questions of liability, legal personality and other ethical and legal issues, including in the context of data processing. In March 2017, the Information Commissioner's Office (UK) updated its big data guidance to address the development of artificial intelligence and machine learning, and to provide (GDPR), which will apply from 25 May 2018. This paper situates the ICO's guidance in the context of wider legal and ethical considerations and provides a critique of the position adopted by the ICO. On the ICO's analysis, the key challenge for artificial intelligence processing personal data are in establishing that such processing is fair. This shift reflects the potential for artificial intelligence to have negative social consequences (whether intended or unintended) that are not otherwise addressed by the GDPR. The question of 'fairness' is an important one, to address the imbalance between big data	High	The paper touches upon the ethical part of AI and GDPR, specifically the fairness part.	Legal and ethical implications; Personal data protection	AI

		organisations and individual data subjects, with a number of ethical and social impacts that need to be evaluated.				
38.	S. Tolan, M. Miron, E. Gómez, and C. Castillo, 'Why Machine Learning May Lead to Unfairness,' 2019, pp. 83–92.	In this paper the authors study the limitations of Machine Learning (ML) algorithms for predicting juvenile recidivism. Particularly, they are interested in analysing the trade-off between predictive performance and fairness. To that extent, we evaluate fairness of ML models in conjunction with SAVRY, a structured professional risk assessment framework, on a novel dataset originated in Catalonia. In terms of accuracy on the prediction of recidivism, the ML models slightly outperform SAVRY; the results improve with more data or more features available for training (AUCROC of 0.64 with SAVRY vs AUCROC of 0.71 with ML models). However, across three fairness metrics used in other studies, we find that SAVRY is in general fair, while the ML models tend to discriminate against male defendants, foreigners, or people of specific national groups. For instance, foreigners who did not reoffend are almost twice as likely to be wrongly classified as high risk by ML models than Spanish nationals. Finally, the paper discusses potential sources of this unfairness and provides explanations for them, by	High	The document assesses ML algorithms predicting criminal behaviour. Cf. summary	Other	AI

		combining ML interpretability techniques with a thorough data analysis. The findings provide an explanation for why ML techniques lead to unfairness in data-driven risk assessment, even when protected attributes are not used in training.				
39.	S. Danziger, J. Levav, and L. Avnaim-Pesso, 'Extraneous factors in judicial decisions,' Proc. Natl. Acad. Sci. U. S. A., vol. 108, no. 17, pp. 6889–6892, Apr. 2011.	Are judicial rulings based solely on laws and facts? Legal formalism holds that judges apply legal reasons to the facts of a case in a rational, mechanical, and deliberative manner. In contrast, legal realists argue that the rational application of legal reasons does not sufficiently explain the decisions of judges and that psychological, political, and social factors influence judicial rulings. We test the common caricature of realism that justice is 'what the judge ate for breakfast' in sequential parole decisions made by experienced judges. We record the judges' two daily food breaks, which result in segmenting the deliberations of the day into three distinct 'decision sessions.' We find that the percentage of favourable rulings drops gradually from $\approx 65\%$ to nearly zero within each decision session and returns abruptly to $\approx 65\%$ after a break. Our findings suggest that judicial rulings can be swayed by extraneous variables that	High	Discussing factors that suggest subjective nature of a judicial ruling and not a ruling, which is purely based on the letter of law and the facts of a case. This indirectly relates to artificial intelligence and the factors which may influence its accuracy in predicting the outcome of a ruling.	Legal and ethical implications	AI

		should have no bearing on legal decisions.				
40.	Alfter Br., Müller-Eiselt, R., and Spielkamp M. 'Automating Society - Taking Stock of Automated Decision-Making in the EU', AlgorithmWatch, 1 st edition, January 2019.	The document analyses automated decision-making (ADM) systems in the EU that affect justice, equality, participation and public welfare, either directly or indirectly.	High	Cf. summary	Legal and ethical implications	AI
41.	B. L. T. Sturm, M. Iglesias, O. Ben-Tal, M. Miron and E. Gómez, 'Artificial Intelligence and Music: Open Questions of Copyright Law and Engineering Praxis,' Arts, vol. 8, no. 3, p. 115, 6 9 2019.	The application of artificial intelligence (AI) to music stretches back many decades, and presents numerous unique opportunities for a variety of uses, such as the recommendation of recorded music from massive commercial archives, or the (semi-)automated creation of music. Due to unparalleled access to music data and effective learning algorithms running on high-powered computational hardware, AI is now producing surprising outcomes in a domain fully entrenched in human creativity—not to mention a revenue source around the globe. These developments call for a close inspection of what is occurring, and consideration of how it is changing and can change our relationship with music for better and for worse. This article looks at AI applied to music from two perspectives: copyright law and engineering praxis. It grounds its discussion in the development and use of a	High	Address specific legal implications regarding the intellectual property law and AI.	Legal and ethical implications	AI

		specific application of AI in music creation, which raises further and unanticipated questions. Most of the questions collected in this article are open as their answers are not yet clear at this time, but they are nonetheless important to consider as AI technologies develop and are applied more widely to music, not to mention other domains centred on human creativity.				
42.	PHRP Expert Meeting on Predictive Policing, R. Richardson, 'Place-Oriented Predictive Policing Data quality'.	The article analyses possible answers to questions related to the impact the use of a predictive technology can have on human rights with regard to data protection and the right to privacy, the right to liberty and security, freedom from discrimination, the right to a fair trial and effective remedy, etc. The article aims to present a profound view on the impact on human rights resulting from the use of innovative technologies (AI) related to the accuracy of the outputs, possible discriminating biases in the underlying data sets and the model using the data, and their effectiveness to actually predict crime. ²⁷¹	High	Cf. summary	Legal and ethical implications	AI

²⁷¹ Summary proposed by the contractor.

43.	P. Nemitz, Constitutional democracy and technology in the age of artificial intelligence, vol. 376, Royal Society Publishing, 2018.	Given the foreseeable pervasiveness of artificial intelligence (AI) in modern societies, it is legitimate and necessary to ask the question how this new technology must be shaped to support the maintenance and strengthening of constitutional democracy. This paper first describes the four core elements of today's digital power concentration, which need to be seen in cumulation and which, seen together, are both a threat to democracy and to functioning markets. It then recalls the experience with the lawless Internet and the relationship between technology and the law as it has developed in the Internet economy and the experience with GDPR before it moves on to the key question for AI in democracy, namely which of the challenges of AI can be safely and with good conscience left to ethics, and which challenges of AI need to be addressed by rules which are enforceable and encompass the legitimacy of democratic process, thus laws. The paper closes with a call for a new culture of incorporating the principles of democracy, rule of law and human rights by design in AI and a three-level technological impact assessment for new technologies like AI as a	High	Cf. summary	Legal and ethical implications, democracy	AI
-----	---	---	------	-------------	---	----

		practical way forward for this purpose. This article is part of a theme issue 'Governing artificial intelligence: ethical, legal, and technical opportunities and challenges'.				
44.	F. -European Union Agency for Fundamental Rights, 'Facial recognition technology: fundamental rights considerations in the context of law enforcement'.	Facial recognition technology (FRT) makes it possible to compare digital facial images to determine whether they are of the same person. Comparing footage obtained from video cameras (CCTV) with images in databases is referred to as 'live facial recognition technology'. Examples of national law enforcement authorities in the EU using such technology are sparse but several are testing its potential. This paper therefore looks at the fundamental rights implications of relying on live FRT, focusing on its use for law enforcement and border-management purposes. EU law recognises as 'sensitive data' people's facial images, which are a form of biometric data. But such images are also quite easy to capture in public places. Although the accuracy of matches is improving, the risk of errors remains real, particularly for certain minority groups. Moreover, people whose images are captured and processed might not know this is happening and so cannot challenge possible misuses. The paper outlines and analyses	High	Cf. summary	Personal data protection, Fundamental rights, Legal and ethical implications	AI

		these and other fundamental rights challenges that are triggered when public authorities deploy live FRT for law enforcement purposes. It also briefly presents steps to take to help avoid rights violations.				
45.	F. – European Union Agency for Fundamental Rights, 'Data quality and artificial intelligence-mitigating bias and error to protect fundamental rights'	The paper discusses the notion of bias in the training data among other aspects. It describes the way data are being collected by businesses for data analysis aiming at business growth. It emphasises the discrepancies in the data depending on the medium they are collected with. For example, data gathering from the internet is not a very efficient way to do so since there are specific groups that do not have access to it. The same goes for social media as many people choose not to use them and as such, the data inevitably have a bias. This is particularly noticeable for households with low income that either do not have internet access. Furthermore, the paper uses examples of biased results when low quality data are used in the training process of the AI systems. Low quality could affect the access to a fair trial.	High	The paper is part of the project work of the European Fundamental Rights Agency on Artificial Intelligence and big data.	Personal data protection, Fundamental rights, Legal and ethical implications	AI
46.	F. – European Union Agency for Fundamental Rights, '#BigData: Discrimination in data-supported decision-making'.	This focus paper specifically deals with discrimination, a fundamental rights area particularly affected by technological developments. When algorithms are used for	High	Cf. summary	Personal data protection, Fundamental rights, Legal and ethical implications	AI

		<p>decision-making, there is potential for discrimination against individuals. The principle of non-discrimination, as enshrined in Article 21 of the Charter of Fundamental Rights of the European Union (EU), needs to be taken into account when applying algorithms to everyday life. This paper explains how such discrimination can occur, suggesting possible solutions. The overall aim is to contribute to our understanding of the challenges encountered in this increasingly important field.</p>				
47.	<p>M. Moiariková, 'Using artificial intelligence in online dispute resolution', Masaryk University, Brno 2018.</p>	<p>Artificial intelligence (AI) offers several features, such as learning, reasoning, problem solving, that the legal domain can benefit from. Litigation is becoming outdated and resolving disputes online is faster, cheaper and more comfortable. Although mainly used in e-commerce, Online Dispute Resolution (ODR) can be applied in other legal fields as well, among others in a division of community property during a divorce. First, the paper describes the types of ODR processes and procedures, especially the two most commonly used ones – negotiation and mediation; as well as AI techniques applied in ODR. Subsequently, it explains the law perspective of community property division in</p>	High	<p>The paper is a master's thesis which represents an extensive research into the ODR subject and AI, providing a concrete use case description in the field of family law and distribution of assets between the parties to a divorce in the Czech Republic, demonstrating that ODR can be applied in different fields of law, although initially conceived for e-commerce disputes.</p>	<p>Online dispute resolution, legal implications, use case description</p>	AI

		<p>the Czech Republic and introduces the current projects used in family law. Afterwards, the paper designs a process for community property settlement to help divide the community property and create an agreement between the parties using online negotiation. The process also assists mediators in online mediation. Different algorithms using game theory and fuzzy logic are implemented to allocate the assets to the parties. The paper provides a web application to present the process. Finally, it applies the process to a real-life scenario and compare the results with the results from similar systems – Adjusted Winner and Asset Divider.</p>				
48.	<p>G. Hallevy, <i>'Liability for Crimes Involving Artificial Intelligence Systems'</i>, (Springer 2015).</p>	<p>The idea of liability for crimes involving artificial intelligence systems has not been widely researched yet. Advanced technology makes society face new challenges, not only technological, but legal as well. The idea of criminal liability in the specific context of artificial intelligence systems is one of these challenges that should be thoroughly explored. The main question is who should be criminally liable for offences involving artificial intelligence systems. The answer may include the programmers, the manufacturers, the users, and,</p>	High	<p>The book is about how in the future AI could impact criminal law.</p>	Horizontal framework	AI

		perhaps, the artificial intelligence system itself.				
49.	G. Hallevy, 'The Basic Models of Criminal Liability of AI Systems and Outer Circles' (2019).	The way humans cope with breaches of legal order is through criminal law, operated by the criminal justice system. Accordingly, human societies define criminal offences and operate social mechanisms to apply them. This is how criminal law works. Originally, this way has been designed by humans and for humans. However, as technology has developed, criminal offences are committed not only by humans. The major development in this issue has occurred in the 17th century. In the 21st century criminal law is required to supply adequate solutions for commission of criminal offences through artificial intelligence (AI) entities. Basically, there are three fundamental models to cope with this phenomenon within the current definitions of criminal law. These models are presented hereinafter.	High	This article discusses criminal liability and its implication on AI.	Legal and ethical implications (criminal law)	AI
50.	S. Gless et al., 'If Robots Cause Harm, Who Is to Blame: Self-Driving Cars and Criminal Liability', 2016. <i>New Criminal Law Review</i> , Volume 19, Issue 3, p. 412.	The fact that robots, especially self-driving cars, have become part of our daily lives raises novel issues in criminal law. Robots can malfunction and cause serious harm. But as things stand today, they are not suitable recipients of criminal punishment, mainly because they cannot conceive of themselves as morally responsible agents and because	High	Touches upon the future impact on criminal law.	Legal and ethical implications (criminal law impact)	AI

		they cannot understand the concept of retributive punishment. Humans who produce, program, market and employ robots are subject to criminal liability for intentional crime if they knowingly use a robot to cause harm to others. A person who allows a self-teaching robot to interact with humans can foresee that the robot might get out of control and cause harm. This fact alone may give rise to negligence liability. In light of the overall social benefits associated with the use of many of today's robots. However, the authors argue in favour of limiting the criminal liability of operators to situations where they neglect to undertake reasonable measures to control the risks emanating from robots.				
51.	S. Gless, 'Working Paper II. Document prepared for the 1 st meeting of the Working Group of Experts on Artificial Intelligence and Criminal Law' (2019).	The Working Paper is a proposal from the European Committee on Crime Problems (CDPC) from the Council of Europe. The working Group of Experts (Group) proposes to analyse the impact, using artificial intelligence (AI) on criminal justice.	High	The paper is part of the horizontal framework and directly relates to the study by analysing the impact of AI on criminal justice.	Horizontal; Criminal law	AI
52.	U. Pagallo and S. Quattrocchio, 'The impact of AI on criminal law, and its twofold procedures', in W. Barfield and U. Pagallo (eds.)	The aim of the chapter is to examine current trends of AI that may affect the tenets of the criminal law field. By ascertaining whether, and to what extent, the increasing autonomy of AI decision-making can affect such tenets of	High	General approach on the criminal law	Legal and ethical implications (criminal law)	AI

		<p>this field, as the notion of an agent’s culpability (i.e. its means rea), vis-à-vis matters of criminal conduct (i.e. the actus reus), a further differentiation appears critical: AI technology can be used either for law enforcement purposes, or for committing (new kinds of) crimes. The analysis is correspondingly divided into two parts. On the one hand, focus is restricted upon the risks of using AI-based evidence in criminal proceedings. More particularly, attention is drawn to Articles 6 and 8 of the European Convention on Human Rights (‘ECHR’). On the other hand, the chapter scrutinises whether an increasing set of decisions taken by smart robots and AI systems may already fall within the loopholes of the system. The overall aim is to show that current provisions of criminal law, such as the ECHR’s rules, can properly tackle the normative challenges of AI as a means for law enforcement purposes and yet, the primary rules of the law that intend to directly govern individual and social behaviour do not cover some of the new cases brought on by the use of the technology under examination. The lacunae that follow as a result suggest that we should take into account a different set of norms and procedures, namely, the</p>				
--	--	--	--	--	--	--

		secondary rules of change that permit to create, modify, or suppress the primary rules of the system. Current developments of AI do not only cast light on the resilience of today's criminal law systems and the principle of legality, but also on basic categories of jurisprudence and its European counterpart, that is, the 'general theory of law.'				
53.	Završnik, 'Algorithmic justice: Algorithms and big data in criminal justice settings' (2019), <i>European Journal of Criminology</i> .	<p>The article focuses on big data, algorithmic analytics and machine learning in criminal justice settings, where mathematics is offering a new language for understanding and responding to crime. It shows how these new tools are blurring contemporary regulatory boundaries, undercutting the safeguards built into regulatory regimes, and abolishing subjectivity and case-specific narratives.</p> <p>After presenting the context for 'algorithmic justice' and existing research, the article shows how specific uses of big data and algorithms change knowledge production regarding crime. It then examines how a specific understanding of crime and acting upon such knowledge violates established criminal procedure rules. It concludes with a discussion of the socio-political context of algorithmic justice.</p>	High	This article debates on criminal justice and the impact of big data, algorithmic analytics and machine learning on that field of justice.	Horizontal; Criminal law	AI

54.	<p>P. Perrot, <i>'What about AI in criminal intelligence? From predictive policing to AI perspectives'</i>. No.16(2017), European Police Science and Research Bulletin.</p>	<p>Predictive policing is more and more developed around the world. TV-shows and fictions such as 'the minority report' or 'Person of Interest' spread a pre-crime effect that is, nevertheless, very different from reality. Many law enforcement bodies develop predictive analysis to find new opportunities against crime and it is generally dedicated to patrols. The Gendarmerie nationale in France carried out, through the concept of criminal intelligence, a way to provide relevant information to describe, understand and foresee crime at different scales: operational, tactic and strategic. The aim is to upgrade the process of decision-making. Because crime is neither a random process nor a deterministic process, some features exist to characterise it. Obviously, it is very difficult and probably not possible to identify all features linked to crime evolution or criminal behaviour. Nevertheless, some characteristics are not so complicated to model in a formal mathematical structure. So in the age of big data, applications of predictive analysis can be overtaken by artificial intelligence (AI). It is very developed in fields like medicine, finance or transportation and could on the</p>	High	<p>The article develops on predictive policing and analysis and the challenges to be faces by law enforcement bodies.</p>	Criminal justice	AI
-----	---	--	------	---	------------------	----

		<p>one hand provide new perspectives to fight crime but also on the other, raise questions for future. Who will be the next organisation able to assure the best way to anticipate crime and criminal behaviour? AI could be defined as the capacity of a computer to model human reasoning. A grand challenge is opened for law enforcement but only if they are able to adapt their way of working in this new era. The scope of this paper is to describe France's development in predictive analysis and to open the potential use of artificial intelligence in different areas of criminal intelligence without avoiding the risk of its new development.</p>				
55.	<p>Carolyn McKay, <i>'Predicting risk in criminal procedure: actuarial tools, algorithms, AI and judicial decision-making'</i>, The University of Sydney Law School, November 2019.</p>	<p>Risk assessments are conducted at a number of decision points in criminal procedure including bail, sentencing and parole as well as in determining extended supervision and continuing detention orders of high-risk offenders. Such risk assessments have traditionally been the function of human discretion and intuition of judicial officers based on clinical assessments, framed by legislation and common law principles, and encapsulated the concept of individualised justice. Yet the progressive technologisation of criminal procedures is witnessing the</p>	High	<p>The paper describes a range of predictive, diagnostic tools, whose results have been used to assist the human expertise in assessing the risk of recidivism in criminal cases.</p>	Criminal justice	AI

		incursion of statistical, data-driven evaluations of risk. Human judicial evaluative functions are increasingly complemented by a range of actuarial, algorithmic, machine learning and artificial intelligence (AI) tools that purport to provide accurate predictive capabilities, and objective, consistent risk assessments. But ethical concerns have been raised globally regarding algorithms as proprietary products with in-built statistical bias as well as the diminution of judicial human evaluation in favour of the machine. This article focuses on risk assessment and what happens when decision-making is delegated to a predictive tool. Specifically, this article scrutinises the inscrutable proprietary nature of such risk tools and how that may render the calculation of the risk score opaque and unknowable to both the offender and the court.				
56.	Zeleznikow, John. 'Can Artificial Intelligence and Online Dispute Resolution Enhance Efficiency and Effectiveness in Courts?' International Journal for Court Administration, 2017.	The article analyses the impact of self-representation of litigants on the justice field. It describes the steps taken towards a better and fair access to justice by people that cannot afford representation or choose to exercise their right to not have a lawyer. It then focuses on the impact of online dispute resolution tools.	High	Provides concrete use cases of AI in the justice field and analysis thereof.	Online dispute resolution	AI

57.	C. Prins, 'Digital justice,' <i>Comput. Law Secur. Rev.</i> , vol. 34, no. 4, pp. 920–923, Aug. 2018.	In a period of growing suspicion about the power of digital technology and 'tech companies', this short comment aspires to argue that the conditions for the functioning of the constitutional state contain an inherent obligation for the state not only to be sufficiently sensitive to the changes brought about by digitisation, but also to make use of digitisation. A key condition for the functioning of the constitutional state is, for example, that the judiciary is capable of fully implementing its task of affording legal protection. Reinterpreting this condition in the modern age implies that courts should remain explicitly vigilant when it comes to digitisation. Hence, affording protection is not only a question of what makes formal regulation in a digital world different from regulation in the well-known offline world. If the constitutional state is to be capable of implementing its task of affording legal protection, it must also be sufficiently sensitive to the changes brought about by digitisation, as well as deploy the potential that digitisation offers.	Medium	The paper talks about the approach courts should take in the digitisation of the justice field. It is relevant since it touches upon subjects such as data protection, a person's right to control his data and briefly on the use of AI in predictive analytics.	Personal data protection; Legal and ethical aspects	AI
58.	A. Kaplan and M. Haenlein, 'Siri, Siri, in my hand: Who's the fairest in the land? On	Artificial intelligence (AI) – defined as a system's ability to correctly interpret external data, to learn from such data,	Medium	This paper clarifies through a series of case studies the	Horizontal, Use cases, Other	AI

	<p>the interpretations, illustrations, and implications of artificial intelligence,' <i>Business Horizons</i>, vol. 62, no. 1. Elsevier Ltd, pp. 15-25, 01-Jan-2019.</p>	<p>and to use those learnings to achieve specific goals and tasks through flexible adaptation—is a topic in nearly every boardroom and at many dinner tables. Yet despite this prominence, AI is still a surprisingly fuzzy concept and a lot of questions surrounding it are still open. In this article, we analyse how AI is different from related concepts, such as the Internet of Things and big data, and suggest that AI is not one monolithic term but instead needs to be seen in a more nuanced way. This can either be achieved by looking at AI through the lens of evolutionary stages (artificial narrow intelligence, artificial general intelligence, and artificial super intelligence) or by focusing on different types of AI systems (analytical AI, human-inspired AI, and humanised AI). Based on this classification, we show the potential and risk of AI using a series of case studies regarding universities, corporations, and governments. Finally, we present a framework that helps organisations think about the internal and external implications of AI, which we label the Three C Model of Confidence, Change, and Control.</p>		<p>usability of AI in general.</p>		
59.	<p>F. Jansen, 'Data Driven Policing in the Context of Europe,' 2018.</p>	<p>This report provides an overview of the data-driven policing technologies currently</p>	<p>Medium</p>	<p>The paper is important from the aspect of</p>	<p>Use cases</p>	<p>AI</p>

		being integrated into European police forces. It looks at the following four data-driven policing trends: expansion of police databases, implementation of real-time identification systems, use of predictive policing technology and the analysis of heterogeneous datasets. The report offers a non-exhaustive list of programs, primarily identified in western and northern parts of Europe.		cybersecurity, a very important factor in any digitalisation approach.		
60.	H. Habibzadeh, B. H. Nussbaum, F. Anjomshoa, B. Kantarci, and T. Soyata, 'A Survey on Cybersecurity, Data Privacy, and Policy Issues in Cyber-Physical System Deployments in Smart Cities,' <i>Sustain. Cities Soc.</i> , Jun. 2019.	Deployments of cyber physical systems (CPSs) in smart cities are poised to significantly improve healthcare, transportation services, utilities, safety, and environmental health. However, these efficiencies and service improvements will come at a price: increased vulnerability and risk. Smart city deployments have already begun to proliferate, as have the upsides, efficiencies, and cost-savings they can facilitate. There are, however, proliferating challenges and costs as well. These challenges include important technical questions, but equally important policy and organisational questions. It is important to understand that these policy and technical implementation hurdles are perhaps equally likely to slow or disable smart city	Medium	The paper is important from the aspect of cybersecurity, which is a very important factor in any digitalisation approach.	Horizontal, Use cases	AI

		implementation efforts. In this paper, a survey of the theoretical and practical challenges and opportunities are enumerated not only in terms of their technical aspects, but also in terms of policy and governance issues of concern.				
61.	T. J. M. Bench-Capon and P. E. Dunne, 'Argumentation in artificial intelligence,' <i>Artif. Intell.</i> , vol. 171, no. 10–15, pp. 619–641, Jul. 2007.	Over the last 10 years, argumentation has come to be increasingly central as a core study within artificial intelligence (AI). The articles forming this volume reflect a variety of important trends, developments, and applications covering a range of current topics relating to the theory and applications of argumentation. The authors' aims in this introduction are, firstly, to place these contributions in the context of the historical foundations of argumentation in AI and, subsequently, to discuss a number of themes that have emerged in recent years resulting in a significant broadening of the areas in which argumentation based methods are used. They begin by presenting a brief overview of the issues of interest within the classical study of argumentation: in particular, its relationship – in terms of both similarities and important differences-to traditional concepts of logical reasoning and mathematical proof. We continue by outlining how a	Medium	Although the paper does not specifically discuss uses of innovative technologies in the justice field or other fields, however, it puts forward some important considerations regarding argumentation, which is a key factor for the purposes of predictive justice.	Other	AI

		number of foundational contributions provided the basis for the formulation of argumentation models and their promotion in AI-related settings and then consider a number of new themes that have emerged in recent years, many of which provide the principal topics of the research presented in this volume.				
62.	Prof. Julia Hörnle, M. Hewitson and Il. Chernohorenko, 'Technical study on online dispute resolution mechanisms', Secretariat Directorate-General of Human Rights and Rule of Law – DGI, CDCJ, Aug. 2018.	The study discusses the trends observed in the Member States of the Council of Europe with regard to the introduction of online dispute resolution (ODR) in their judicial systems or elements thereof. It also provides recommendations for the main points of attention to be taken into consideration when implementing ODR ²⁷² .	Medium	Even though the paper talks about technical aspects for ODR, the information in it is important as a registry of existing solutions where some are using intelligent systems.	Legal and ethical implications; Use cases	AI
63.	Berkman Klein Centre for Internet & Society at Harvard University, Ethics and Governance of Artificial Intelligence Initiative: ' <i>Algorithms and Justice</i> '.	Government institutions around the globe are beginning to explore decision automation in a variety of contexts: from determining eligibility for services to evaluating where to deploy health inspectors and law enforcement personnel, to defining boundaries around voting districts. Use cases for technologies that incorporate AI or machine learning will expand as governments and companies amass larger quantities of data	Medium	The paper discusses the use of AI technology in the decision-making process in the justice field. It provides insights on the algorithmic elements of AI. It does address the notions of Transparency, Bias and others.	Legal and ethical implications	AI

²⁷² Summary prepared by the contractor.

		<p>and analytical tools become more powerful. The criminal justice system offers valuable insight into government use of algorithmic technology. With fallible judges, juries, and lawyers, that system has been rightly criticised for inconsistency and for perpetuating practices that disproportionately harm marginalised groups. The Algorithms and Justice track explores ways in which government institutions incorporate artificial intelligence, algorithms, and machine learning technologies into their decision-making. Our aim is to help the public and private entities that create such tools, state actors that procure and deploy them, and citizens they impact understand how those tools work. We seek to ensure that algorithmic applications are developed and used with an eye toward improving fairness and efficacy without sacrificing values of accountability and transparency.</p>				
64.	<p>Ministry of Economy and Finance of France, DG Trésor, International comparative study « <i>Stratégies nationales en matière d'intelligence artificielle</i> », Nov. 2017.</p>	<p>The document provides a comparative analysis of national strategies in the AI field, including strategies of a number of EU Member States – the UK, Estonia, Italy and Germany. The paper is a result of a question-and-answer exercises conducted with public sector</p>	Medium	<p>The study provides reference on projects and initiatives in a number of EU Member States but does not specifically focus on use of AI in the justice field.</p>	Use cases; Other	AI

		organisations regarding the situation in their country with regards to projects, initiatives, academic research, measures for support of enterprises and training related to AI technologies. ²⁷³				
65.	Datenethikkommission, 'Opinion of the Data Ethics Commission - Executive Summary'.	The document makes specific recommendations planned to be included and/or considered for action in a new national legislation on the use of innovative technologies as AI. It was commissioned by the German Federal Government (GFG) to the Data Ethics Commission (DEC). The GFG proposed as a starting point several questions in three main sections: Algorithm-based decision-making, AI and Data. However, the work was afterwards structured in two main headings instead: Data and Algorithmic Systems, both in a broader sense. The Recommendation is particularly relevant as it suggests standards for the use of personal data. A total of 75 recommendations are presented. ²⁷⁴	Medium	Cf. summary	Legal and ethical implications	AI
66.	Legrain P. and Lee-Makiyama H., 'Ever	The paper proposes ways of boosting the European	Medium	This paper analyses potential usability	Other	AI

²⁷³ Summary prepared by the contractor.

²⁷⁴ Summary prepared by the contractor.

	<p>Cleverer Union: How AI could help EU institutions become more capable, competent, cost-effective and closer to citizens', OPEN, December 2019.</p>	<p>institutions' productivity performance and bringing them closer to the citizens by development and deployment of AI tools. For example, the paper suggests use of chatbots and better data collection and analysis; natural language processing to scan huge volumes of data more promptly and effectively; predictive analytics to facilitate planning and improve forecasting; and cognitive processing to ensure the better use of EU funds.</p>		<p>of AI technologies in the EU institutions in general and not with a particular focus on the justice field. It can, however, be used as a reference for specific uses of AI in the justice domain.</p>		
67.	<p>Algorithm use in the criminal justice system report, The Law Society, UK, August 2017.</p>	<p>The Law Society established the Technology and the Law Policy Commission to examine the use of algorithms in the justice system of England and Wales. This report contains findings and recommendations concerning the use of algorithmic systems in the criminal justice system. The Commission considered a range of currently deployed systems that fell within this brief, including individual risk assessment and recidivism prediction; prospective crime mapping and hot-spotting; and mobile phone data extraction tools. At the most basic level, the Commission has found a lack of explicit standards, best practice, and openness or transparency about the use of algorithmic systems in criminal justice across England and Wales. This was concerning, as</p>	Medium	Cf. summary	Legal and ethical implications; use cases	AI

		the high-stakes decisions and measures taken in the justice system demand extremely careful deployment. There are significant challenges of bias and discrimination, opacity and due process, consistency, amenability to scrutiny, effectiveness, and disregard of qualitative and contextual factors, against a backdrop of the potential of these systems to more deeply change the nature of the evolution of the law. The Commission recommends that a National Register of Algorithmic Systems should be created as a crucial initial scaffold for further openness, cross-sector learning and scrutiny.				
68.	DG HOME background document 'Creating data spaces for law enforcement', (not official).	The document is an unofficial draft provided by one of the stakeholders in the present study. It describes strategic steps to be taken towards creating data lakes as possible models for common infrastructure for law enforcement data.	Medium	Unofficial draft document	Legal and ethical implications	AI/DLT
69.	DG HOME background document, 'Artificial intelligence for optimising security and operational efficiency', (not official).	The document is an unofficial draft provided by one of the stakeholders in the present study. It presents the results of a study on AI in the law enforcement field, including some specific use cases in several Member States.	Medium	Unofficial draft document, however, the presented use cases are taken into account in the study.	Legal and ethical implications	AI
70.	Agreement between the United States of America and the European Union	The agreement complements rules regarding personal data	Medium	Part of the horizontal legal framework on data	Horizontal legal framework, Data protection	AI/DLT

	on the protection of personal information relating to the prevention, investigation, detection, and prosecution of criminal offences, OJ L 336, 10.12.2016, p. 3-13.	protection in existing EU/EU country-US agreements, and in national laws, that authorise the exchange of information for law enforcement purposes. It establishes a common data protection framework which will also apply to future agreements and national laws in this field. The agreement covers all personal data (including names, addresses, and criminal records) exchanged between the EU and the US for the purpose of the prevention, detection, investigation and prosecution of criminal offences, including terrorism. It provides greater legal certainty and strengthens the rights of the individuals concerned by the transfer of their data.		protection, however, not part of the EU data protection package, which is categorised with high relevance for this study.		
71.	Lawtech Adoption Research Report, The Law Society, UK, 2019.	The Law Society has published its Lawtech Adoption Research report, which shows a rise in the number of lawtech companies in recent years. However, this increase is not reflected in the rate of lawtech adoption among legal practitioners. The research explores what types of lawtech providers are gaining traction in different sectors of the profession and the drivers behind this, with a view to how adoption rates might impact the future shape of legal process and delivery.	Medium	Cf. summary	Legal and ethical implications; use cases	AI/DLT
72.	Technology, Access to Justice and the rule of law: is technology the	The Law Society conducted research to explore whether technology is the key to	Medium	The paper does not directly discuss specific use cases of	Legal and ethical implications; use cases	AI/DLT

	key to unlocking access to justice innovation?, The Law Society, UK, 2018.	improve access to law, justice and rights. Based on an assessment of 50 initiatives, qualitative interviews with more than 45 stakeholders, and an academic literature review, they found that, while it certainly has a role, technology is not the silver bullet to making the justice and legal system more accessible.		innovative technologies in the justice field. However, it discusses common barriers to access to justice, law and rights, which can be used as 'inspiration' for further policy action.		
73.	S. K. Ötting and G. W. Maier, 'The importance of procedural justice in Human-Machine Interactions: Intelligent systems as new decision agents in organisations,' <i>Comput. Human Behav.</i> , vol. 89, pp. 27-39, Dec. 2018.	In the present study, the effects of procedural justice (fair or unfair) and the type of decision agent (human, robot, or computer) on employee behaviour and attitudes (e.g. job satisfaction, organisational citizenship behaviour, or counterproductive work behaviour) were examined. It was predicted that the type of decision agent (or the source of justice) would moderate the relationship between procedural justice and employee behaviour and attitudes, with the relationship being strongest when the decision agent is a human team leader, medium when the decision agent is a humanoid robot, and weakest when the agent is a computer system. This research question was investigated with a between-subjects design in two experiments (N 1 = 149 and N 2 = 145) that displayed two different decision situations in organisations (allocation of new tasks and allocation of further	Low	The paper addresses the notion of decision agent on the fairness of an employee's procedural justice. It is related to the study since it does imply the use of intelligent machine in making decisions. Despite the interesting topic of the paper, this study is more on the justice field in terms of law and court proceedings rather than the assessment of an agent decision-making result in an organisation that has employees.	Use case	AI

		<p>vocational training courses). Results of both studies showed significant effects of procedural justice on employee behaviour and attitudes, confirming the importance of procedural justice at the workplace for both human and system decision agents. Furthermore, both studies failed to verify any interaction effects of procedural justice and the decision agent. This further emphasises the importance of procedural justice in decision situations because there is no difference in reactions to procedural justice of human or system decisions. Limitations and implications for future research and the integration of justice and human-machine interaction research are discussed.</p>				
74.	<p>D. J. Olsher, 'New Artificial Intelligence Tools for Deep Conflict Resolution and Humanitarian Response,' in <i>Procedia Engineering</i>, 2015, vol. 107, pp. 282-292.</p>	<p>Truly understanding what others need and want, how they see the world, and how they feel are core prerequisites for successful conflict resolution and humanitarian response. Today, however, human cognitive limitations, insufficient expertise in the right hands, and difficulty in managing complex social, conflict, and real-world knowledge conspire to prevent us from reaching our ultimate potential. This paper introduces cogSolv, a highly novel Artificial Intelligence system capable of understanding how people from</p>	Low	<p>This paper introduces a new system for conflict resolution but it does not discuss uses of innovative technologies in the justice field or other fields. However it puts forward some important considerations, primarily of technical nature, that could have an impact on future AI projects implemented by</p>	Use case	AI

		<p>other groups view the world, simulating their reactions, and combining this with knowledge of the real world in order to persuade, find negotiation win-wins and enhance outcomes, avoid offence, provide peacekeeping decision tools, and protect emergency responders' health. CogSolv allows governments and local NGOs to use expert culture and conflict resolution knowledge to accurately perform a wide range of humanitarian simulations. cogSolv assists responders with training, managing complexity, centralising and sharing knowledge, and, ultimately, maximising the potential for equitable conflict resolution and maximally effective humanitarian response.</p>		Member States' authorities.		
75.	<p>M. Mourby et al., 'Are 'pseudonymised' data always personal data? Implications of the GDPR for administrative data research in the UK,' <i>Comput. Law Secur. Rev.</i>, vol. 34, no. 2, pp. 222–233, Apr. 2018.</p>	<p>There has naturally been a good deal of discussion of the forthcoming General Data Protection Regulation. One issue of interest to all data controllers, and of particular concern for researchers, is whether the GDPR expands the scope of personal data through the introduction of the term 'pseudonymisation' in Article 4(5). If all data, which have been 'pseudonymised' in the conventional sense of the word (e.g. key-coded), are to be treated as personal data, this would have serious implications for research. Administrative</p>	Low	<p>The paper does not discuss uses of innovative technologies in the justice field or other fields. However it puts forward some important considerations related to pseudonymised data and GDPR, that could be taken in regard in future AI projects implemented by Member States' authorities.</p>	Personal data protection	AI

		<p>data research, which is carried out on data routinely collected and held by public authorities, would be particularly affected as the sharing of de-identified data could constitute the unconsented disclosure of identifiable information. Instead, however, we argue that the definition of pseudonymisation in Article 4(5) GDPR will not expand the category of personal data, and that there is no intention that it should do so. The definition of pseudonymisation under the GDPR is not intended to determine whether data are personal data; indeed, it is clear that all data falling within this definition are personal data. Rather, it is Recital 26 and its requirement of a 'means reasonably likely to be used', which remains the relevant test as to whether data are personal. This leaves open the possibility that data, which have been 'pseudonymised' in the conventional sense of key coding can still, be rendered anonymous. There may also be circumstances in which data, which have undergone pseudonymisation within one organisation, could be anonymous for a third party. We explain how, with reference to the data environment factors as set out in the UK Anonymisation</p>				
--	--	---	--	--	--	--

		Network's Anonymisation Decision-Making Framework.				
76.	L. H. Yang, Y. M. Wang, and Y. G. Fu, 'A consistency analysis-based rule activation method for extended belief-rule-based systems,' Inf. Sci. (Ny), 2018.	Problems with inconsistency and incompleteness are widely found in rule-based decision support systems. These problems often impact the accuracy and usability of rule-based decision support systems. The present work focuses on an advanced rule-based decision support system, namely the extended belief-rule-based (EBRB) system, and proposes the consistency analysis-based rule activation (CABRA) method to overcome the above two problems simultaneously.	Low	The paper does not discuss uses of innovative technologies in the justice field or other fields. However it puts forward some important considerations, primarily from technical nature, such as algorithmic rule-based techniques and methods that could be taken in regard in future AI projects implemented by Member States' authorities.	Other	AI
77.	M. Li, 'A Rule-Based Real-Time AI Problem Solving Mechanism,' IFAC Proc. Vol., 1998.	Rule-based systems, also called production systems, are one of the most well-known general AI problem-solving mechanisms and have been widely used to build AI problem-solving systems. However, their adaptation to real-time application environments has been proven to be a formidable task. Based on an analysis of the major deficiencies in rule-based systems, which make them unsuitable for real-time applications, this paper presents a rule-based real-time AI problem solving mechanism - Function Module System (FMS)	Low	<i>Ut supra</i>	Other	AI

		and introduces an application example.				
78.	S. Vashishtha and S. Susan, 'Fuzzy rule-based unsupervised sentiment analysis from social media posts,' Expert Syst. Appl., 2019.	In this paper, we compute the sentiment of social media posts using a novel set of fuzzy rules involving multiple lexicons and datasets. The proposed fuzzy system integrates natural language processing (NLP) techniques and Word Sense Disambiguation using a novel unsupervised nine fuzzy rule-based system to classify the post into: positive, negative or neutral sentiment class. We perform a comparative analysis of our method on nine public twitter datasets, three sentiment lexicons, and four state-of-the-art approaches for unsupervised Sentiment Analysis and one state-of-the-art method for supervised machine learning. Traditionally, Sentiment Analysis of twitter data are performed using a single lexicon. Our results can give an insight to researchers to choose which lexicon is best for social media. The fusion of fuzzy logic with lexicons for sentiment classification provides a new paradigm in Sentiment Analysis. Our method can be adapted to any lexicon and any dataset (two-class or three-class sentiment). The experiments on benchmark datasets yield higher performance for our approach	Low	<i>Ut supra</i>	Other	AI

		as compared to the state-of-the-art.				
79.	R. Clarke, 'Regulatory alternatives for AI,' <i>Comput. Law Secur. Rev.</i> , 2019.	Artificial Intelligence (AI) is enjoying another of its periodic surges in popularity. To the extent that the current promises are fulfilled, AI may deliver considerable benefits. Whether or not it does so, however, AI harbours substantial threats. The first article in this series examined those threats. The second article presented a set of Principles and a business process whereby organisations can approach AI in a responsible manner. Given how impactful AI is expected to be, and the very low likelihood that all organisations will act responsibly, it is essential that an appropriate regulatory regime be applied to AI. This article reviews key regulatory concepts and considers each of the various forms that regulatory schemes can take. Given the technical and political complexities and the intensity of the threats, co-regulation is proposed as the most appropriate approach. This involves the establishment of a legislative framework with several key features. Parliament needs to declare the requirements; the enforcement processes and sanctions and allocate the powers and responsibilities to appropriate	Low	The article discusses and analyses the regulatory framework and requirements for AI and does not relate to uses of AI in the justice field. However, it mentions some important considerations that can be taken in regard in future AI projects of the Member States.	Legal and ethical implications	AI

		regulatory agencies. In addition, it needs to delegate the development and maintenance of the detailed obligations to an independent body, comprising representatives of all stakeholder groups, including the various categories of the affected public.				
80.	M. Wollowski et al., 'A Survey of Current Practice and Teaching of AI,' 2016.	The field of AI has changed significantly in the past couple of years and will likely continue to do so. Driven by a desire to expose students to relevant and modern materials, two surveys were conducted: one of AI instructors and one of AI practitioners. The surveys were aimed at gathering information about the current state of the art of introducing AI as well as gathering input from practitioners in the field on techniques used in practice. In this paper, we present and briefly discuss the responses to those two surveys. ²⁷⁵	None	The paper is a practitioners' survey aimed at identified teaching methods and techniques in the field of AI. In this sense, it is oriented towards the technical implications of the innovation technology and does not relate to its use in the justice field.	Other	AI
81.	H. Kemmit and M. Dizon, 'EU update,' <i>Comput. Law Secur.</i>	This is the latest edition of Baker & McKenzie's column on developments in {EU} law relating to IP, {IT} and	None	The paper is more on the side of legal aspects pertaining collaboration	Legal and ethical implications	AI

²⁷⁵ Summary prepared by the contractor.

	Rev., vol. 26, no. 1, pp. 94–98, Jan. 2010.	telecommunications. This article summarises recent developments that are considered important for practitioners, students and academics in a wide range of information technology, e-commerce, telecommunications and intellectual property areas. It cannot be exhaustive but intends to address the important points. This is a hard copy reference guide, but links to outside web sites are included where possible. No responsibility is assumed for the accuracy of information contained in these links.		between UK and EU.		
82.	M. Soui, I. Gasmi, S. Smiti, and K. Ghédira, 'Rule-based credit risk assessment model using multi-objective evolutionary algorithms,' Expert Syst. Appl., 2019.	Credit risk assessment is considered as one of the vital topics in financial institutions. The existing credit risk evaluation methods are based on black box models or transparent models. The black box models cannot adequately reveal information hidden in the data and the credit risk evaluation remains difficult. In addition, there exist relatively few transparent models that take into consideration interpretability and comprehensibility. To address this problem, the paper aims to build a reliable credit risk evaluation model which generates a set of classification rules.	None	<i>Ut supra</i>	Other	AI

83.	R. Ueberecken, 'Schengen reloaded,' 2019.	The paper discusses the necessity of Schengen borderless area since it is, as the author suggests, one of EU's most popular achievements. It illustrates the benefits of the Schengen agreement and the progress made since it has become operational in 1995. The author acknowledges the challenges in the field of freedom, security and justice. It moves on and specifies the areas of improvement such as the need of trust between EU members and to continue carrying out their obligations. Improvements such as interoperability of law-enforcement and migration databases, investment in new innovative technologies to fight crime, to strengthen its partnerships with non-EU countries, starting with those that are Schengen but non-EU countries.	None	Cf. summary	Other	N/A
84.	Integrated Infrastructure Operational Program of Slovakia	This program aims to impact the transport infrastructure (railways, waterways) and the energy efficiency at a national and EU level. Additionally, the programme focuses on numerous main priorities such as promoting sustainable transport, improving and supporting environmentally friendly transport systems.	None	Cf. Summary	Horizontal framework	N/A
85.	M. Planck, 'Michèle Finck: Blockchains and	This document describes the challenges posed by the GDPR to the use of blockchain and	High	Michèle Finck is a thought leader in the field of	Personal data protection	DLT

	Data Protection in the EU’.	analyses in depth the legal issues posed by the current technology (encryption, pseudonymisation, etc.) ²⁷⁶		blockchain and GDPR compliance.		
86.	CNIL, ‘Premiers éléments d’analyse de la CNIL Blockchain’, 2018.	In this document, the CNIL offers concrete solutions to organisations who wish to use blockchain technology in the context of personal data processing. ²⁷⁷	High	Cf. summary	Personal data protection	DLT
87.	El. Deleuze, ‘La blockchain au service de la protection du droit d’auteur dans le domaine du livre numérique’.	This document proposes the use of blockchain for an increased protection of the rights of authors over their works and explores the impact of exceptions to copyright and contract law. ²⁷⁸	High	Cf. summary	Use cases	DLT
88.	D. Billard, ‘Weighted forensics evidence using blockchain’, in ACM International Conference Proceeding Series, 2018.	This document proposes a blockchain-supported methodology to provide courts with weighted digital evidence assigned with a confidence rating that eventually helps juries and magistrates in their endeavour. ²⁷⁹	High	Cf. summary	Use cases	DLT
89.	D. Van Aaken, F. Ahlemann, C. Bode, R. Brüh and others, ‘Junior Management Science The impact of tax differentials on pre-tax income of Swiss MNEs blockchain technology and IP-investigating	This document describes/proposes: - blockchain technology benefits to IP protection strategies (patent, copyrights, trade secrecy, defensive publication and open innovation): hashing and secure timestamping - proposals / examples of	High	Cf. summary	Use cases	DLT

²⁷⁶ Summary prepared by the contractor.

²⁷⁷ Summary prepared by the contractor.

²⁷⁸ Summary prepared by the contractor.

²⁷⁹ Summary prepared by the contractor.

	benefits and acceptance in governments and legislations,' Junior Management Science, vol. 3, no. 1, pp. 1-15, 2018.	tangible use cases in IP protection - required institutional support. ²⁸⁰				
90.	L. Kai, Institute of Electrical and Electronics Engineers. Beijing Section, Beijing da xue. Towards Using Public Blockchain in Information-Centric Networks: Challenges Imposed by the European Union's General Data Protection Regulation, Proceedings of 2018 1st IEEE International Conference on Hot Information-Centric Networking (HotICN 2018) : Aug. 15-17, 2018, Shenzhen, Guangdong, China.	Blockchain enables new approaches to solve privacy issues in distributed systems, but at the same time also raises new concerns with its openness and immutability. The EU has taken steps towards addressing information privacy concerns and defining rights of data subjects and obligations of controllers and processors of personal data. This paper applies and discusses these in light of current Blockchain implementations. It also proposes a guideline for GDPR compliant Blockchain developments in the future.	High	Cf. summary	Personal data protection	DLT
91.	K. Hegadekatti and D. H. Author, 'M P RA Munich Personal RePEc Archive Legal Systems and Blockchain Interactions', 2017.	This document proposes the use of blockchain technology to simplifying legal procedures (litigation processes).	High	Cf. summary	Use cases	DLT
92.	A. Guo, 'Chicago-Kent Journal of Intellectual Property Blockchain Receipts: Patentability and Admissibility in	This document analyses admissibility of the distributed ledger receipts (data) as evidence in court.	High	Cf. summary	Other	DLT

²⁸⁰ Summary prepared by the contractor.

	Court Recommended Citation', 2017.					
93.	A. Savelyev, 'Copyright in the blockchain era: promises and challenges'.	This paper focuses on legal aspects of blockchain technologies in the copyright sphere. It analyses the existing challenges for distribution of copyrighted works in a digital environment, and also gives some suggestions, with examples, on how they can be solved with the use of blockchain on/off-chain storage, legal status of online intermediaries and cryptocurrencies transactions. ²⁸¹	High	Cf. summary	Use cases	DLT
94.	P. De Filippi & M. Raymond, 'La Blockchain: comment réguler sans autorité', Nitot, T. (dir.) & Cercy N. <i>Numérique: reprendre le contrôle: Framabook</i> . 2016, p. 81-96.	This chapter is dedicated to the right to be forgotten (RTBF). The right to be forgotten, more aptly designated as a right to de-listing, is a tool of European data protection law aimed at opposing operators present on the network the sovereignty that natural persons have over their personal data. The text explores the interface between this legal development and blockchain technology, which on the contrary tends towards the permanence of data. ²⁸²	High	Directly related to GDPR and right to be forgotten.	Personal data protection	DLT

²⁸¹ Summary prepared by the contractor.

²⁸² See : <https://archive-ouverte.unige.ch/unige:90735>

95.	Melanie Swan, 'Blockchain 3.0: Blockchain, blueprint for a new economy', O'Reilly, 2015.	In its chapter 3 'Justice Applications Beyond Currency, Economics and Markets', this book proposes an overview of applications and use cases of blockchain to: digital identity, digital art protection, digital democracy.	High	Cf. summary	Horizontal framework	DLT
96.	Maisha Afrida Tasnim et al., 'CRAB: Blockchain Based Criminal Record Management System', International Conference on Security, Privacy and Anonymity in Computation, Communication and Storage, pp. 294–303, 2018.	This paper introduces a criminal record storage system by implementing blockchain technology to store the data, which helps to attain integrity and security. With this system, it is expected that the effect of corruption on the law enforcement forces will decrease, by removing any possibility of tampering with criminal records data by thorough accountability. ²⁸³	High	Cf. summary	Use cases	DLT
97.	Alejandro Tomás Dini et al., 'Analysis of implementing blockchain technology to the Argentinian criminal records information system', 2018. Congreso Argentino de Ciencias de la Informática y Desarrollos de Investigación (CACIDI), 2018.	The paper proposes a system to store citizen criminal records in a decentralised way by using a permissioned blockchain, taking advantage of some of its characteristics to ensure privacy, security, immutability, and availability of stored sensitive data. This system would overcome the current one since it can cryptographically guarantee that data, once stored, had not been modified but by a competent authority. It also improves the delivery of	High	Describes a criminal records system using blockchain which is directly applicable to the justice field.	Use cases	DLT

²⁸³ Summary prepared by the contractor.

		the records to its destination which can be geographically spread throughout the territory.				
98.	Yv. Pouillet and H. Jacquemin, 'Blockchain : une révolution pour le droit', Journal Tribunaux, 137, 36 - No. 6748, pp. 801-819, 10 November 2018.	The document acknowledges that blockchain technology now extends beyond its applications in monetary matters: bitcoin and other "crypto-currencies". Administrations, authors, notaries can use it. It can be used for transactions relating to works of art, real estate certificates, insurance, etc. The authors thus question whether this constitutes a revolution for the law seen through the prism of multiple law branches: intellectual property law, financial law, data protection law or even contract law that the "smart contract" intends to call into question. At the end of the analysis, the answer is nuanced: if there is real questioning, the blockchain law revolution is not for tomorrow. ²⁸⁴	High	Cf. summary	Legal and ethical implications	DLT
99.	C. Sullivan and E. Burger, 'E-residency and blockchain', Computer Law and Security Review, vol. 33, no. 4, pp. 470-481, 18 2017	This document describes the use of blockchain for: e-Residency in Estonia (government-backed transnational digital identity); a self-sovereign identity (SSI); identity authentication. It also considers legal, policy and technical implications.	High	Cf. summary	Use cases	DLT

²⁸⁴ Summary prepared by the contractor.

100.	Stéphane Blemus, 'Law and Blockchain: A Legal Perspective on Current Regulatory Trends Worldwide', Corporate Finance and Capital Markets Law Review, 2017.	This document proposes an overview of EU and worldwide current and emerging regulatory frameworks applicable to blockchain and cryptocurrencies.	Medium	Not directly relating to use of DLT in the justice field, however the described regulatory trends could be potentially reused for regulation of blockchain uses in the justice field.	Legal and ethical implications	DLT
101.	J. Vachet, 'La Blockchain et le droit des sociétés', Promotion 2017-2018.	This document analyses the legal difficulties posed by blockchain and smart contracts during their application in company law, in particular on due diligence, financial securities, creation of company, corporate governance, decision-making, dividend payment, new methods of financing companies - transmission of minibons, ICO's.	Medium	Not directly relating to the justice field, however, the outcomes of the described use cases can be potentially reused in the justice field.	Legal and ethical implications	DLT
102.	A. J. Kolber, J. Askin, R. Calo, D. Chalmers, A. Elga, D. Estrada, D. Hinkes, J. Metnick, M. Raskin, L. Sacharoff, H. Surden and R. I. Yampolskiy, 'Not-So-Smart Blockchain Contracts and Artificial Responsibility',	This document analyses the dangers lurking in the 'code-is-the-contract' view of smart contracts.	Medium	Cf. summary	Legal and ethical implications	DLT
103.	K. E. C. Levy, 'Book-Smart, Not Street-Smart: Blockchain-Based Smart Contracts and The Social Workings of Law', Engaging Science, Technology,	This document analyses the incapacity of smart contracts to completely cover contractual obligations. Additionally, it encounters difficulties to address the social and relational contexts of contracting other than formal adjudication. One of	Medium	Cf. summary	Legal and ethical implications	DLT

	and Society, vol. 3, p. 1, 17 2 2017.	the main problems mentioned is related to the fact that smart contracts "neglect the fact that people use contracts as social resources to manage their relations. The inflexibility that they introduce, by design, might short-circuit a number of social uses to which law is routinely put." ²⁸⁵ Attention to the social and relational contexts of contracting is essential in the development of smart contracts. ²⁸⁶				
104.	P. Ryan, 'Technology Innovation Management Review', 2017.	This document explores blockchain-based smart contracts primarily as non-contractual social exchanges (i.e. idea that most contracts are social rather than legal in nature and are entered into because the parties trust each other to perform the agreed exchange). ²⁸⁷	Medium	Cf. summary	Legal and ethical implications	DLT
105.	K. Yeung, 'Blockchain, Transactional Security and the Promise of Automated Law Enforcement: The Withering of Freedom Under Law?'	This document reflects on some of the potential implications of automated enforcement via distributed ledger systems to ensure the security of transactions for 'freedom under law' and the social foundations upon which the rule of law in modern legal orders is grounded. It further elaborates on how DLT can be used to create a trust through security,	Medium	The article elaborates on a DLT solution in a trust situation between citizens and the governing institutions, which can be taken into consideration and as 'inspiration' for use of the	Legal and ethical implications	DLT

²⁸⁵ See : <https://estsjournal.org/article/view/107>

²⁸⁶ Summary prepared by the contractor.

²⁸⁷ Summary prepared by the contractor.

		so that individuals don't have to expose themselves to risk, by their trustees.		technology in the justice field.		
106.	K. Lauslahti, J. Mattila and T. Seppälä, 'Raportit Reports Smart Contracts – How will Blockchain Technology Affect Contractual Practices?', 2017.	This article analyses smart contracts from the perspective of digital platforms and the Finnish contract law. It examines how well the formation mechanisms of the general principles of contract law can be applied to the new technological framework of smart contracts. In addition, the adoptability of smart contracts as a part of the current Finnish legislation is evaluated on the basis of this analysis. The authors find that instead of a clearly defined single use case, smart contracts can be applied in a multitude of different ways, with highly varying goals and circumstances. The paper concludes that at least in some cases, smart contracts can create legally binding rights and obligations to their parties.	Medium	Cf. summary	Legal and ethical implications	DLT
107.	P. De Filippi and S. Hassan, 'Blockchain Technology as a Regulatory Technology from Code is Law to Law is Code'.	This document describes our increasing reliance on code, not only to enforce legal rules, but also to draft and elaborate these rules - discussion of Lessig's 'Code is Law' (1999).	Medium	Cf. summary	Legal and ethical implications	DLT
108.	A. Savelyev, 'Contract Law 2.0: «Smart» Contracts As the Beginning of the End of Classic Contract Law'.	This document analyses mainly the legal issues related to the application of the existing contract law provisions to the fully automated contracts ('smart contracts'). The paper underlines the key tensions between the classic contract law	Medium	Cf. summary	Legal and ethical implications	DLT

		and the smart contracts and proposes possible solutions to overcome the challenges, while supporting innovative business models. ²⁸⁸				
109.	Blockchain: the legal implications of distributed systems, The Law Society, UK.	<p>The growth of distributed trust networks, such as blockchain, may revolutionise the way information is stored and how transactions occur, removing the need for trusted intermediaries including banks, solicitors and government. A blockchain is a continuously growing list of records, called blocks, which are linked and secured using cryptography.</p> <p>In a digital world, blockchain offers a tool for achieving and maintaining integrity in distributed systems. This Horizon Scanning report explores the potential use cases of blockchain, its challenges and opportunities, and what this might mean for solicitors.</p>	Medium	C.f. summary	Legal and ethical implications	DLT
110.	Antoine Garapon & Jean Lassègue, <i>'La blockchain, révolution dans la révolution, Justice digitale: révolution graphique et rupture anthropologique'</i> ,	This book offers a description of the 'new digital law' brought about by the digital revolution. One of the chapters elaborates on the use of blockchain in digital justice by use of smart	Low	The book and the specific chapter discuss more the new technologies in general for digital justice. It only mentions blockchain as an	Legal and ethical implications	DLT

²⁸⁸ Summary prepared by the contractor.

	Presses Univeristaires de France, 2018.	contracts or online dispute resolution (ODR). ²⁸⁹		example, without going in detail on it.		
111.	O. E. Radutnii 'Adaptation of criminal and civil law in view of scientific-technical progress (artificial intelligence, dao and digital human)', Problems of Legality, vol. 0, no. 144, pp. 138-152, 15 3 2019.	This document proposes a high-level overview of the concept of Decentralised Autonomous Organisation.	Low	The paper does not discuss uses of innovative technologies in the justice field or other fields. However, it puts forward some important considerations that could be taken in regard in future AI projects implemented by Member States' authorities.	Legal and ethical implications	DLT
112.	In: T. Kerikmäe and Ad. Rull, 'The Future of Law and eTechnologies', Springer International Publishing Switzerland 2016: 'From Bitcoin to Smart Contracts: Legal Revolution or Evolution from the Perspective of <i>de lege ferenda</i> ', K. Künnapas.	This document analyses the nature of Bitcoin (electronic commodity vs representative, fiat money or factum money) and proposes possible scenarios for bitcoin regulation. It also explores some fundamental problems related to the smart contracts, namely that they cannot intercept and cover all facts of life. ²⁹⁰	Low	The paper does not discuss use of innovative technologies in the justice field, however, contains some important consideration from legal perspective on the blockchain technology that could be taken into account in future decision-making.	Legal and ethical implications	DLT

²⁸⁹ Summary prepared by the contractor.

²⁹⁰ Summary prepared by the contractor.

113.	In: T. Kerikmäe and Ad. Rull, 'The Future of Law and eTechnologies', Springer International Publishing Switzerland 2016: 'Smart Contracts', Merit Kolvart, Margus Poola, and Addi Rull, 2016	This document proposes an overview of the concepts and legal requirements to conclude a contract and the resulting challenges to the contract law posed by smart contracts. ²⁹¹	Low	Not directly focusing on facilitating legal proceedings themselves.	Legal and ethical implications	DLT
114.	T. Kerikmäe and Ad. Rull, 'The Future of Law and eTechnologies', Springer International Publishing Switzerland 2016: 'Challenges in Collecting Digital Evidence: A Legal Perspective', Agnes Kasper and Eneli Laurits.	This document analyses digital evidence and requirements for digital forensics. It explores how digital evidence is considered in / processed by legal frameworks (with real court cases as examples) and points out the ineffectiveness / inflexibility of existing legal frameworks. ²⁹²	Low	Not directly focusing on facilitating legal proceedings themselves.	Other	DLT
115.	OECD, Tax Challenges Arising from Digitalisation -Interim Report 2018 Inclusive Framework on BEPS, OECD Publishing, 2018	This document sets out the Base erosion and profit shifting (BEPS) Inclusive Framework's agreed direction of work on digitalisation and the international tax rules through 2018. However, it does not go beyond merely mentioning blockchain.	None	Cf. summary	Other	DLT
116.	D. Valeev and E. Bazilevskikh, 'E-Justice and information technologies in civil procedure', BRICS Law Journal, vol. 5, no. 4, pp. 175-179, 15 12 2018.	This document only contains a pointer to a paper related to the use of blockchain in civil procedures in Russia: - 'Blockchain and notary: First evaluation' (Prof. Vladimir Yarkov, Professor at Ural State Law University and head of the Department of Civil Procedure).	None	Only points to another paper related to blockchain/DLT.	Other	DLT

²⁹¹ Summary prepared by the contractor.

²⁹² Summary prepared by the contractor.

Study on the use of innovative technologies in the justice field – Annex I: List of References

		In this pointed paper, blockchain technology ensures the technological transparency of the transaction, but there is no verification of the legal reliability of the transaction.				
117.	D. Raheem, 'Law in the Digital Era - Perspectives from IP Law, Contract Law & IT Law',	These are the minutes of a conference at the University of Lapland from 10th–12th December 2017 on the legal disruptions that digitalisation is causing in the fields of intellectual property law, contract law and ICT law (incl. proposed solutions by experts). The document refers to a presentation on smart contracts by Aleksandr Savelyev, cf. supra.	None	Only points to another paper related to blockchain/DLT.	Legal and ethical implications	DLT

3. Summaries of references

This section provides summaries of the reference documents, reviewed and categorised with high relevance for the study.

3.1. References categorised as part of the horizontal framework on innovative technologies

This section provides summaries of the high relevance reference documents which are considered as part of the horizontal framework for innovative technologies. These are reference numbers from 3 to 16. The respective number of the reference in the reference list is indicated next to its title.

3.1.1. General Data Protection Regulation (Ref. no. 3)

Reference title: Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 [2019], OJ L 119/1

Key words: *GDPR, data protection, data processing, data processor, data controller, special categories of data, principle, rights and obligations*

The GDPR is part of the EU data protection reform package, along with the Data Protection Directive for Police and Criminal Justice Authorities (Directive 2016/280). The Regulation entered into application on May 25, 2018.

The main objective of the GDPR is to allow data subjects to better control their personal data. It also modernises and unifies rules allowing businesses to reduce red tape and to benefit from greater consumer trust.

In terms of scope, the GDPR is applicable to all data controllers / processors including those not established in the EU, but they for instance offer goods or services to data subjects in the EU. It sets six principles according to which personal data should be processed. The GDPR imposes an obligation to data controllers / processors to process the data securely by implementing 'appropriate technical and organisational measures'. In addition, the data controllers or data processors need to ensure that processing operations comply with the principle of data protection by design and by default. The GDPR also stipulates the conditions, which need to be fulfilled in order for a data controller / processor to be allowed to process personal data, such as freely given, specific, informed and unambiguous consent of the data subject, compliance with a legal obligation, performance of a task in the public interest, etc. It provides a number of guarantees for the respect of the data subject's rights under its provisions, e.g. by stipulating the obligation for some data controllers or processors to appoint data protection officers. The GDPR guarantees a range of data protection rights (such as the right to be informed, right of access, right to erasure etc.), which aim to give individuals more control over the data they provide.

In conclusion, the GDPR is designed to create business opportunities and stimulate innovation through a number of steps including:

- a single set of EU-wide rules;
- a Data Protection Officer (DPO) – to be designated by public authorities and data controllers/processors processing data on a large scale;
- one-stop-shop – one single supervisory authority per Member State;
- EU rules for non-EU companies;
- innovation-friendly rules – data protection by design and by default;
- privacy-friendly techniques such as pseudonymisation and encryption;
- removal of notifications;
- impact assessments;
- record-keeping – SMEs are not required to do it, subject to some conditions.

3.1.2. Directive (EU) 2016/680 – Law Enforcement Directive (LED) (Ref. no. 4)

Reference title: Directive (EU) 2016/680 of the European Parliament and of the Council of 27 April 2016 [2016], OJ L 119/89

Key words: *data protection, data processing, data processor, data controller, special categories of data, principle, rights and obligations*

The Law Enforcement Directive (LED) is part of the EU data protection reform package along with the General Data Protection Regulation (Regulation [EU] 2016/679).

It aims to better protect individuals' personal data when competent authorities are processing their data. It also aims to improve cooperation in the fight against terrorism and cross-border crime in the EU by enabling different competent authorities, such as police and criminal justice authorities in EU countries to exchange information necessary for investigations more efficiently and effectively.

The LED requires that the data collected by law enforcement authorities are processed lawfully and fairly; collected for specified, explicit and legitimate purposes and processed only in line with these purposes; adequate, relevant and not excessive in relation to the purpose in which they are processed; accurate and updated where necessary; kept in a form which allows identification of the individual for no longer than is necessary for the purpose of the processing and appropriately secured, including protection against unauthorised or unlawful processing.

In addition, under the LED, the EU Member States must establish time limits for erasing the personal data or for a regular review of the need to store such data. The LED requires that the law enforcement authorities make a clear distinction between the data of different categories of persons including, suspects, criminal offenders, victims of criminal offences and parties to criminal offences, including witnesses.

Under the LED, individuals have the right to have certain information made available to them by law enforcement authorities. In addition, national authorities must take technical and organisational measures to ensure a level of security for personal data that is appropriate to the risk.

The LED replaces Framework Decision 2008/977/JHA on the protection of personal data processed in the framework of police and judicial cooperation in criminal matters with effect from 6 May 2018.

3.1.3. Regulation (EU) 2018/1725 (Ref. no. 5)

Reference title: Regulation (EU) 2018/1725 of the European Parliament and of the Council of 23 October 2018 [2018], OJ L 295/39 on the protection of natural persons with regard to the processing of personal data by the Union institutions, bodies, offices and agencies and on the free movement of such data

Key words: *data protection, personal data, data processing, data processor, data controller, special rules, European Data Protection Supervisor (EDPS), rights and obligations*

The Regulation 2018/1725 lays down rules on how EU institutions, bodies, offices and agencies should process personal data. It upholds an individual's fundamental rights and freedoms, especially the right to protection of personal data. It also aligns the rules for EU institutions, bodies, offices and agencies with those of the General Data Protection Regulation (GDPR) and of Directive (EU) 2016/680, known as the Law Enforcement Directive (LED). It applies since 11 December 2018, except with regard to the processing of personal data by Eurojust, where it applies since 12 December 2019.

It also creates a supervisory body – European Data Protection Supervisor (EDPS), appointed for a once renewable five-year term of office and based in Brussels.

Special rules apply to EU bodies, offices and agencies that process operational personal data for the purposes of law enforcement (e.g. Eurojust). They are covered by a specific chapter in the regulation, which is aligned with the LED. Moreover, in the founding acts of

these bodies, offices and agencies, more specific rules can be laid down to take into account their specificities. Europol and the European Public Prosecutor's Office are excluded from the regulation.

3.1.4. EU-US Privacy Shield Implementing Decision (Ref. no. 6)

Reference title: Commission Implementing Decision (EU) 2016/1250 of 12 July 2016 pursuant to Directive 95/46/EC of the European Parliament and of the Council on the adequacy of the protection provided by the EU-U.S. Privacy Shield

Key words: *data protection, personal data, data transfer, US-EU, Privacy Shield, certified US organisations*

The Implementing Decision recognises that the EU-US Privacy Shield, comprising the privacy principles applicable to certified US organisations (companies) signed up with the US Department of Commerce and other related commitments made by US relevant authorities, provides an adequate level of protection for personal data transferred from the EU to those organisations (companies). The Decision applies since 21 August 2016.

The main objective of the Implementing Decision is to ensure that personal data can be freely transferred to organisations (companies) in the US that are on the 'Privacy Shield List', which is maintained and made publicly available by the US Department of Commerce. It also ensures legal certainty for businesses that rely on the arrangement to transfer personal data from the EU to Privacy Shield-certified US organisations. The Privacy Shield arrangement guarantees the right to protection of personal data of every individual from the EU, whose personal data are transferred under the Implementing Decision's rules.

In particular, the Implementing Decision stipulates that in order to be put on the list, US companies must commit to abide by a strong set of data protection rules and safeguards. For example, they have to display their privacy policy (aligned with the Privacy Shield Principles) on their website, ensure compliance, including with respect to onward transfers of personal data to third parties and reply promptly to any complaints and subject themselves to oversight by an independent dispute resolution body (which may be an EU Data Protection Authority).

The US has also assured the EU that there will be clear limitations and safeguards with regard to US Government access to personal data. The European Commission has been continuously monitoring the functioning of the EU-US Privacy Shield, with the help of the national data protection authorities, to make sure that it continues to provide sufficient protection.

3.1.5. European Ethical Charter on the Use of Artificial Intelligence in Judicial Systems and their environment (Ref. no. 7)

Reference title: CEPEJ, 'European Ethical Charter on the Use of Artificial Intelligence in Judicial Systems and their environment', adopted at the 31st plenary meeting of the CEPEJ (Strasbourg, 3-4 December 2018)

Key words: *artificial intelligence (AI), principles of use of AI, justice field, (respect of) fundamental rights, non-discrimination, quality and security, transparency, impartiality and fairness, under user control, machine learning, predictive justice, online dispute resolution (ODR), criminal justice*

This Charter elaborates the principles by which the application of AI in the field of justice should abide and analyses the state of play of 'predictive justice' tools in the CEPEJ²⁹³ Member States.

²⁹³ Council of Europe European Commission for the efficiency of justice.

The Charter is directed at public and private stakeholders responsible for the design and deployment of AI tools and services that involve processing of judicial decisions and data. It also concerns public decision-makers in charge of the legislative or regulatory framework, of the development, audit or use of such tools and services.

In terms of methodology, the analysis of the use cases is based on the replies of the CEPEJ Member States to a survey conducted in April 2018.

The Charter classifies the AI use cases in the justice field into several categories²⁹⁴. More specifically, the document explores the state of development of open data on judicial decisions in the CEPEJ Member States, describes the application of AI in civil, administrative and commercial proceedings and comments on other implications, such as data protection. It elaborates on the legal guarantees on fundamental rights with which an AI tool should be compatible, such as, among others, the right of access to a court in case of ODR, equality of arms, when digital proceedings need to take regard of individuals who are not familiar with digital tools, impartiality of judges and right to counsel. Finally, the Charter describes use cases of AI specific to the criminal justice²⁹⁵ and the challenges of 'prediction' in criminal matters, like the risk of discrimination. To address some of them, the Charter points out that AI tools should be based on the 'rehabilitation' principle²⁹⁶ and the human factor (judge) should be present to individualise the sentence.

In conclusion, the Charter encourages a number of applications of AI in the justice field, such as case-law enhancement, access to law (through chatbots using natural language processing) and creation of new strategic tools (with the involvement of legal professionals to own these tools and analyse their results). However, other applications require a more cautious approach, like, among others, ODR, where the applicants should be informed whether their matter is handled in a fully automated way or whether it involves a mediator in order to allow an informed choice. The Charter also argues that some applications could be considered after further scientific research, such as judge profiling and anticipating court decisions. Finally, it points out that applications like individual profiling in criminal matters and quantity-based norm need to be considered with extreme reservations.

As a way forward, the Charter highlights the need for an in-depth public debate, testing and continuous review on predictive justice tools prior to the implementation of public policies for their development. It also points out the urgency of drafting an ethical framework for the development of AI algorithms while respecting fundamental rights.

3.1.6. Artificial Intelligence in service of the judiciary – CEPEJ, Round Table (Ref. no. 8)

Reference title: CEPEJ, *'L'intelligence artificielle au service du pouvoir judiciaire'*, 26 September 2018, Round Table, CEPEJ General Administration of Lithuania

Key words: *artificial intelligence (AI), predictive justice*

The paper is part of the round table discussion of the European Commission for the Efficiency of Justice (CEPEJ) and explores the state of play in France in terms of predictive justice tools in place and the concept of 'open data judicial decisions'.

In terms of methodology, the paper discusses the context of what 'predictive justice' implies and presents France's experience with it. It also elaborates on the ways in which the justice decision-making process can be modified in the process of developing predictive justice tools.

In particular, the paper enumerates a number of technical tools, which have been developed in France with the aim of processing the data collected in an efficient manner.

²⁹⁴ Advanced case-law search engines; ODR; assistance in drafting deeds; analysis (predictive, scales); categorisation of contracts according to different criteria and detection of divergent or incompatible contractual clauses; and 'chatbots' to inform litigants or support them in their legal proceedings.

²⁹⁵ 'Predictive policing', and tools used in the criminal trial, such as Harm Assessment Risk Tool (HART).

²⁹⁶ Social rehabilitation is the process of bringing back to normal life individuals with deviant behaviour. It involves all activities and programmes designed to facilitate the process of (re-)integration of these individuals in the society.

First, there are the case law databases, Jurinet and Jurica, administered by the Cassation Court. The Cassation Court would like to have one database which groups all judgments in the French judicial order (more than 3 million), and ensures their pseudonymisation and distribution. However, the paper points out two main challenges in realising this project – the constitution of the database which requires the storage and then the escalation into a single database of the decisions produced, by means of the applications for processing procedures used by the courts; and the ability to pseudonymise the database, thus constituted, with a view to its dissemination in open data²⁹⁷. **Second**, the paper discusses the LegalTechs (start-ups in France) and points out that the AI services they offer in the judicial field are not as advanced as presented. More specifically, the predictive justice tools proposed to date are more or less confined to only the analysis of compensation disputes. The technological break that would constitute an automated semantic analysis of court decisions capable of reinstating its sense and logical articulation has not yet occurred. Moreover, the paper discusses the issues related to the development of predictive justice in the centre of the decision-making process. It states that a tool for predictive justice needs to allow the objectification of concrete case law. The open data of court decisions will give visibility to all the decisions rendered by the jurisdictions, which will then be processed and used by a plurality of public and private actors with all the capacities offered by data mining. In addition, the paper points out the most commonly identified risks which the predictive technologies hide – namely the risk of performativity, where the judge would make a decision not by the exercise of his own appreciation of the litigation but because the tool restores to him what would be done by his peers in such a situation. This highlights the risk of case law being ‘trapped’ in the past and the risk of subversion of quality and quantity.

In conclusion, facing these risks, it is essential to preserve the safeguards residing in the fundamental principles of the judicial process – preserve the balance between the harmonisation and the individualisation logic.

3.1.1.7. Ethics Guidelines for Trustworthy AI (Ref. no. 9)

Reference title: High-Level Expert Group on AI (AI HLEG), ‘Ethics Guidelines for Trustworthy AI’, 8 April 2019

Key words: *artificial intelligence (AI); ethical AI; human-centric AI*

The publication analyses trustworthy AI, where it is characterised by being: lawful, ethical, and robust.

The Guidelines aim to promote trustworthy AI based on 7 key requirements.

In terms of methodology, the Guidelines for Trustworthy AI go in detail on the aspects of ethical and robust AI. They provide guidance on how such aspects can be operationalised in socio-technical systems. Guidance is provided in three layers of abstraction, from the most abstract, to the most concrete, closing with examples of opportunities and critical concerns raised by AI systems.

The Guidelines discuss the framework for achieving trustworthy AI, where 3 components (lawful AI, ethical AI and robust AI) are mapped over 3 level of Trustworthy AI (the foundations, realisation, and assessment).

In the foundation level of trustworthy AI, the focus lays in the ethical principles and their correlated values that must be respected in the development, deployment and use of AI systems. The derived conclusions are:

- AI systems should be developed in such a way that they adhere to the ethical principles of: respect for human autonomy, prevention of harm, fairness and explicability.

²⁹⁷ An operation that can be envisaged for annual flows of tens of thousands of decisions, but beyond the reach of the state of the art (the Court of Cassation is currently conducting a research program in artificial intelligence to overcome this technical barrier).

- Pay particular attention to situations involving more vulnerable groups such as children, persons with disabilities and others who have historically been disadvantaged or are at risk of exclusion, and to situations which are characterised by asymmetries of power or information, such as between employers and workers, or between businesses and consumers.
- Acknowledge that AI systems also pose certain risks and may have a negative impact, including ones difficult to anticipate, identify or measure (e.g. on democracy, the rule of law and distributive justice, or on the human mind itself.) Adopt adequate measures to mitigate these risks when appropriate, and proportionately to the magnitude of the risk.

Trustworthy AI can be realised, by taking into consideration seven key requirements that the AI systems should meet. These requirements are: (1) human agency and oversight, (2) technical robustness and safety, (3) privacy and data governance, (4) transparency, (5) diversity, non-discrimination and fairness, (6) environmental and societal well-being and (7) accountability.

In order to achieve compliance with these requirements some technical and non-technical methods are suggested that could be used:

- Foster research and innovation to help assess AI systems. Disseminate results and open questions to the wider public, and systematically train a new generation of experts in AI ethics;
- Communicate, in a clear and proactive manner, information to stakeholders about the AI system's capabilities and limitations. Be transparent about the fact that they are dealing with an AI system. Facilitate the traceability and auditability of AI systems;
- Involve stakeholders throughout the AI system's life cycle. Foster training and education so that all stakeholders are aware of and trained in trustworthy AI;
- Be mindful that there might be fundamental tensions between different principles and requirements.

For the level of assessing trustworthy AI, a non-exhaustive assessment list has been created with the aim of operationalising the seven key requirements mentioned above. The list could assist the deployment of AI systems. Nevertheless, attention should be given to the need of continuously identifying and implementing requirements, evaluating solutions, ensuring improved outcomes throughout the AI system's lifecycle, and involving stakeholders in this process.

In conclusion, it is important to build AI systems that are worthy of trust, since human beings will only be able to confidently and fully reap its benefits when the technology, including the processes and people behind the technology, are trustworthy.

As next steps, the Guidelines recommend some more exploration whether, in addition to this horizontal framework with the focus on AI applications in general, a sectorial approach is needed, given the context-specificity of AI systems. Different situations raise different challenges. Also, the Guidelines have been written with a culture of "Trustworthy AI for Europe" and aim to foster research, reflection and discussion on an ethical framework for AI systems at a global level.

3.1.8. Recommendation of the Council on Artificial Intelligence (Ref. no. 10)

Reference title: Organisation for Economic Co-operation and Development (OECD), Recommendation of the Council on Artificial Intelligence, OECD/LEGAL/0449

Key words: *artificial intelligence (AI), human values, trustworthy AI, transparency*

The Recommendation discusses how AI can positively influence the welfare and well-being of people and to help respond to key global challenges. However, the OECD Recommendation, the first intergovernmental standard on AI, also recognises that AI raises challenges which demand extensive research and a stable policy environment, before any specific implementation of AI technologies can be made in society.

The Recommendation aims to foster innovation and trust in AI by promoting responsible stewardship of trustworthy AI while ensuring the centrality and respect for human rights and democratic values.

In terms of methodology, the present Recommendation is the result of several empirical studies and activities taken by OECD, mainly since 2016. More specifically, it reflects and includes the conducted analytical and measurement work that provides an overview of the AI technical landscape, maps economic and social impacts of AI technologies and their applications, identifies major policy considerations, and describes AI initiatives from governments and other stakeholders at national and international levels.

The paper describes and identifies five complementary values-based principles for responsible stewardship of trustworthy AI: (1) inclusive growth, sustainable development and well-being; (2) human-centric values and fairness; (3) transparency and explainability; (4) robustness, security and safety; (5) and accountability.

In addition, in the second section of the Recommendation, the OECD proposes the following five recommendations to policymakers pertaining to national policies and international cooperation for trustworthy AI: investing in AI research and development; fostering a digital ecosystem for AI; shaping and enabling the policy environment for AI; building human capacity and preparing for labour market transformation; and international cooperation for trustworthy AI.

The Recommendation is a result of inclusive and participatory work involving the Committee on Digital Economy Policy (CDEP), the AI Group of experts at the OECD (AIGO) and other relevant OECD bodies.

Regarding the Recommendation's implementation, it will be under the aegis of the CDEP who will be responsible for developing practical guidance, monitoring and dissemination of tools, aided by the AI Policy Observatory –launched in February 2020.

In conclusion, the OECD Recommendation consists of a range of principles and recommendations on the use of innovative technologies.

As a way forward, the Recommendation encourages the adherents to responsibly work and support a human-centric, sustainable, transparent and collaborative usage of AI.

3.1.9. Building Trust in Human-Centric Artificial Intelligence (Ref. no. 11)

Reference title: Communication from the Commission to the European Parliament, the Council, the European Economic and social Committee and the Committee of the regions, 'Building Trust in Human-Centric Artificial Intelligence', 8 April 2019, COM(2019) 168 final

Key words: *artificial intelligence (AI); ethical AI; human-centric AI, trustworthy AI*

The Communication builds on the work of the AI High Level Expert Group (HLEG on AI) on ethical guidelines for trustworthy AI by focusing on new AI projects.

The Communication aims to launch a comprehensive piloting phase involving stakeholders on the widest scale in order to test the practical implementation of the ethical guidance for AI development and use.

In terms of methodology, the Communication focuses on the ethical guidelines developed by the HLEG on AI, an independent expert group set up by the Commission in June 2018, in view of using them from the onset of the development of new AI initiatives.

The Communication discusses the fact that in the near future AI will become an integral part of our everyday life. Nevertheless, AI brings new challenges as it enables machines

to 'learn' to take and implement decisions without human intervention. Decisions taken by algorithms could suffer from data that is incomplete, tampered with by cyber-attackers, biased or incorrect. Unreflectively applying the technology as it develops could lead to problematic outcomes as well as reluctance by citizens to accept or use it. Therefore, it needs to be ensured that AI is trustworthy and human-centric.

The guidelines drafted by the HLEG on AI propose the following three components in order to achieve trustworthy AI: (1) it should comply with the law, (2) it should fulfil ethical principles and (3) it should be robust.

Based on these three components and the European values, the guidelines identify seven key requirements that AI applications should respect, so as to be considered trustworthy: (1) Human agency and oversight; (2) Technical robustness and safety; (3) Privacy and data governance; (4) Transparency; (5) Diversity, non-discrimination and fairness; (6) Societal and environmental well-being; (7) Accountability.

In conclusion, with this Communication the Commission aims to ensure that the guidelines developed by the HLEG on AI are followed in view of developing ethical and human-centric AI.

As next steps, the Communication notes the launch of a set of networks of AI research excellence centres through the EU Research and Innovation programme Horizon 2020. In addition, the Commission will begin setting up networks of digital innovation hubs focusing on AI in manufacturing and on big data, as well as will start preparatory discussions to develop and implement a model for data sharing and making best use of common data spaces together with stakeholders and MS.

3.1.10. Artificial Intelligence for Europe (Ref. no. 12)

Reference title: Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions, '*Artificial Intelligence for Europe*', 25 April 2018, COM(2018) 237 final

Key words: *artificial intelligence', European Union, Digital Single Market, European Initiative on AI*

The Communication explores the importance of artificial intelligence for Europe and describes the steps taken towards making the EU one of the leading global players in the development and deployment of AI solutions in AI. It further explores the current and future position of the EU in the competitive international landscape and elaborates on the impact of AI on both the public and private sectors.

The Communication aims to raise awareness of the significant positives AI will bring and is already bringing into the lives of people. It describes the necessity for the EU to join the AI race and the importance of being proactive in the development of this new technology by supporting the private and public sectors. Additionally, the Communication exposes the lack of private investment in AI development and strongly advocates leveraging public funding in order to expedite the inevitable alignment with the rest of the world.

In terms of methodology, the Communication provides statistics on funding from the public sector along with the current situation in AI adoption by countries and private companies in the EU, its Member States and in third countries.

The Communication discusses the need for the EU to continue its work on creating an environment that stimulates investments and highlights the importance of the role the Union plays in the development and exploitation of platforms providing services to companies. It emphasises the projects already being funded by the EU that focus predominantly on robotics. Funded projects include an unmanned agricultural vehicle that can mechanically remove weeds, a highway pilot using AI and Internet of Things to provide safe driving recommendations and reduce road fatalities, a robotic ortho-prosthesis and

others. Furthermore, the Communication introduces the European Initiative on AI aiming to boost the EU's technological and industrial capacity. On this aspect, it describes in figures the stepping-up of investments, including project plans at a high level and budgetary figures. One of the main goals is to facilitate access to the latest technologies for all potential users, especially small and medium-sized enterprises, companies from non-tech sectors and public administrations, and encourage them to test AI by supporting an 'AI-on-demand platform' that will offer relevant services. Additionally, the Communication mentions that the EU aims to attract private investments under the corresponding research and innovation framework programme. The EU has made significant efforts over the past 15 years to open up public sector information and publicly funded research results for reuse. There is a need for data available for reuse for the purpose of training deep learning algorithms. The Communication explores the actions taken by the EU at the level of directives and guidance for data sharing and handling. One of the main messages is the rule of 'no one to be left behind' the AI bandwagon. The communication acknowledges the inevitable transformation AI will bring for jobs and states that the EU is prepared to assist in training and any preparation needed for making changes.

In conclusion, the Communication iterates the strong objective of the EU to build on through research and education.

As next steps, the Communication stresses the need to join efforts at EU level in order to place the power of AI under the service of human progress.

3.1.11. Coordinated Plan on Artificial Intelligence (Ref. no. 13)

Reference title: Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions, 'Coordinated Plan on Artificial Intelligence', 7 December 2018, COM(2018) 795 final

Key words: *coordinated actions on AI, investments, public-private partnership, strategies, innovation*

The coordinated plan reflects the importance of coordinated actions at European level between the Commission and the Member States to in line with the Strategy on AI for Europe, adopted in April 2018²⁹⁸.

The coordinated plan sets several main objectives, such as common efforts of the Member States (e.g. in adopting national strategies); fostering public-private partnerships and financing of start-ups and innovation enterprises; promoting best practice and expertise exchange; building up the European data space and better understanding the AI security aspects.

In particular, the coordinated plan envisages that Member States and the Commission join efforts towards, among others:

- Scaling up public and private investments in AI in order to meet the EUR 20 billion annual budget target in the next decade.
- Bringing companies and research organisations together to develop a common strategic research agenda on AI, defining priorities in line with the needs of the market and encouraging exchanges between sectors and across borders.
- Scaling up national research capacities and reaching critical mass through tighter networks of European AI research excellence centres. The large-scale reference test sites, open to all actors across Europe, will be developed using up to EUR 1.5 billion from the AI strand of the proposed Digital Europe Programme.
- Exchanging best practices among Member States on how to reinforce excellence and retain talented workers.

²⁹⁸ COM (2018) 237.

- Supporting Masters and PhDs in AI through the proposed closer cooperation between AI research excellence centres and the EU's research and innovation programmes.
- Developing guidelines by the European Data Protection Board on the issue of the processing of personal data in the context of research. This will facilitate the development of large cross-country research datasets that can be used for AI.
- Better understanding of how AI can impact security in three dimensions: how AI could enhance the objectives of the security sector; how AI technologies can be protected from attacks; and how to address any potential abuse of AI for malicious purposes.

In conclusion, with the document the Commission invites the European Council to endorse the coordinated plan; Member States to implement it, including by adopting national AI strategies by mid-2019, outlining investment levels and implementation measures; and the co-legislators to swiftly adopt the remaining legislative initiatives, which are essential for the success of the European AI Strategy, including the proposals put forward in the context of the next Multiannual Financial Framework.

3.1.12. Towards a common European data space (Ref. no. 14)

Reference title: Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, 'Towards a common European data space', 25 April 2018, COM (2018) 232 final

Key words: *artificial intelligence (AI); common European data space*

The Communication presents a package of measures proposed by the Commission as a key step towards a common data space in the EU. These measures include: the reuse of public sector information; update of the Recommendation on access to and preservation of scientific information; and guidance on sharing private sector data.

The Communication is the first step in the follow-up on the mid-term review of the Digital Single Market Strategy with proposed measures for a common European data space.

In terms of methodology, the Communication highlights the socioeconomic benefits of data-driven innovation, focuses on service of data-driven innovation (including re-use of public sector information and access to scientific information), and presents private sector data as a key driver of innovation including B2B and B2G data sharing.

The Communication discusses the socio-economic benefits of data-driven innovation, from which new technologies such as AI and IoT are benefiting enormously. It stresses that the EU must take its opportunities to stimulate innovation in healthcare solutions such as telemedicine and mobile health applications, and in full compliance with data protection legislation. Three key areas have been identified: (1) citizens' secure access to and sharing of health data; (2) better data to promote research, disease prevention and personalised health and care; and (3) digital tools for citizen empowerment and for person-centred care. Some of the proposed measures are:

- To promote the re-usability of public and publicly-funded data by: reducing market entry barriers by lowering charges for data; increase the availability of data by bringing new types of public and publicly-funded data into the scope; minimise the risk of excessive first-mover advantage; and increase business opportunities by encouraging the publication of dynamic data and the uptake of application programming interfaces (APIs).
- To give access to and preserve scientific information by, for example, funding a pan-European portal for the European Open Science Cloud.
- To arrange access to and re-use of private sector data as further major cornerstones of a common European data space. In the context of B2B data sharing and in order to ensure fair and competitive markets for the Internet of Things objects and for products and services that rely on non-personal machine-generated data created by such objects, the following key principles should be respected: Transparency,

Shared value creation, Respect for each other's commercial interests, Ensure undistorted competition, and Minimise data lock in.

- To arrange access to and re-use of private sector data for the purposes of public sector bodies, the following key principles could support the supply under preferential conditions for re-use: Proportionality in the use of private sector data; Purpose limitation; 'Do no harm' (legitimate interests are respected); Conditions for data re-use; Mitigate limitations of private sector data; and Transparency and societal participation.

In conclusion, with the presented measures, the Commission hopes it will be easier for businesses and the public sector actors to access and re-use data coming from different sectors in the EU. Together with other existing initiatives (i.e. the new regulatory framework for the protection of personal data that enters into force in May 2018, free flow of non-personal data and the initiatives on boosting connectivity), these measures will create a truly European common data space essential for EU economic growth and competitiveness.

As next steps, the Communication calls upon the co-legislators to work towards a rapid adoption of the legislative element of the proposed data package to ensure that the EU can fully benefit from the opportunities offered by the data economy. It also calls upon the Member States and all other stakeholders to contribute to the announced measures and initiatives.

3.1.13. [White Paper on Artificial Intelligence - A European approach to excellence and trust \(Ref. no. 15\)](#)

Reference title: European Commission, White Paper on Artificial Intelligence - A European approach to excellence and trust, February 2020

Key words: *artificial intelligence (AI), technology, excellence, policy options*

This White Paper presents policy options to enable a trustworthy and secure development of AI in Europe, in full respect of the values and rights of EU citizens.

In terms of methodology, the main building blocks of this White Paper are:

- The policy framework setting out measures to align efforts at European, national and regional level ('ecosystem of excellence').
- The key elements of a future regulatory framework for AI in Europe that will create a unique 'ecosystem of trust'.

In particular, the White Paper puts forward recommendations to set up partnership framework between the private and the public sector, with the aim to mobilise resources to achieve an 'ecosystem of excellence' along the entire value chain, starting in research and innovation, and to create the right incentives to accelerate the adoption of solutions based on AI, including by small and medium-sized enterprises (SMEs).

In addition, in order to create an 'ecosystem of trust', the regulatory framework must ensure compliance with the EU rules, including the rules protecting fundamental rights and consumers' rights particularly with AI systems that pose a high risk. According to the White Paper building an ecosystem of trust is a policy objective in itself and should give citizens the confidence to take up AI applications and give companies and public organisations the legal certainty to innovate using AI.

The White Paper sets some suggestions to improve the legislative framework and address some AI-related risks and situations:

- Effective application and enforcement of existing EU and national legislation;
- Limitations of scope of existing EU legislation;
- Changing functionality of AI systems.

- Uncertainty as regards the allocation of responsibilities between different economic operators in the supply chain
- Changes to the concept of safety:

When designing the future regulatory framework for AI, it will be necessary to decide on the types of mandatory legal requirements to be imposed on the relevant actors. These requirements may be further specified through standards. Such requirements should be in place regarding the training of the dataset; record-keeping; information provision, robustness and accuracy of the AI, human oversight, specific requirements for remote biometric identification. The White Paper also suggests voluntary labelling for those AI systems that do not qualify as 'high-risk' ones and are not subject to the proposed requirements.

Regarding the addressees of these requirements, in the Commission's view, each obligation should be addressed to the actor(s) who is (are) best placed to address any potential risks. The geographical scope of the legislative intervention should also be considered. In the view of the Commission, it is paramount that the requirements are applicable to all relevant economic operators providing AI-enabled products or services in the EU, regardless of whether they are established in the EU or not.

Finally, the implementation of the regulatory framework should rely on a governance structure comprising a network of national authorities, sectorial networks and regulatory authorities, at national and EU level and committee of experts providing assistance to the Commission.

In conclusion, with this White Paper and the accompanying Report on the safety and liability framework, the Commission launches a broad consultation of Member States civil society, industry and academics, of concrete proposals for a European approach to AI.

3.1.14. Study on the Human Rights Dimensions of Automated Data Processing Techniques (in Particular Algorithms) and Possible Regulatory Implications (Ref. no. 16)

Reference title: Committee of experts on internet intermediaries (MSI-NET), '*Study on the Human Rights Dimensions of Automated Data Processing Techniques (in Particular Algorithms) and Possible Regulatory Implications*', as finalised on 6 October 2017.

Key words: *artificial intelligence (AI), algorithms, data processing, automated data processing techniques, regulatory implications, human rights*

This report identifies a number of human rights concerns triggered by the increasing role of algorithms in decision-making.

It aims to assess the impact of algorithms on human rights, which would vary depending on the types of functions performed by them and the level of abstraction and complexity of the automated processing that is used. This inevitably triggers the question on liability for infringement of human rights and the challenges to the human rights impact of algorithms.

In terms of methodology, the report's basic approach starts from existing well-established definitions of algorithms and builds on them²⁹⁹. It does not discuss algorithms that automate manufacturing processes or perform other such routine tasks. Rather, it limits the discussion to algorithms that are digital and affect the public at large, thus focusing mainly on algorithmic decision-making that has implications for human rights.

²⁹⁹ Tarleton Gillespie's assumption that "algorithms need not be software: in the broadest sense, they are encoded procedures for transforming input data into a desired output, based on specified calculations. The procedures name both a problem and the steps by which it should be solved." (Gillespie 2014:167). Algorithms are thus perceived as "a series of steps undertaken in order to solve a particular problem or accomplish a defined outcome" (Diakopoulos 2015:400).

In particular, the report considers the following characteristics of algorithms that engage in automated data processing and (semi-)automated decision making as key issues from a human rights perspective: automation, data analysis, and adaptability. In addition, algorithms and data processing techniques are produced by human beings and operated by human beings. Their implications can therefore not be understood without acknowledgement of the social constructs that exist around them. First the report examines the impact on free and fair trial. It explains that algorithms are increasingly used in the context of the civil and criminal justice systems where AI is being developed to eventually support or replace decision-making by human judges. It is suggested that such systems can support or assist judges (and lawyers). Given the pressure of high caseloads and insufficient resources from which most judiciaries suffer, there is a danger that support systems based on artificial intelligence are inappropriately used by judges to “delegate” decisions to technological systems that were not developed for that purpose and are perceived as being more ‘objective’ even when this is not the case. Great care should therefore be taken to assess what such systems can deliver and under what conditions that may be used in order not to jeopardise the right to a fair trial. This is particularly the case when such systems are introduced mandatorily, as is the case for parole decisions in the United States. Concerns about judicial bias around parole decisions have led to the mandatory introduction of software to predict the likelihood of offenders reoffending in many U.S. states. Furthermore, the report elaborates on the impact of algorithms on other human rights, such as the right to privacy and personal data protection, freedom of expression, freedom of assembly and association, effective remedy, prohibition of discrimination, etc. It then goes forward to examine the regulatory implications of the use of algorithms. It states that there are numerous cases where regulation is already in place. For instance, software and data processing systems, including algorithms, used in ‘slot machines’ in Australia and New Zealand must be “fair, secure and auditable”. Developers of such machines are required to submit their algorithmic systems to regulators before they can be presented to consumers.

In conclusion and as a way forward, the authors propose extended research to obtain more information about algorithms, and engagement of professional communities’ members in debates and discussions. It also recommends, promotion of media and information literacy activities and allowing access to people and organisations to information. The public debate on the multiple human rights dimensions of algorithms is lagging behind technological evolution and must be strengthened rapidly.

3.2. References discussing Artificial Intelligence

This section provides summaries of the high-relevance reference documents which discuss various aspects of AI. These are references numbers from 31 to 56. The respective number of the reference in the reference list is indicated next to its title.

3.2.1. Humans forget, machines remember: Artificial intelligence and the Right to Be Forgotten (Ref. no. 31)

Reference title: E. F. Villaronga, P. Kieseberg, and T. Li, ‘Humans forget, machines remember: Artificial intelligence and the Right to Be Forgotten’ *Computer Law & Security Review*, vol. 34, no. 2, pp. 304–313, Apr. 2018.

Key words: *artificial intelligence’ (AI); right to be forgotten, data, personal data protection, memory, forgetting, innovative techniques*

The article analyses the current privacy legal framework and case law in the EU, the concepts of human and artificial intelligence (AI) memory and forgetting in order to understand the ‘right to be forgotten’ (RTBF) and its applicability to AI.

The article aims to demonstrate the failure of the current privacy laws in the EU to reflect the realities of AI technologies and to identify necessary adaptations of these laws to address the RTBF in a post-AI world.

In terms of methodology, in order to prove the inapplicability of the RTBF to AI, the authors take the idea as a starting point that AI fundamentally changes the current understanding that privacy rests on the concept of how humans remember and forget. They demonstrate that the concepts of human and AI memory and forgetting should be understood differently, although the current privacy laws treat them as alike. These differences are explained through analysis of the legal controversies around the RTBF and in particular the failure of Article 17 to accommodate the complexity of data deletion from real-life technical environments, and through providing a technical analysis of data deletion in machine learning ('forgetting').

The paper discusses methods for changing the underlying data to make them less sensitive and eventually remove the need to delete the data, none of which is considered fit enough to be used in real-life applications. The authors propose several alternative technology solutions to address the issue, however, the question whether they are sufficient to fulfil the legal requirements under the RTBF remains open as the law is not explicit. Finally, the article suggests changes in the legal/policy framework to address the gaps. The authors observe that the EU data protection laws are scarce and ambiguous in defining methods for deletion of personal data, which renders the application of RTBF to AI impossible. It is not clear which deletion techniques would suffice to fulfil the legal expectations of regulators, courts and the legal communities in general. Although some innovative techniques may be better placed to satisfy these expectations than others, there is still a lot of work to be done to prove their efficacy.

In conclusion, the authors opine that the EU privacy laws are not fit to handle the complexities and challenges of artificial intelligence. Discussing the technical problems faced when adhering to strict interpretation of data deletion requirements under the RTBF, they ultimately conclude that it may be impossible to fulfil the legal aims of the RTBF in artificial intelligence environments. Finally, they observe a core issue for AI and RTBF – namely, the insufficient interdisciplinary scholarship in support of privacy law and regulation.

As next steps, the article recommends amendments to the EU data protection framework to make it less ambiguous regarding the technical side of the information systems with regard to deletion of personal data and can therefore be of use to the EU decision makers. In particular, these may include creation of a guidance of non-binding nature, which may be 'inspired' by standards like the ISO/IEC 29134:2017, preferably in collaboration with the binding nature of hard law.

3.2.2. How is Austria approaching AI integration into judicial policies (Ref. no. 32)

Reference title: M. G. Stawa, 'How is Austria approaching AI integration into judicial policies?'

Key words: *anonymisation, data, analogue*

This paper describes the ways Austria approaches AI integration into judicial policies. It elaborates on the use cases of digital and physical mail, digitisation assistance of existing analogue files, anonymisation of court documents, and analysis and preparation of investigation data.

In terms of methodology, it clarifies the main key points of this approach and briefly mentions the steps for implementation. In terms of research methodology, it is assumed that the research itself has been conducted before the generation of this presentation.

The paper's key points are that in this strategy, Austria is focusing on the acquisition of data using AI, the optimisation of workflows and using AI in decision-making. The main goal is to automate repetitive manual tasks. These can be split into two main categories, data analysis and file management: data analysis is for investigation data and anonymisation of court documents, and file management involves intelligence in digitisation of analogue (scanned) files handling mail income.

In conclusion, the paper remains high-level without diving into the technical details since it is intended for a broader audience.

As next steps, analysing the presentation, the opportunity of a European-wide pattern recognition in documents and judicial cases can be observed. In other words, there is a business case where MSs could adopt some of the practices mentioned in the presentation. In order for this to happen, several commitments, studies and proof of concepts will be made.

3.2.3. A Law on robotics and Artificial Intelligence in the EU? (Ref. no. 33)

Reference title: Ponce, Aida, *A Law on Robotics and Artificial Intelligence in the EU?* (October 3, 2017). ETUI Research Paper- Foresight Brief #02-September 2017.

Key words: *EU law, robots, technological change, digitalisation, artificial intelligence' (AI), artificial agents, electronic persons, electronic personhood, robot liability*

The article discusses the common acceptance of the proliferation in using artificial intelligence (AI), robots and other technologies within the society and questions what might happen when advanced technologies go wrong, and who or what is legally accountable. Furthermore, it considers problems that can arise regarding the key challenges for regulating new technologies.

The article aims to contribute to the discussion of existing and potentially required regulation on the increasingly interaction with robots, AI and other technologies.

In terms of methodology, the article takes as its point of reference the European Parliament (EP) Resolution on Civil Law Rules on Robotics, with recommendations to the European Commission³⁰⁰ and analyses the proposed definition of robots and its limitations.

Firstly the author describes the background behind the Resolution and its main assumptions such as the right to privacy. The Resolution focuses on the development of robotics and artificial intelligence only for civil use and provides recommendations on an 'ethical framework for the design, production and use of robots', however it does not propose a specific definition or categorisation of 'smart autonomous robots'. It only presents an annex with a broad list of criteria, calling for the Commission to come forward with a more specific definition and subcategorisation of the term 'robot'. On the other hand, and opposing to the mentioned recommendation to better define "robot", the author suggests the term "*artificial (made by humans) agents*"³⁰¹ (*because they take actions*) which despite not acting fully autonomous, they "have the capacity to learn, evolve, and eventually become semi- or fully autonomous".

Because robots perform such important tasks and make autonomous decisions in real time, the author brings legal concerns to light, such as liability. In this sense, the EP Resolution introduces the status of 'electronic persons' with rights and obligations. The author comments on this idea noting that the debate on the personhood and capacity to be held accountable for its action can open a sensitive debate.

In conclusion the author defends a more ambitious legal framework in the sense of not focusing on categories of robots but addressing artificial intelligence and agents as well. Further, the author forewarns on the risks of putting humans and robots as players with equivalent legal status (legal person-electronic persons) in the same legal framework.

As a way forward, identifying the levels of risk of inappropriate use or development of autonomous artificial agents is crucial and requires instruments of governance rather than

³⁰⁰ Available at <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52017IP0051&from=EN>

³⁰¹ As per the author includes: decision-making algorithms, automated machines, digital agents, hybrid multi-agents, internet bots, robots, nano-robots, drones, etc. p. 6.

soft guidelines or codes of conduct. Given the volume of data, interactions and technologies being put into use, the EU must also implement the means to exercise the 'right to explanation' of decisions taken by automated systems.

3.2.4. Data to Decision and Judgment Making – a Question of Wisdom (Ref. no. 34)

Reference title: K. S. Gill, 'Data to Decision and Judgment Making – a Question of Wisdom,' *IFAC-PapersOnLine*, vol. 51, no. 30, pp. 733–738, Jan. 2018.

Key words: *AI, decision-making*

The paper points out that the technological waves of super artificial intelligence, big data, algorithms, and machine learning continue to impact our thinking and actions, thereby affecting the ways individuals, professions and institutions make judgments. On the one hand, there is an argument that more data and knowledge together with the cyber physical system of industry4.0 will automatically push society along some track towards a better world for all. On the other, we hear worrying voices of the imponderable downside of powerful new cyber, bio-, nanotechnologies, and synthetic biology. In the age of uncertainties, big data and the algorithm, how is the decision- and judgment-making process affected?

In terms of methodology, the paper mostly uses a qualitative approach with crucial references but does not dive into quantitative information. The main goal is to raise awareness of the potential developments of processes in decision- and judgment-making.

It describes various types of judgment and decision-making processes incorporating several aspects that are important for the final outcome. It makes a loose chronological reference to the various definitions and points out the contradiction between them. Finally, it moves on to establish a connection with data science and specifically the processes of profiling. It highlights references to modern examples of usages of data to predict situations and profile groups of people for the best interest of specific parties. It highlights the ethical part of the usage of personal data and notes the concerns expressed by others on the notion of reducing judgment to a calculation.

Concluding, the paper reads: 'We need to reflect on whether the instrumental thinking of computability would continue its march of making a lasting shift from judgment to calculation'.

3.2.5. Computational intelligence techniques for multicriteria decision aiding: An overview (Ref. no. 35)

Reference title: M. Doumpos and C. Zopounidis, '*Computational Intelligence Techniques for Multicriteria Decision Aiding: An Overview*, in *Multicriteria Decision Aid and Artificial Intelligence*', John Wiley and Sons, 2013, pp. 1–23.

Key words: *artificial intelligence' (AI); multicriteria, data, decision aid, fuzzy logic, linear programming, real world*

The chapter of the book analyses the field of multicriteria decision aid (MCDA) which fits in the context of real-world decision-making processes where problems are usually too complex and often ill-structured. Such problems could not be considered and approached through a single criterion that will provide an optimal decision. Thus the chapter introduces the usage of artificial intelligence and suggests a number of algorithms and practices that could be followed towards such solutions.

The chapter aims to clarify the processes, techniques, models and paradigms in multicriteria decision aid systems. The purpose is to provide a clear description on the capabilities of the said models, mentioning the historical aspects as well as the applicability techniques. Finally, the chapter aims to clarify that the combination of artificial intelligence

and MCDA is interesting, attracts an increasing attention from researchers and has a promising future.

In terms of methodology, the text uses mostly quantitative methods by enumerating the models and techniques in approaching a real-world multicriteria decision problem. It provides a comparison between models and identifies potential issues in each.

The chapter discusses the effectiveness of MCDA and provides an overview of the lack of structure along with the necessity of a large number of potentially conflicting criteria to be considered. It further elaborates the benefits of artificial intelligence in aiding the decision-making process. It illustrates a modelling process which involves four main stages. These are interchangeable and the process suggests a bidirectional approach. Additionally, it lists and describes the methodological approaches in achieving MCDA which include multiobjective mathematical programming, outranking techniques, preference disaggregation analysis and so forth. Further, the chapter connects computational intelligence (as part of AI) and MCDA by introducing AI techniques such as data mining, neural networks, rule-based models, fuzzy modelling and others. It provides several references in the bibliography to support the collaboration with MCDA. The chapter proves its point through mathematical reflections.

In conclusion, the authors support the integration of computational intelligence with MCDA by proving its benefits with citations and credible findings.

As next steps, the chapter recommends that due to the increasing interest in the area, research could include other methodologies such as knowledge management, representation and engineering, natural language processing, intelligent agents and other. However, it seems mandatory to provide an empirical evaluation for identifying weaknesses and strengths in each additional methodology.

3.2.6. Artificial Intelligence in Online Dispute Resolution (Ref. no. 36)

Reference title: D. Carneiro, P. Novais, and J. Neves, 'Artificial Intelligence in Online Dispute Resolution' 2014, pp. 61–96.

Key words: *artificial intelligence' (AI), online dispute resolution (ODR), alternative dispute resolution methods*

This paper provides a critical analysis of a number of commercial ODR providers and research projects from an AI point of view. The authors present the approach which they are following, in line with the conclusions achieved with an analysis of the state of the art.

The article aims to determine how AI techniques can be used to improve the current state of the art in the field of ODR, as one of the alternatives to the dispute resolution by means of litigation.

In terms of methodology, the paper explains the meaning of ODR³⁰², provides examples for traditional alternative methods for dispute resolution, such as negotiation, mediation, arbitration and conciliation, and focuses on ODR as a new method to resolve conflicts which occur online, e.g. in the context of e-commerce activities. In this sense, the authors are of the opinion that in order to transplant or adapt these conventional methods to the new environment, one needs to integrate AI-based problem-solving techniques into ODR ones. The authors proceed to describe how ODR can be improved by AI by analysing different problem-solving techniques and methodologies.

The paper provides an overview and analyses techniques such as decision support systems, expert systems, knowledge-based systems, intelligent interfaces, case-based reasoning, multi-agent systems, legal ontologies and rule-based systems. Consecutively, the authors look at specific projects on the intersection AI and law, such as, among others,

³⁰² ODR refers to the use of the mechanisms in a technological context, either supported by technology or under a virtual computational environment.

rule-based decision-making systems (LDS), which were first conceived for the domain of liability law; *EXPERTUS*³⁰³ and *SmartSettle* (supporting the parties to find the middle ground among them to settle a dispute). The paper then analyses the state of play of AI and ODR, concluding that the technologies are not currently exploited to their full potential, but rather its use remains at rudimentary level. The authors point out the major disadvantage that existing ODR implementations rely on traditional forms for acquiring information, providing little to no assistance at all. The interfaces lack intelligence and intuitiveness and technologies are barely used for even the simplest forms of process automation. In addition, very few systems use IT for knowledge management and goal achievement. Finally, the authors propose a phase-based approach for problem-solving that can be combined by ODR systems. The phases include pre-selection of cases by means of lightweight algorithms, evaluation and classification of the cases by criteria using evaluation algorithms and knowledge generation.

In conclusion, the paper argues that fully autonomous (so-called 'second generation') ODR systems are not yet achievable and human factors still play a major role even for simple tasks to be performed. However, with research focusing on development of fully automated systems based on AI-borrowed techniques, this current state may be improved.

As next steps, the article recommends that a hybrid approach be followed in the development of the advanced expert systems above, merging the simplicity of a rule-based system with the completeness of a case-based one.

3.2.7. The ICO and artificial intelligence: The role of fairness in the GDPR framework' (Ref. no. 37)

Reference title: M. Butterworth, 'The ICO and artificial intelligence: The role of fairness in the GDPR framework' *Computer Law Security Review*, vol. 34, no. 2, pp. 257–268, Apr. 2018.

Key words: *artificial intelligence' (AI), General Data Protection Regulation (GDPR), data protection, fairness, ICO, purpose limitation, data minimisation; accuracy; accountability and governance, transparency, DPIA, collective profiling*

The article situates the United Kingdom Information Commissioner's Office (ICO) guidance in the context of wider legal and ethical considerations and provides a critique of the position adopted by the ICO.

The article aims to critically explore the difficulties with the ICO's analysis in its 2017 paper and to identify spaces where future regulation or guidance may be required. It also aims to put such debates arising from an analysis of data processing into context, alongside wider concerns around the development and implementation of AI.

In terms of methodology, the paper starts with the issue of the legal liability of AI that has been discussed and triggers some ethical concerns of the effects of AI on humanity. It points out that the legislation that currently deals with these effects is the data protection laws, continues with an overview of the ICO's paper of 2017 and extends it with its own analysis.

The paper argues that according to the ICO's analysis, the key challenge for AI processing personal data are in establishing its fairness. This shift reflects the potential for AI to have negative social consequences (whether intended or unintended) that are not otherwise addressed by the GDPR. In particular, the article mentions the five tendencies identified by the ICO in its paper, namely: the use of algorithms; the opacity of processing; the tendency to collect 'all the data'; the repurposing of data; and the use of new types of data. It follows the ICO's analysis and covers concepts such as: fairness; conditions for processing personal data (consent and legitimate interests); purpose limitation; data minimisation; accuracy; accountability and governance. Regarding for instance, the

³⁰³ A decision-support system that advises Mexican judges and clerks upon the determination of whether the plaintiff is or not eligible for granting him/her a pension (on the basis of the 'feeding obligation').

principle of *purpose limitation* under the GDPR, the author differs from the ICO's opinion that assessing the compatibility of data 'repurposing', should be based on the fairness of the new purpose. In his opinion, this creates uncertainty, as the concept of fairness is rather vague, despite certain guarantees of the data subject's rights in this regard. The paper also discusses existing compliance tools under the GDPR, such as data privacy impact assessments (DPIAs), anonymisation, privacy notices, and privacy by design and certifications. The ICO encourages some ethical approaches and algorithmic transparency, which are not covered by the GDPR, such as organisations defining the benefits of the analytics, using the least risky approach, respecting the interests of stakeholders during processing, etc. The article also comments on the significance of fairness to algorithms and the issue of 'collective profiling'.

In conclusion, the author proposes a number of next steps to boost innovation, such as preserving the GDPR transparency and governance requirements when preparing any future AI legislation, but in addition, ensuring adequate protection of the collective interests that arise in the construction of a profile, which the GDPR currently fails to acknowledge. Furthermore, the paper recommends putting in place appropriate forms of regulation of the 'fairness' principle by governments, encourages the performance of DPIAs by organisations which use AI, and granting legal personality of AI or adopting other legislative measures.

3.2.8. Why Machine Learning May Lead to Unfairness (Ref. no. 38)

Reference title: S. Tolan, M. Miron, E. Gómez, and C. Castillo, 'Why Machine Learning May Lead to Unfairness,' 2019, pp. 83–92.

Key words: *algorithmic fairness, algorithmic bias, machine learning, risk assessment, criminal recidivism*

The article discusses the restrictions of machine learning (ML) algorithms, in particular in predicting juvenile recidivism, tacking the case of Catalonia, as decisions based on ML happen to be potentially biased, thus leading to unfair results and decisions.

The article aims to investigate the trade-off between predictive performance and fairness, comparing risk assessment results from ML methods and the predictive performance of Structured Assessment of violence Risk in Youth - SAVRY³⁰⁴; to observe if discrimination on sex and nationality occur whether in SAVRY or in ML models. Finally, it tries to explore the potential sources of unfairness of using ML methods.

In terms of methodology, the authors used the dataset in Catalonia on recidivism juvenile justice from 2002 to 2010 as input, involving 4,753 Catalan adolescents that committed offences. In order to observe recidivism behaviour, their status was followed up on December 31, 2013 and December 31, 2015 (independent of their association with the juvenile justice system). The authors followed up and demonstrated on a binary classification task of predicting recidivism from demographics, criminal history and SAVRY features.³⁰⁵

In this article, the authors first describe multiple and sometimes opposing definitions of fairness from the legal perspective, computer science academics and even in further literature³⁰⁶. The article then comments on existing risk assessment tools used to support judges assessing the offender's risk of recidivism. In this context SAVRY is described, where professionals are highly involved in risk assessment and it is more oriented to inform on interventional planning. This evaluation of violent risk recidivism is purely a professional judgment, meaning that there is no algorithm associated. However, the authors also add that unfortunately there is no sufficient literature on the discriminatory results of risk

³⁰⁴ That evaluates 24 risk factors divided in Historical, Individual and Social/Cultural categories.

³⁰⁵ Four experiments are done varying on the selected feature and volume of training data. More detailed information on feature set in p. 3 of the article here in discussion.

³⁰⁶ The study considers the fairness criteria a derived from legal context – Art. 14 of the European convention on Human Rights

assessment tools such as SAVRY, contrary to what already exists regarding COMPAS, largely used in the United States of America.

After a detailed explanation on methodology and evaluation on experimental sets, the authors present the study's results.

In conclusion, the study demonstrates that with regards to accuracy, ML models slightly succeed over SAVRY, yet the same models also revealed to be more discriminative against foreigners, including citizens of some nationalities and male offenders.

As a way forward, the authors propose to investigate methods that could mitigate unfairness in the ML methods and ideally preserve accuracy gains. Moreover, it is intended to extend the experiment to other countries, also the investigation to predict adult criminal recidivism.

3.2.9. Extraneous factors in judicial decisions (Ref. no. 39)

Reference title: Shai Danziger, Jonathan Levav and Liora Avnaim-Pesso, '*Extraneous factors in judicial decisions*,' Proc. Natl. Acad. Sci. U. S. A., vol. 108, no. 17, pp. 6889–6892, Apr. 2011

Key words: *judicial rulings, extraneous factors, parole decisions, mental exhaustion*

The article discusses an alternative view of law – realism - that holds that psychological, political and social factors – extraneous factors – have an important influence on decision makers and their rulings.

The article aims to demonstrate how extraneous factors can potentially impact judges' rulings, therefore challenging the law view that judges only apply legal reasons to a case in a rational way. Thus, it also aims to speculate on judges' psychological bias.

In terms of methodology, the empirical test of such an argument consists in observing 1,112 judicial rulings by eight experienced judges presiding over two important boards in four Israeli prisons. The data were collected over 50 days in a 10 months period and only parole decisions were taken into consideration.

The daily average of rulings was analysed in parallel to the interventions taken – the present study focuses on the two daily food breaks by the decision makers in order to overcome executive function and mental exhaustion. Finally, the analysed rulings are classified into two categories: accept request and reject request.

The paper first describes the existence of several studies proposing that repeated rulings depletes an individual's executive and mental functions, which can impact on judges' judicial decisions. The article continues with the analysis of the judges' daily routine: number of rulings (14–35 cases per day), breaks taken during the day, etc.

The study shows that 64.2% of the sample of parole requests were rejected and that the probability of a favourable ruling for cases of similar legal characteristics increases when the decision is taken at the beginning of the session after the food break. Moreover, it hints that the mental exhaustion of the judges is more linked to the act of making decisions than to the duration of the deliberations, as the study also demonstrate that a favourable ruling takes longer than a parole rejection in this case. Thus, the cases being ruled later in each session tend to be unfavourable.

In conclusion, the authors do not argue whether a judge's favourable judicial decision is directly and unequivocally linked to breaks, as in this study only pauses for taking a meal were considered. However, the study findings showed that legally irrelevant situational determinants such as a food break may influence rulings differently in cases with similar characteristics.

As a way forward the authors predict and leave on hold that the presence of other 'forms of decision simplification strategy' may also influence other relevant sequential decisions, such as in medical or financial fields etc. The interesting findings of this study show some

fields where, arguably, the use of innovative technologies could prevent bias in judicial rulings.

3.2.10. Automating Society - Taking Stock of Automated Decision-Making in the EU (Ref. no. 40)

Reference title: Alfter Br., Müller-Eiselt, R., and Spielkamp M. '*Automating Society - Taking Stock of Automated Decision-Making in the EU*', AlgorithmWatch, 1st edition, January 2019

Key words: *artificial intelligence (AI), automated decision-making (ADM)*

The paper is a report of AlgorithmWatch³⁰⁷ and analyses automated decision-making (ADM) systems in the EU that affect justice, equality, participation and public welfare, either directly or indirectly.

The report aims to show that algorithmically driven ADM systems are already used within the EU; to outline the state of the political discussion at EU and Member State levels; to serve as a nucleus for a network of researchers focusing on the impact of ADM on individuals and society; and to distil recommendations from the results of the findings.

In terms of methodology, the authors classify their report as an explorative study of automated decision-making at EU level and in 12 selected Member States. It contains a wide range of issues and examples that justify a closer look, more in-depth research and discussion.

In particular, the report focuses on four main issues. Firstly, it examines how society is discussing ADM. On the one hand, the paper looks at the debates initiated by governments and legislators like AI strategies, parliamentary commissions etc., while on the other, it lists civil society organisations engaged in the debate, outlining their positions with regard to ADM. Secondly, the paper explores the full range of regulatory proposals in place – laws, codes of conduct, technical standards, even ideas of self-regulation. Thirdly, the report looks into the oversight institutions and mechanisms that are in place. Last but not least, it explores the ADM systems already in use.

As a way forward, the authors provide specific recommendations, such as (1) closing the gap between Member States, and encouraging those which lag behind others to invest more in capacities; (2) inspiring regulatory ideas from existing legislation in addition to the GDPR³⁰⁸, (3) involving a wide range of stakeholders in the development of criteria for good design processes and audits, including civil liberty organisations; and (4) setting up appropriate bodies to monitor, etc.

3.2.11. Artificial Intelligence and Music: Open Questions of Copyright Law and Engineering Praxis (Ref. no.41)

Reference title: B. L. T. Sturm, M. Iglesias, O. Ben-Tal, M. Miron and E. Gómez, '*Artificial Intelligence and Music: Open Questions of Copyright Law and Engineering Praxis*,' Arts, vol. 8, no. 3, p. 115, 6 9 2019.

Key words: *artificial intelligence', music, copyright, engineering, ethics*

The paper analyses the rapid evolution of AI pertaining to music creation. It illustrates the various developments made so far and it focuses on the intellectual property, the creator's rights and the combination of human- and AI-generated music.

The paper aims to provide information on how AI-generated music works and what steps have been taken so far towards achieving this. It further elaborates on ownership of this

³⁰⁷ <https://algorithmwatch.org/en/>

³⁰⁸ For example, equal-pay regulation, to address new challenges like algorithmically controlled platform work, also known as the Gig Economy, and explore new avenues for regulating the collective effects of ADM altogether.

music. It talks about the training data required by AI and the implications related to responsibility, infringement and rights. Finally, the paper aims to raise awareness and caution on the potential new shape of music, access to music and real-time music generation.

In terms of methodology, the paper uses both qualitative and quantitative methods, since it provides information on the progress of AI-generated music, it refers to legislation regarding intellectual property. Additionally, it raises several questions and cases where copyright law has to address AI training, data, AI-generated music and the combination of AI-generated music and human created music.

The paper discusses the huge leaps in development regarding AI and integrates them with the owners of the development. It begins by explaining the copyright law perspective when it protects original works such as musical composition, lyrics etc. It brings the differences between countries when it comes to copyright rights for AI-generated works and human-centric works to the reader's attention. The Court of Justice of the European Union, for example, considers work as original when it is the expression of the author's own intellectual creation and their free creation choices. This means that AI-generated work might not be eligible for copyright protection. Furthermore, it raises the issue of training data which are much needed for AI systems that use machine-learning algorithms. In other words, as it might happen, a musical work product could be the combination of both AI and human deliverables. The paper talks about the benefits of using fair, accountable and transparent machine-learning processes since there could be cases of infringement and bias. By referring to folkrrn.org, an AI-based system that generates folk music based on datasets from thousands of human-centred productions, it addresses the aforementioned concerns on copyright and intellectual property.

In conclusion, the paper acknowledges that technology is a doubled-edged sword with benefits and detriments that deserve to be critically analysed as it is developed, applied, improved and retired. Furthermore, the paper explores the possibilities of an entirely different approach for receiving music which will affect the copyright and other related rights. It further iterates the question of whether the owner of the AI program (software) would be entitled to any rights.

As next steps, the authors are positive about the future since human creativity can surprise in its ability to incorporate new technologies with new ways of creativity.

3.2.12. PHRP Expert Meeting on Predictive Policing (Ref. no. 42)

Reference title: PHRP Expert meeting, '*PHRP Expert meeting on predictive policing*', Police and Human Rights Programme (PHRP), Amnesty International, 20 May 2019.

Key words: *artificial intelligence' (AI); bias; data quality; human rights*

The article analyses possible answers on questions related to the impact the use of such predictive technology can have on human rights with regard to data protection and the right to privacy, the right to liberty and security, freedom from discrimination, the right to a fair trial and effective remedy, etc.

The article aims to present a profound view on the impact on human rights resulting from the use of innovative technologies (AI) related to the accuracy of the outputs, possible discriminating biases in the underlying data sets and the model using the data, and their effectiveness to actually predict crime.

In terms of methodology, a differentiation is made in the perspectives of the impact on the human rights from 'place-oriented predictive policing', and 'person-oriented predictive policing'. Then the data quality and algorithm model are analysed in terms of bias, and the difficulties of handling the systems outcome.

The paper discusses the special care that should be given to the data quality of the training set. It should form a pool with the same distribution as the world on which the model is applied. Relying on the police's previous approach and priorities often results in a

structural bias. Finding the reason for this bias could also enable a more in-depth look into the causes of crime and address them rather than to choose a law-enforcement approach.

The algorithmic model is a way to show how the system functions. It is based on statistical correlations. Some of these correlations are missing a crucial link and lead to irrelevant predictions of crime. Some features might show a statistical correlation with crime but are ethically not entirely correct to be able to include them in the algorithm. The inclusion of certain minorities can result in more 'high risk' profiles, which can end up in more false positives. However, in real life, humans tend to overestimate dangerousness and their predictions can result in a high rate of false positives compared to the system. With regards to true positives (true criminals), the accuracy of the system is often much lower.

Self-learning systems have their additional problems: (1) the system does not always reflect the real world, but how the system sees the world. (2) A feedback loop: an area where the police pass more will be where the likelihood of catching criminals will be higher.

Challenges of place-oriented predictive policing: (1) The risk that crime is actually only displaced, but not reduced. (2) It is not proven that predictive crime systems decrease the actual crimes committed in an area. (3) It is difficult to test to what extent predictions are accurate. (4) It is difficult to define what is considered a success through predictive policing.

There is a concern that even if the computed risk assessment is accompanied by an explanation of how it came to the result, a high-risk score is still likely to impact decision-making, for example by judges. People agree that it proves to be particularly difficult when it comes to the use of algorithms in decision-making, or even to challenge any decision taken. Who is accountable? High transparency is needed.

In conclusion, it seems very hard to avoid any bias in the dataset, although it is important to have a good representation of the real world, and there is still some learning to be done in the way to interpret the outcomes of the system.

As next steps, the article recommends further research in finding a remedy to the problem of data quality, the acceptability of the predictive policing on human rights perspective, and looking at the different ways of using the algorithm models.

3.2.13. Constitutional democracy and technology in the age of artificial intelligence (Ref. no. 43)

Reference title: P. Nemitz, '*Constitutional democracy and technology in the age of artificial intelligence*', vol. 376, Royal Society Publishing, 2018

Key words: *artificial intelligence (AI), digital power, democracy, GDPR, personal data protection, laws on AI*

The article discusses digital power, the unwillingness of the big digital actors to abide by the law when exercising it and the threats to democracy this hides.

The article aims to identify the challenges of AI, which should be addressed by ethical rules, and the ones that need legal codification and to raise considerations on the approaches towards a law on AI.

In terms of methodology, the author sets the context of the different perspectives the democratic rights and the laws are seen from when it comes to new technologies – the one of the giant corporations and the one of the decision makers. He channels the idea that technology neutral law complemented with case law on its interpretation is fit to guarantee democratic rights and can be adapted to the technological development.

This paper first describes the four core elements of today's digital power concentration in the hands of the five key digital market players Google, Amazon, Facebook, Alphabet and Apple, which, seen together, are a threat to democracy and to functioning markets. These are the power of money, the control over digital environment and infrastructure for public discourse and democracy, the power over individuals based on profiling and the dominance in AI innovation. It then recalls the experience with the lawless Internet and the relationship between technology and the law as it has developed in the Internet

economy and the experience with the GDPR. The article perceives the GDPR as a modern example of a technology neutral law, the meaning and relevance of which changes with the progress of technology. The paper points out the argument put forward by big corporations and neo-liberals that a democratic, technology neutral and compromising legislation, such as the GDPR or a future AI legislative framework, is not 'flexible' enough to accommodate and address complex technological development issues. However, this claim ignores the power of technology neutral legislation and the power of general laws to be concretised by evolving application practice and jurisprudence. Furthermore, the article discusses the challenges of AI, which have to be addressed by ethical rules and those, which need enforceable rules.

In conclusion, the paper closes with a call for a new culture of incorporating the principles of democracy, rule of law and human rights by design for AI.

As a way forward, the article reflects the approach towards AI law and proposes several reflection paths. First, if one concludes that actions carried out by an AI (negligently or intentionally) are considered illegal only when carried out by a human, this should be codified in law. Second, it should be tested whether regulatory principles found in specific bodies of law should be generalised for AI or whether specific modifications of such principles should be applied and makes parallel with pharma law. Third, it suggests performing a three-level impact assessment on AI - level of the legislator, the level of the developers and users of the technology, and level of the individuals, who should have the right to be introduced by law to the AI, its functions, logic and impacts on their interests.

3.2.14. Facial recognition technology: fundamental rights considerations in the context of law enforcement (Ref. no. 44)

Reference title: F. - European Union Agency for Fundamental Rights (FRA), '*Facial recognition technology: fundamental rights considerations in the context of law enforcement*', 2019

Key words: *artificial intelligence' (AI), (impact) on fundamental rights, (live) facial recognition technology (FRT), respect for private life and data protection, non-discrimination*

This paper forms part of FRA's research project on artificial intelligence, big data and fundamental rights.

The objective of the paper is to explore specifically the 'live facial recognition technology' (LFRT)³⁰⁹ and the fundamental rights implications related to its development, deployment, use and regulation.

In terms of methodology, the paper explains the FRT and the role of facial images as unique biometric identifier under the EU data protection *acquis* and assesses the risks of wrong identification. It then describes several cases of use of FRT by public authorities in the EU and comments on the fundamental rights that are most affected by these uses.

The paper explains the uses of the FRT, namely for verification (one-to-one comparison); for identification (one-to-many comparison) and for categorisation (matching general characteristics). The paper focuses on the fundamental rights implications of FRT used for identification, i.e. where the facial image is cross-checked against many other images in a reference database. It argues that the accuracy of the FRT algorithms is strongly influenced by the data quality of the training databases. The paper explains that these algorithms have binary outcomes – false positive and false negative³¹⁰. Factors influencing this quality may be background and object occlusion, illumination and light reflection, ergonomics, age, aging, gender, skin colour and skin conditions. The paper highlights the importance of knowing which datasets were used to build the FTR; of having high-quality training data and of checking the quality of the reference data in watchlists to

³⁰⁹ Comparing footage obtained from video cameras against facial image databases, such as watchlists, for law enforcement and border-management purposes.

³¹⁰ In the first case an individual is wrongly identified as being in the watchlist, whereas they are not. In the second case, the outcome is 'no match' with the watchlist, whereas there actually is.

ensure respect of fundamental rights and avoid discrimination. Furthermore, it describes test uses of LFRT for law enforcement purposes in the UK, Germany and France, and clarifies that due to lack of legal basis for their deployment, LFRT could currently not be used legally in the latter two countries. Tests in Austria and the Netherlands show interest of other EU Member States in the technology. In addition, the paper analyses the fundamental rights most affected by the use of LFRT, such as respect for private life and data protection, non-discrimination, freedom of expression and procedural rights, through the prism of the EU data protection laws.

In conclusion, before deploying FRT in real-life applications, among other key aspects, one should consider setting a clear and sufficiently detailed legal and regulatory framework; close monitoring of facial recognition developments by independent supervisory bodies; fundamental rights impact assessments through consultations with the industry; and placing by public authorities of data protection and non-discrimination requirements at the centre of all technical specifications when procuring FRT or commissioning innovative research.

3.2.15. Data quality and artificial intelligence – mitigating bias and error to protect fundamental rights (Ref. no. 45)

Reference title: F. – European Union Agency for Fundamental Rights, '*Data quality and artificial intelligence-mitigating bias and error to protect fundamental rights*'.

Key words: *artificial intelligence*, *data*, *data privacy*, *quality of data*, *training data*, *ethics*, *fundamental rights*.

The paper analyses the concepts of artificial intelligence and the crucial importance of data quality when it comes to training AI systems. It further analyses the impact of the usage of incomplete or biased data on people's fundamental rights, including discrimination.

The paper aims to provide information on what data quality and artificial intelligence are, and how they are connected with fundamental rights. It aims to raise awareness about how the data are being used in a training cycle for AI systems. Additionally, the paper aims to provide knowledge on the impact of poor quality data and suggests that the assessment of the data themselves could negatively impact the protection of personal data.

In terms of methodology, the paper uses a qualitative method by providing instilled knowledge that has been accumulated pertaining to the AI systems and the need of training data in combination with the fundamental rights of people.

The paper discusses the notion of bias in training data among other aspects. It describes the way data is being collected by businesses for data analysis aiming at business growth. It emphasises the discrepancies in data depending on the medium they are collected. For example, data gathering from the internet is not efficient since not everyone has access to the internet. The same goes for social media as many people choose not to use them and as such, the collected data is inevitably biased. This is particularly noticeable for households with low income that do not have internet access. Furthermore, the paper uses examples of biased results when low quality data are used in the training process of the AI systems. Low quality could affect the access to a fair trial. As a general idea, the paper suggests that even though a data analysis could rely on big data, it does not necessarily guarantee high quality. Thus, it further describes the ways data quality could be assessed by indicating a few, like determining the measurement error, the representation error, the reliability and validity of data.

In conclusion, the paper notes that assessing AI-related technologies and algorithms from a fundamental rights' perspective is a complex task. It states that the use of algorithms in AI can negatively impact on fundamental rights if the data used to build an AI system measures the wrong thing. The quality of data can raise discrimination and as such special caution needs to be exercised.

As next steps, the paper agrees that there are no standards in assessing the quality of data but it provides a few steps in the form of questions that could be used for assessing the quality of data. These are: (1) Origin of data, where does the data come from? (2)

Information in the data. Is the information included in the data appropriate for the purpose of the algorithm (in training the data)? (3) Data coverage. Is there any under-representation in the data? (4) Missing information. Are there parts of the dataset that are partially covered? (5) Geographical coverage? (6) What is the location of data collected?

3.2.16. #Big Data: Discrimination in data-supported decision-making (Ref. no. 46)

Reference title: European agency for Fundamental Rights publication, '*#Big Data: Discrimination in data-supported decision-making*' May 2018

Key words: *Fundamental rights, discrimination, big data, machine learning (ML), Artificial Intelligence (AI)*

The article discusses the problematics that technological developments – such in *artificial intelligence (AI)* – raise and how they influence and reshape several areas and aspects of our everyday life.

The article aims to contribute to the debate on the challenges posed by the increasing process and decision automation using machine learning (ML) and (AI), and highlighting how it could represent a threat to the protection of fundamental rights, namely the right to non-discrimination.

In terms of methodology the paper starts with a definition of big data and what it entails; reviews its use in decision-making algorithms (prediction) and its implications.

The paper first describes big data and fundamental rights' implications, starting from referring to big data as 'technological developments related to data collection, storage, analysis and applications' and frequently characterised by the 'three V's': increasing volume, velocity and variety of the data produced and that can have multiple sources such as the Internet of Things (IoT) and social media among others. It was this availability of data that influenced the development of new technologies (ML and AI) for the purpose of analysis and using this data, such as in predicting behaviour. By problematising the use of data and algorithm in facilitating decisions, the authors emphasise how low quality, poorly selected and incomplete data can lead to questionable decisions and discrimination. In this context, the paper shares a study on biased algorithms, which particularly investigates the racial bias in the risk assessment tool Correctional Offender Management Profiling for Alternative Sanction (COMPAS). COMPAS was used in the United States of America and resulted being a racially-biased algorithm³¹¹. Finally, the article debates how the algorithm may be repaired to avoid discrimination by the dataset. Even though it mentions how, for example, in some EU Member States the collection of data on ethnicity is forbidden, 'potential bias or discrimination cannot be easily solved by simply excluding information on protected groups'.³¹²

The article concludes that it is inevitable how the use of data and algorithm in daily decision-making influences peoples' lives, from sensitive predictive judicial decisions to simple spam filters.

However, the use of data and new technologies, such as ML and AI, can lead to unfair and biased decisions. Therefore, the authors argue that the transparency of the automated tools used is vital to predict decision-making, while safeguarding fundamental rights.

As a way forward the articles stress the overwhelming importance to address fundamental rights and big data developments in regulations. This importance is compared

³¹¹ Similar conclusions were stressed in parallel studies: T Brennan and W Dieterich. 2018. Correctional Offender Management Profiles for Alternative Sanctions (COMPAS). Handbook of Recidivism Risk/Needs Assessment Tools (2018), 49., cited in S. Tolan, M. Miron, E. Gómez, and C. Castillo, 'Why Machine Learning May Lead to Unfairness,' 2019, p. 84.

³¹² FRA, #BigData: Discrimination in data-supported decision- making, page 8.

to other areas that are already strongly regulated, such as medicine, production and selling of food or drugs as per the danger to peoples' lives if not properly regulated. On the matter of big data-related technologies, these are not being held responsible and, for that reason, the paper proposes setting up institutions similar to the data protection authorities that could provide oversight of these big data-related technologies in order to guarantee effective accountability. Furthermore, the paper proposes examples that may help the development and use of algorithms while safeguarding fundamental rights compliance: i) guarantee transparency; ii) conduct fundamental rights impact assessments in order to continually identify potential bias outputs from algorithm application; iii) review the quality of the data; iv) ensure algorithm explainability.

3.2.17. Using artificial intelligence in online dispute resolution (Ref. no. 47)

Reference title: M. Moiariková, 'Using artificial intelligence in online dispute resolution', Masaryk University, Brno 2018

Key words: *Artificial Intelligence (AI), online dispute resolution (ODR), family law, settlement*

The paper is a master thesis which analyses the application of artificial intelligence (AI) technologies in online dispute resolution (ODR) and provides a concrete example of a use case in the legal field of division of community property during a divorce. The paper is solely focused on the situation in the Czech Republic.

The thesis aims to create a process for settling community property using AI techniques.

In terms of methodology, the paper is split into a theoretical and a practical part. First, the author sets the legal context by describing the procedures for settling a dispute in the Czech Republic. She then takes the ODR as a type of out-of-court (or alternative) dispute resolution, analyses its nature, advantages and disadvantages and demonstrates that, although primarily used in e-commerce, ODR can also be applied to other legal fields, e.g. family law and more particularly community property division during divorce. In the practical part, the author provides a concrete example of AI use in ODR in the Czech Republic.

First, the paper describes the types of ODR processes and procedures, especially the two most commonly used ones – negotiation and mediation, as well as AI techniques applied in ODR. Subsequently, it explains the law perspective of community property division in the Czech Republic and introduces the current projects used in family law. Afterwards, the paper designs a process for community property settlement to help divide the community property and create an agreement between the parties using online negotiation. The process also assists mediators in online mediation. Different algorithms using game theory and fuzzy logic are implemented to allocate the assets to the parties. The paper provides a web application to present the process. Finally, it applies the process to a real-life scenario and compares the results with the results from similar systems – Adjusted Winner and Asset Divider.

In conclusion, in the process implemented in the thesis, the algorithms try to maximise the rating values of each party while minimising the difference between total prices (monetary values) of the parties. Therefore, the final allocation is the most satisfying possible. The implemented process is easy to extend as the algorithms determining the allocation and algorithm evaluating the best one are independent modules. Two possible approaches to extend the process arise. First, the process assumes that the monetary value was agreed beforehand. The possible extension is therefore covering the cases when the price is unknown. Another option considers unequal split between the parties, in case one party is entitled to a bigger part of the community property than the other party. In the Czech Republic, the split between the parties has to be 50/50. However, in some cases an unequal split may be used and the algorithm could be extended to support such a scenario.

3.2.18. The impact of AI on criminal law, and its twofold procedures (ref. No. 48)

Reference title: Gabriel Hallevy, *'Liability for Crimes Involving Artificial Intelligence Systems'*, Springer publications, 2015

Key words: *artificial intelligence', criminal law, perpetrators, motive, culpability, law, civil law*

The book analyses a theory on criminal law and the possible liability of artificial intelligence (AI). It develops a theoretical approach and discusses the implications in terms of liability, culpability of artificial intelligence itself and the owners or users of it.

The book aims to raise awareness of the implications regarding liability of AI when the latter is part of everyday life. It provides a general overview of cases where AI is the perpetrator or accomplish or a mere instrument for the factual event.

In terms of methodology, the book uses a qualitative method by developing a theory on liability of AI against criminal law and addresses all the possible perspectives.

The book presents the concept of AI and describes the historical journey towards the present. It mentions the initial theories and clarification of what could be defined as artificial intelligence. It provides examples, theorems and principles on the same, such as Asimov's laws on AI, and it tries to establish working examples on how that would be applicable given the current development of AI. It describes the societal readiness in accepting the new technologies by raising the topics of fear of the new and how should it be handled. It further establishes analogies of liability against criminal law. It provides examples on how animals are excluded from criminal law and how humans are bound to be merciful and that law prohibits the abuse of power by humans against animals. Moving forward the book analyses the model criminal liability touching upon the requirements of offences explaining what constitutes for an offence by providing definitions and examples. It provides examples and establishes a basis on the term of factual events and it analyses the facts, parameters and attributes in identifying the categories of an offences. It describes the definition of an external element of the criminal liability which can be reflected in the factual element analysing the following four main ones:

- (a) The general description of the occurrence ('What has happened?');
- (b) The offender's identity ('Who has done it?');
- (c) The event's time ('When has it been done?');
- (d) The event's location ('Where has it been done?').³¹³

Additionally, the author discusses the capability of artificial intelligence technology to fulfil the factual element requirement in order to be liable under criminal law. The concept touches upon the notions of conduct, which is the mandatory element in the factual element requirements. Going further, the book analyses the structure of mental element requirement which the fundamental principle of culpability for criminal law and it provides examples such as recklessness. It analyses the notion of intent and provides a basis before introducing the applicability to AI. The author argues that the notion of reasonability, could be easily applied to AI since, as it continues, it is a matter of calculation that both humans and AI could do.

When it comes to negligence offences, the book establishes a common understanding of what constitutes a punishable negligence under criminal law and what society considers as a form of autodidact. The author argues that in this case, AI could be criminally liable if the mental elements and the factual element exist. The same goes for the indirect liability. Strict liability is discussed in the book and the argument that if AI is capable in fulfilling the strict liability elements it is feasible and achievable to impose criminal liability. Furthermore, the book is reflecting the *in personam* negative faults and whether this could be applicable to AI. Aspects such as infancy, loss of self-control, insanity, intoxication, factual mistake, legal mistake, substantive immunity are discussed. The same goes for *in*

³¹³ As described in the book in discussion.

*rem*³¹⁴ negative fault elements such as self-defence, necessity, duress, superior orders, *de minimis* defence. Finally, the book analyses the notion of punishment and sentencing of AI. It firstly presents the basic theory and definition of punishment and sentencing before it dives into the relevance of punishment and sentencing AI. The author argues that in terms of rehabilitation, AI could simply be retrained. In terms of physical punishment, the author argues that the same approach as corporations could be followed. When it comes to imprisonment, the author argues that any type of withdrawing the machine from the everyday life for the purposes of repairment and retrain, would be similar to the social sentiment of imprisonment.

In conclusion, the author argues that modern society is still using old definitions that are not necessarily suitable. Criminal law, the author continues, is required to adapt to the new advancements of technology through case law and legislative actions.

3.2.19. The Basic Models of Criminal Liability of AI Systems and Outer Circles (Ref. no. 49)

Reference title: G. Hallevy, 'The Basic Models of Criminal Liability of AI Systems and Outer Circles', Social Science Research Network (SSRN), June 11, 2019.

Key words: *artificial intelligence (AI), Criminal Law, AI, complicity*

The article presents a view on the evolution of criminal offences from humans to AI systems. As technology develops, criminal offences are committed not only by humans, but can also be committed through artificial intelligent (AI) entities.

The article aims to present three fundamental models to cope with the phenomenon of criminal offences through AI within the current definitions of criminal law.

In terms of methodology, the article goes over the criminal liability of AI systems in three steps where at the start the human behind the AI is responsible, towards full responsibility from the AI system.

The paper discusses the three fundamental models to cope with this phenomenon within the current definitions of criminal law. The models are: (1) The Perpetration-by-Another Liability Model; (2) The Natural Probable Consequence Liability Model; and (3) The Direct Liability Model.

- **The Perpetration-by-Another Liability Model**

An AI system is a machine and therefore at the beginning considered an innocent agent. However, due to the capabilities of an AI system, it should be considered that the AI system can act as a perpetrator of an offence. It could be treated as the offences done by a child, or a mentally incompetent person, because it is ordered to do so. In this case, the originating actor (the perpetrator-by-another) is the real perpetrator. This could be the programmer or the user of the AI system. According to this model, there is no legal difference between an AI system and a screwdriver or an animal having no capacity to make decisions.

- **The Natural Probable Consequence Liability Model**

This model assumes that neither the programmer nor the user planned the AI system to commit a criminal offence, however, during the execution of its daily missions, the AI system commits an offence. This model is based upon the ability that reasonable programmers or users could have foreseen the offence, and therefore prevent it from being

³¹⁴ All general defenses may be divided into two main types: *in personam* and *in rem* defenses. *In personam* defenses are general defenses which are related to the personal characteristics of the offender (exempts), whereas *in rem* are related to the characteristics of the factual event (justifications). (See: Compare Kent Greenawalt, Distinguishing Justifications from Excuses, 49 LAW & CONTEMP. PROBS. 89 (1986); Kent Greenawalt, The Perplexing Borders of Justification and Excuse, 84 COLUM. L. R EV. 1897 (1984); GEORGE P. FLETCHER, RETHINKING CRIMINAL LAW 759-817 [1978, 2000]).

committed by the AI system. This is the concept of a negligent person, who is, in a criminal context, a person who does not know about the offence, but a reasonable person could have known about it, since the specific offence is a natural probable consequence of that person's conduct.

- **The Direct Liability Model**

In this model, AI is not dependent on a programmer or user. Criminal liability for a specific offence is mainly combined of the external and internal elements of the offence. In this case AI capabilities can be considered equal or even higher than those of humans, and it can be therefore considered criminally liable. Exceptions can be given to AI in defence or policing tasks, the same as with humans.

In conclusion, the legal result of applying the first model is that programmers or users are fully criminally liable for the specific offence committed by an AI system when ordering it to do so. The AI system has no criminal liability at all. If there was no intent from the user or programmer to commit any specific offence, the user or programmer could have foreseen it and have the state of a negligent person. It then depends whether the AI system has acted as an innocent agent, in order for it to be considered criminally liable or not. Some AI systems can be considered equal or to even exceed human capabilities, therefore they can be held criminally liable.

As next steps, the article states that all entities, human, legal or AI, are subordinated to criminal law. *"If the clearest purpose of the imposition of criminal liability is the application of the legal social control in the specific society, then the coordinated application of all three models is necessary in the very context of AI systems involvement within the commission of offenses."*

3.2.20. [If Robots Cause Harm, Who Is to Blame? Self-Driving Cars and Criminal Liability \(Ref. no. 50\)](#)

Reference title: Sabine Gless/Emily Silverman/Thomas Weigend, 'If Robots Cause Harm, Who Is to Blame? Self-Driving Cars and Criminal Liability'. January 29, 2016 New Criminal Law Review

Key words: *robots, self-driving cars, criminal responsibility, negligence, comparative criminal law*

The paper analyses the growing usage of robots in everyday life and the legal consequences that might occur in case of harmful acts from them. The paper analyses the implications in various legal matters across different types of law including criminal law.

The paper aims to raise awareness of the ongoing discussions and research being conducted on the way robots should be treated from the perspective of law. The authors aim to provide knowledge of the current situation and argue in favour of limiting criminal liability to the creators of robots in cases in which the former have neglected to undertake reasonable measures to prevent risks.

In terms of methodology, the paper mostly uses a qualitative approach through which the authors approach the notion of liability of owners of robots, creators of robots and the robots themselves with arguments.

The paper discusses the two different ways in which German and US law addresses the notion of robots and intelligence. The authors of the paper start from the clear distinction between the way German and US law addresses the liability of a legal entity. In all cases for the time being it seems difficult or not applicable yet to apply criminal or other liability to non-human agents, like corporations and in this case robots, although the US law applies for corporations. When it comes to intelligent robots making a judgement under unknown circumstances, it is even more difficult to determine the liability. The main argument against making a robot liable is the notion of not having a strategy how to create a consciousness, which would entail entirely autonomous decisions (thick definition of an act). Furthermore, the paper discusses the thin definition of an act, which corresponds to the actions itself, which could be a way of making a robot liable. Going further, the paper

focuses on machine ethics by giving examples where robots would have to make a decision depending on rules as inputs. For example, a self-driving car that would be in a dilemma of whom to hurt in case of an accident. The moral reasoning is something that might be applied to robots in the future and the above example could have logic behind the decision, the paper says.

In the second part of the paper, the authors discuss the liability of the creators of robots. Nowadays, robots, as it has been proven, make decisions on topics that their respective creators have not thought of. As the paper argues, robots independently analyse conditions before making a choice and thus, the probability to cause harm is not zero. The paper provides several examples in order to demonstrate the complexity of the issue. It uses German and US law and shows the similar approaches in each. The main commonality in both laws is the notion of lawful risk exposure of users of products in general. They try to differentiate the known endangerment of customers from cases, such as in robots, where the product itself did things that were in no way known to the product creator. Due to their intelligence, robots will learn how to come to a conclusion on their own, based on little to no input rules and restrictions. The authors acknowledge that negligence and other lawful acts while creating products make the creators liable but they argue that in the case of intelligent robots, there is a responsibility gap - robots, as discussed above, cannot be held responsible while at the same time, there will be cases where the robots' creators should not be either.

In conclusion, the paper raises the question of whether society should embrace change and address the potential lack of responsibility as a type of exemption from liability because under certain risks in producing intelligent robots, according to the paper, there should not be any.

3.2.21. [Working Paper II. Document prepared for the 1st meeting of the Working Group of Experts on Artificial Intelligence and Criminal Law of European Committee on Crime Problems, Council of Europe \(Ref. No. 51\)](#)

Reference title: Working Group of Experts on Artificial Intelligence and Criminal Law – Document prepared by Professor Sabine Gless, Special Rapporteur

Key words: *criminal law, criminal justice, criminal responsibility, artificial intelligence, e-evidence, substantive criminal law, criminal procedure, mutual legal assistance, penitentiary law, risk assessment*

The Working Paper is a proposal from the European Committee on Crime Problems (CDPC) from the Council of Europe. The Working Group of Experts (Group) proposes to analyse the impact using artificial intelligence (AI) on criminal justice.

The project aims – as the overall CDPC work – to avoid unwanted effects of the use of AI and robotics in the criminal justice field.

In terms of methodology, the project has as its starting point the premise that the combination of intelligent machines where technology responding to human needs results in a gradual increase of human-robotic cooperation in common and daily activities, such as automated driving. This example will serve as a reference throughout the paper in order to explain four areas of interest where AI can influence the criminal justice field and impact the principles of criminal law.

The paper then elaborates on the definition of AI, robots and bots, e-evidence and driving automation and advances further to explaining the four above-mentioned areas of interest:

- *Substantive criminal law* specifically addresses the issue of the *responsibility gap*. In automated driving, the system progressively assumes the human action of driving. This

raises the issue of when an accident occurs, where the liability of such an action lies if performed by a robot. The Group suggests that such situations demand a government regulation on enterprises in the AI industry. This area of interest also reflects on the *socially permissible risk*. Driving is legal as society acknowledges the risks of such activity, for example in road traffic. When it comes to automated driving, it is important to ensure that Member States have a common definition of this risk in order to avoid dual criminality. Lastly, the multiplicity of elements and providers that enable robots' functions could limit the attribution of responsibility which also demands a regulatory approach in the supply chain.

- *Criminal procedure* encompasses the *challenge of machine evidence*. When an accident happens, the evidence presented most probably will be machine evidence, which raises the question on how it can be tested credible when the assessment of reliability of the evidence is purely human-centred. This challenge also links to the issue of the right to examine the witness, which could be difficult to ensure when the 'witness' is data generated by machine. The right of the person prosecuted to examine the witness could represent a principle to trigger access to the source of code, which links to the importance of third-party monitoring of AI systems.
- *Mutual Legal Assistance* relates to the situation in which there are Member States that admit automated driving and others do not, which could present a problem with prosecution. Also, there are concerns over accessing data across borders in investigative cases. On this issue, a Convention on Cybercrime already exists, however, it has not been assessed as to whether such a regulation is sufficient.
- *Penitentiary Law, Policing/Risk assessment*. AI is used for example in recidivism assessment on offenders in the parole process. The same use could be applicable to detect a tendency to break traffic rules such as speed limits.

In conclusion, while the working paper problematises the potential impacts of the use of AI in criminal justice field by defining four areas of interest, it also suggests the different domains where governmental regulation is necessary and of high relevance in order to diminish harm effects to them.

As a way forward the Working Group will proceed with a project plan and finally present draft instruments to the CDPC in October 2020.

3.2.22. [The impact of AI on criminal law, and its twofold procedures \(ref. No 52\)](#)

Reference title: Ugo Pagalo and Serena Quattrocolo, '*Research Handbook on the law of Artificial Intelligence*', Woodrow Barfield and Ugo Pagallo. *Edward Elgar Publishing Limited* 2018

Key words: *artificial intelligence', criminal law, perpetrators, motive, culpability, law, civil law*

The chapter analyses the impact of AI on criminal law. It intends to shed light on whether AI affects the principle of legality.

The chapter aims to explore the aspects and consequences in using AI to enforce the law and to discuss whether AI is going to bring a new generation of crimes.

In terms of methodology, the chapter uses a qualitative approach in theorising on the aforementioned aspects.

The chapter discusses how AI could be used and affect law enforcement and specifically the gathering of evidence in criminal proceedings. It adds the notion of 'Equality of Arms' pursuant to Article 6(1) of the ECHR. It talks about the concept of digital life and private life and goes further in analysing the concept of digital domicile for privacy protection. The chapter moves further in challenging the effectiveness of AI when it comes to large volumes of data and it mentions processes that could regulate the code of the algorithms in order to achieve transparency and accountability, mentioning examples in detail and how things could evolve. The authors continue and introduce the concept of breaking the law through AI. The argument is that due to the rapid evolution of AI, the prospect of using it as a criminal element is evident. For AI to be accountable, the notions of preconditions, consciousness, free will and human-like intentions need to be present. They continue on a

conceptual level in that through recent developments, the breath-taking evolution of AI could introduce the mental element required for criminal liability.

In conclusion, the chapter emphasises the divergence of the aforementioned aspects, the law enforcing AI, specifically for evidence processing, and the new generation of crimes that use AI. In order to use AI and achieve 'fair balance' between the parties, a number of transparency solutions should be put in place.

3.2.23. Algorithmic justice: Algorithms and big data in criminal justice settings (ref. No. 53)

Reference title: Aleš Završnik, 'Algorithmic justice: Algorithms and big data in criminal justice settings'. November 2019 CER. EU European Journal of Criminology 1–20

Key words: *artificial intelligence, big data, algorithmic analytics, machine learning, criminal justice, algorithms, bias, sentencing*

The paper analyses the use of big data and artificial intelligence in the justice system in order to fight crime, improve predictions in various processes in the judicial proceedings such as bail amount calculation, recidivism risks and others. Additionally, it examines how such methods and algorithms violate established criminal procedure rules.

The paper aims to raise awareness of the use of algorithms and mathematics in the judicial system. It aims to provide knowledge on the risks of using these algorithms.

In terms of methodology, the paper uses a combination of quantitative and qualitative methods by providing concrete statistics of uses of AI and big data in the justice field.

The paper discusses the various implementations of algorithms and mathematics in the judicial system and provides risks and discussions already made on the topic. It further elaborates on cases where big data and intelligent systems have been used in the judicial system where, according to the paper, the results were biased and not objective. It mentions the need for education within judicial authorities for the purpose of understanding how to use the intelligent algorithms. It clearly states that algorithms and their improvement is not the solution to a better judicial system since society needs to improve itself. It tackles the concept of probability in recidivism and the assistance of AI. It goes further and generalises the concept of bias and how it should or should not be removed from the process since the paper discussed that the legislative actions take into account the current societal interests. Furthermore, it does raise the fact that AI is helpful for judicial proceeding and criminal investigations by mentioning an example in Slovenia.

In conclusion, the paper raises the question of whether AI is an appropriate tool to boost judicial efficiency and which are the implications of removing the human factor from the judgment. As a conclusion, the paper argues that AI could help in automating some tasks used in the procedures but there should be caution and reflection before considering removing the human factor entirely from the decision-making process.

3.2.24. What about AI in criminal intelligence? From predictive policing to AI perspectives (Ref. no. 54)

Reference title: Patrick Perrot, Gendarmerie nationale, Ministry of Interior, Paris, France 'What about AI in criminal intelligence? From predictive policing to AI perspectives', European Police Science and Research Bulletin, vol. 16, Summer 2017

Key words: *artificial intelligence (AI), crime analysis, predictive policing, GAFAM, law enforcement*

The article presents a view on developments by the French national police in predictive analysis and on the potential use of AI in different areas of criminal intelligence without avoiding the risk of its new developments.

The article aims to analyse whether AI can help the police in predicting crimes in a better way than the currently existing mathematical tools to calculate the criminal risks.

In terms of methodology, the article starts by introducing AI itself, followed by an overview of developments in AI since 1956, ending with the risks and potential usability for law enforcement.

The paper discusses policing tasks in general, which are twofold: (1) investigation of crimes, and (2) assuring public safety. In both fields new technologies are making promising improvements. Predictive approaches to criminal risks have already been developed for several years. They are now starting to transform into an AI approach, where machine learning also has evolved over the years. Indeed, AI systems have in recent years started to outperform humans, especially in fields such as object recognition, face recognition, facial expression, speech recognition and even emotion identification.

The principle for forecasting crimes, based on predictive analysis, is to take advantage of the past acknowledgments to understand the present and explore the future. Results are derived from two different sets of past data: the first dataset is used to train the algorithm and build the model and the second one is used to evaluate the performance of the model.

A next generation technology, Web 3.0 (the semantic web), offers the possibility to deliver observational, behavioural and tailored content to individuals rather than to 'crowds'. It takes into account the analysis of massive data, the exploitation of connected devices and a capacity to provide individual profiles by anticipation. It gathers large volumes of direct or indirect evidence of relationships of interest, applying learning algorithms to understand and generalise. In the field of crime analysis, it is easy to imagine some concrete applications:

- To recognise a known criminal in a specific area and send an email to a personal smartphone;
- To identify geographical and time hotspot areas of crime;
- To make a profile of a criminal based on massive data;
- To indicate the level of multiple offences in a specific area; and
- Why not to replace a police officer by a virtual agent in specific tasks.

Some risk areas can be presented on citizens' smart phones, which might give him a sensation of control of his own security, but it will go with the cost of privacy.

Theoretically AI can be used in three different cases: to model criminal acts; to model behaviour and criminal way of reasoning; and to model behaviour and investigators' way of reasoning. The advantage of an AI is to train the model using criminological theory and from real case reports.

In conclusion, currently (2017), we can consider that a virtual agent able to provide objective help to a real investigator does not yet seem realistic because of the heterogeneity and the complexity of the real situation that is not uniquely logical. The aim is to upgrade human decision-making through AI. The risk is to see these perspectives developed by private companies or industrial groups, or even criminal organisations, instead of law enforcement.

As next steps, the article recommends using AI as a support for the human decisions, and to prepare against criminals who also are taking advantages of AI to extend and improve their criminal activities. What will happen when computers think and improve themselves on new forms of previously unanticipated forms of criminality?

3.2.25. Predicting risk in criminal procedure: actuarial tools, algorithms, AI and judicial decision-making (Ref. no. 55)

Reference title: Carolyn McKay, *'Predicting risk in criminal procedure: actuarial tools, algorithms, AI and judicial decision-making'*, The University of Sydney Law School, November 2019

Key words: *artificial intelligence (AI), prediction, risk, criminal procedure, algorithms, judicial decision-making, actuarial tools*

The paper describes a range of predictive, diagnostic tools, whose results have been used to assist the human expertise in assessing the risk of recidivism in criminal cases.

It aims to reply to the question whether criminal procedure can be fully or partially automated and if so, how such emerging actuarial/algorithmic tools could assist judicial officers in making decisions that could impact the offender's liberties and legal status.

In terms of methodology, the article commences with an analysis of risk in the context of an increasingly risk-averse society and criminal justice system, and the tensions between a general right to be at liberty versus community safety. Then, it examines some criticisms towards the human discretion of the judge when they render their sentence. In addition, the article provides an overview of the development of predictive tools in risk assessments in criminal procedure to question whether machine and data-driven assessments offer more accuracy and objectivity than human judges. Finally, the need to revisit the concept of procedural justice is examined in the context of a progressively technologised criminal justice system.

In particular, the article acknowledges the use of actuarial tools in a number of criminal cases, where the judge has to assess the risk of the offender re-committing further crimes and decide on the sentence or the parole. In one case, a combination of tools was used such as STATIC Risk Factors Actuarial Assessment - Sex Offending (STATIC-99R), as a tool for predicting sexual recidivism and the Risk of Sexual Violence Protocol RSVP. The second tool is a structured professional judgment instrument developed to assist in the identification and management of sexual violence using 22 static and dynamic factors identified by the literature related to sexual offending and grouped into five domains (1) a history of sexual violence; (2) psychological adjustment; (3) mental disorder; (4) social adjustment; and (5) manageability. STATIC-99R first put the offender in the category of high risk and then RSVP 'confirmed' its result with a 'more comprehensive' evaluation. Although they use these tools, experts acknowledge their shortcomings and therefore render their expertise with the caveat that the human behaviour cannot be scientifically predicted. Concerns are raised in terms of the predictive instruments not assessing information about the individual, but based on group characteristics, thus contradicting with the principle of individualised justice. Moreover, they may not be able to differentiate between the different gravity of the harm. Finally, the algorithmic assessments are largely uncontested, as they are protected by intellectual property, which deprives the individual from the opportunity to question the weighing mechanisms applied³¹⁵.

In conclusion, the article suggests creation of regulatory bodies, especially in countries with clear separation of governmental and judicial powers, to oversee and audit algorithms and thereby ensure transparency, accountability and procedural justice. In addition, the article seems to imply that in compliance with the principle of open procedural justice, the defendants, courts and the society should be able to test, contest and scrutinise the validity and reliability of predictive formulae, therefore no proprietary protections and financial interests should be invoked.

3.2.26. [Can Artificial Intelligence and Online Dispute Resolution Enhance Efficiency and Effectiveness in Courts? \(Ref. no. 56\)](#)

Reference title: Zeleznikow, John. *'Can Artificial Intelligence and Online Dispute Resolution Enhance Efficiency and Effectiveness in Courts.'* International Journal for Court

³¹⁵ The article illustrates the bias and the proprietary protection challenges with the US case of *State of Wisconsin v Loomis* 881 N.W.2d 749 (Wis. 2016), where the Correctional Offender Management Profiling for Alternative Sanctions (COMPAS) was used in sentencing procedure.

Administration 8 (2). 2017, International Association for Court Administration: 30–45. doi:10.18352/ijca.223.

Key words: *self-represented litigants, access to justice, online dispute resolution, artificial intelligence*

The article analyses the impact of self-representation litigants in the justice field and describes the steps taken towards a better and fairer access to justice for people that cannot afford or choose to exercise their right not to have a lawyer. It then focuses on the impact of online dispute resolution tools.

The article aims to raise awareness on the impact of self-representation and the lack of proper and fair access to justice for people who cannot necessarily afford a lawyer. Furthermore, it aims to point out the efforts pertaining to online dispute resolution mechanism. The main goal is to produce positive results and conceptualise a mindset towards using IT and AI in the justice field.

In terms of methodology, the article provides a combination of a qualitative and a quantitative approach. It describes the pitfalls and the unfairness for self-represented litigants with statistics and raises the importance of a solution. It uses the same methodology for presenting initiatives towards providing fair access to justice through online dispute resolution.

The article discusses the reasons of a constantly increasing self-representation as observed in the countries that have common law (US, UK, Australia and others) from the perspective of lack of access and proper information and guidance. From the statistics it becomes apparent that the assistance of information technology is mandatory. This conclusion is backed by references that support the same. It emphasises the necessity of a simple and clear way to provide access to information that can be understood by people with no legal background. Furthermore, the article dives into ways of utilising artificial intelligence and the concept of online dispute resolution. It elaborates on types of artificial intelligence that could be beneficial for ODR such as rule-based reasoning, case-based reasoning, machine learning and others. Moving on, it enlists and describes the existing systems that have been created to pragmatically complete the needs mentioned above. Some of those applications are the Get Aid System which uses decision trees, the AssetDivider and the Split-Up systems which use negotiation methods based on game theory at different levels. These systems follow the principle of 'best alternative to a negotiated agreement' (BATNA). The article dives into details on those systems by describing the ways they were developed and how helpful they have been, each to its own right and field.

In conclusion, the article praises the use of ODR systems if not for a better reason, the immediate benefit of self-represented litigants (SRLs) because they provide easily useful advice and help people in their dispute. Additionally, they help in educating SRLs and in facilitating communication with the parties in dispute.

As next steps, the article recommends that ODR tools should not be fully automated. The authors base their suggestion on the principle of having the systems in an assisting mode. By having intelligent systems assisting citizens, states, legal practitioners and courts, all processes could be quicker and better.

3.3. References discussing blockchain/DLT

This section provides summaries of the high relevance reference documents which discuss various aspects of blockchain/DLT. These are references numbers from 85 to 99.

3.3.1. Michèle Finck: Blockchains and Data Protection in the EU (Ref. No. 85)

Reference title: M. Planck, 'Michèle Finck: Blockchains and Data Protection in the EU'

Key words: *data protection; data sovereignty; innovation; legal issues*

The paper presents the challenges posed by the GDPR in the use of blockchain and analyses in depth the legal issues related to the current blockchain technology applications such as encryption, pseudonymisation, etc.

The paper aims to evaluate to what extent the blockchain technology is compliant with the GDPR and what the possible paths of evolution are towards better compliance.

In terms of methodology, the study first elaborates on the incompatibility aspects between the GDPR and the blockchain characteristics. It then explains in five steps how the blockchain technology can evolve to be more in compliance with the data protection regulation.

The paper describes in an overview the functionalities of putting data on a blockchain by means of a distributed ledger technology (DLT), followed by an elaboration on the current 'state of play' on how the DLT experts are trying to apply the GDPR rules on a blockchain. The article focuses on un-permissioned blockchains as they offer the most novelties and complications from a data protection perspective.

According to the author, the current conceptual level blockchain solutions, especially the public and un-permissioned ones, seem profoundly incompatible with the GDPR. The data protection mechanisms developed for centralised data silos, such as the traditional data bases, cannot be easily reconciled with decentralised data storage and protection as it is offered by the DLT. After giving an in-depth analysis of the situation for transactional data as well as for the usage of public keys, the author concludes that both the public keys themselves, as well as the transactional data, stored on blockchains, will often qualify as personal data.

Continuing with the knowledge of the capabilities of blockchains, applying GDPR rules the above findings have some legal implications. For example, the GDPR defines a data controller. When it comes to private blockchains, it might still be possible to identify a central intermediary that can qualify as the data controller, such as the systems operator that will be the addressee of the data subject's claims. For other DLT's all nodes are public, so none are suitable for that role.

Another point is the GDPR territorial scope. Seeing the fact that un-permissioned blockchains usually runs on nodes located in various jurisdictions, or countries, across the globe, there is no real control over the geographical spread of the network. The GDPR's broad territorial scope accordingly likely entails that its obligations bind many blockchain-based applications with only an indirect link to the EU.

In order to enforce substantive data protection rights on blockchains several limitations of the blockchain must be considered. The principle of data minimisation is difficult to maintain with DLT as the data on a blockchain per definition continuously expands. It keeps all previous versions of data. But when it is taken care to select what is being kept on the chain and what data will be stored off-chain, there will be more freedom in the possibilities regarding the modification, minimization and even deletion of data. These would be actions toward the right to access and the right to be forgotten.

Two overarching principles of the GDPR are 'data protection by design' and 'data protection by default'. According to the article, blockchain solutions do not automatically support data sovereignty but it rather must be purposefully designed to do so.

Regarding the status of innovation in EU law, the article states that the tension between the GDPR and these new decentralised databases (DLT) indeed reveals a clash between two normative objectives of supranational law: the fundamental rights protection on the one hand, and the promotion of innovation on the other.

In conclusion, the author summarises that, in order not to stifle innovation throughout the EU, a compromise is needed where the legal certainty of data protection in the EU is reconciled with the desired promotion of innovation, and thus also alternative effective

means of data protection. At least partial reconciliation of these (apparently) conflicting rationales can be achieved through legal interpretation techniques.

As next steps, the paper recommends that appropriate data protection safeguards are implemented and strongly encouraged by regulators. In addition, the same regulators should ensure that data sovereignty considerations are incorporated into software from the onset.

3.3.2. Premiers éléments d'analyse de la CNIL BLOCKCHAIN (Ref. No. 86)

Reference title: CNIL, '*Premiers éléments d'analyse de la CNIL BLOCKCHAIN*', 2018

Key words: *data protection, public blockchain, block miner, data controller, sub-contractor, compliance, security.*

The paper presents the concrete solutions offered by the CNIL (France) to actors who wish to use blockchain technology in the context of personal data processing.

The paper aims to provide an initial set of elements of analysis identified by the CNIL. It does not aim at being a final exhaustive set of technical and organisational measures to comply with data protection regulation.

The paper discusses the conditions under which CNIL considers that blockchain network participants can and should be considered as data controllers (or not). In particular, these include the role and responsibilities of:

- block miners (for a proof of work-based blockchain);
- private persons *outside of a business or commercial context*;
- a sub-contractor (e.g. a smart contract developer) working under the responsibility of a data controller.
- joint data controllers.

Regarding joint data controllers, the CNIL recommends electing a legal entity or a person as (main) data controller to which the data subject can turn to.

CNIL puts forward several recommendations on **how to minimise the compliance risk** when based on a blockchain. Firstly, it recommends to carefully assess whether the benefits of using a blockchain outweigh the potential issues related to data protection. For instance, the transfer of data outside of the European Union can create an issue in the context of a public blockchain (since it is difficult to enforce geographical location of block miners). Secondly, CNIL recommends to minimise the data stored on the chain. Public key identifiers of block miners and participants cannot be removed from the chain. However, other (personally identifiable) data should not be stored on chain, unless a risk assessment demonstrates that the residual risk of doing so is acceptable. A third recommendation concerns a careful assessment of how to enable the data subject to exercise his/her rights related to data protection, in particular, the right to erasure (or 'right to be forgotten'), the right to amendment and the right to oppose a decision (in particular when taken automatically by a smart contract).

In addition, CNIL makes recommendations **on key measures to ensure security and data integrity** on the blockchain. In the context of public blockchains, potentially exposed to so-called '51% attacks', the CNIL recommends ensuring a sufficiently large number of block miners and the absence of coalitions with incentives to attempt to take control. The CNIL also recommends implementing proper governance of software evolutions, to ensure that cryptographic algorithms can be upgraded and to develop a contingency plan, which takes into account breaches due to malfunctions of the consensus algorithm and smart contracts. The data controller is responsible for ensuring the security of private keys e.g. by enforcing storage on a secured medium.

In conclusion, in this article published in 2018, the CNIL provided some elements for a 'checklist' to be taken into consideration by project owners or sponsors who wish to use blockchain technology in the context of personal data processing.

3.3.3. La blockchain au service de la protection du droit d'auteur dans le domaine du livre numérique (Ref. No. 87)

Reference title: El. Deleuze, 'La blockchain au service de la protection du droit d'auteur dans le domaine du livre numérique'

Key words: digital works; author's rights; intellectual property protection; transparency; traceability; contract law; smart contract; disintermediation

The paper presents an in-depth study of the impact of digitisation of the (digital work) value chain on the internet as well as its ultimate consequences on the author's control on the exploitation of his/her work and associated compensation. It also assesses the potential benefits of blockchain technology as a technical solution to enforce transparency and traceability along the digital work value chain and identifies the obstacles to its deployment.

The paper discusses how the digitisation of the digital work value chain and the lack of transparency has progressively created an imbalance between authors on the one hand and editors (or rights management firms) on the other. The consequence of this, is the loss of control of the author on digital works, ultimately resulting in (1) substitution effects lowering sales of (legally reproduced and exploited) digital work and (2) diminution of the author's compensation. The paper also elaborates on the potential of blockchain in this context, providing transparency on rights and payments and enabling the author to regain control on their digital work without relying on third parties or middle-men (disintermediation) (cf. chapter I. 'La blockchain comme outil technologique au service du droit d'auteur, une utilisation prometteuse'). In addition, it discusses the obstacles in the use of blockchain to its full potential for disintermediation. These are mainly legal (inability to fully address exceptions to author's rights and contract law via smart contracts) as well as the difficulty to engage all traditional value chain actors to use this technology (cf. chapter II. 'La blockchain comme outil technologique au service du droit d'auteur, une utilisation incertaine').

In conclusion, the author argues that blockchain can be a solution to provide transparency in authorship and traceability of digital works.

However, legal difficulties and the persistence of the established value chain actors challenge its use today in the context of the management and enforcement of rights; this in turn so far results in lukewarm reception by the authors themselves (as well as limited traction for the services proposed by the many start-ups in this field so far).

As next steps, the paper recommends addressing the aforementioned obstacles as the main priorities and challenges to overcome.

3.3.4. Weighted Forensics Evidence Using Blockchain (Ref. no. 88)

Reference title: D. Billard, 'Weighted forensics evidence using blockchain,' in Association for Computing Machinery ACM International Conference Proceeding Series, 2018

Key words: blockchain; digital forensics; digital evidence; e-evidence; technology; legal evidence admissibility; data provenance

The article analyses the validity of digital evidence in court. The study suggests the use of the blockchain based 'weighted digital evidence' method to present digital evidence to the court. This method provides the evidence with a confidence rating.

The article aims to add a certain weight or reliable pinch of scientific certainty when dealing with digital evidence in court.

In terms of methodology, the study proposes a preliminary framework solution based on blockchain from a theoretical perspective, based on previous works in the field.

The paper discusses the methodology of weighted forensics evidence which will provide digital forensics investigators with tools to collect and produce e-evidence with associated metrics. The e-evidence will then be handed over to the courts attributed with a confidence level expressed in metrics and ordered through a timeline.

This method of providing the e-evidence with the associated confidence rating exists out of three parts:

The first part is the Digital Evidence Inventory (DEI), which is based on a blockchain technology and will contain the actual evidence. This DEI is immutable and can be used by all parties in a case. Each party has access to the same knowledge about the digital evidences. It contains multiple aspects: The transaction, which is the evidence itself, represented by a hash; a block, which is formed by multiple transactions; and the miners, which are the digital forensics investigators working in the same laboratory or office.

The second part is the Forensics Confidence Rating (FCR) structure. With the FCR, the practitioner grades the e-evidence, based on a categorisation of data and data provenance. This rating is subject to modification, depending on the unfolding of the case. The rating is built up from nine data types, each with their related confidence rating.

Examples of some of these types are: "Service data" which is the data you transmit to a social networking site in order to process it. It is automatically created and has a high confidence rating; "Disclosed data" which is what a person posts on his or her own pages, or social media, so that everybody can create it. It has a lower confidence rate than service data; and "Incidental data" which is what other people post about you. It has a low confidence rating as people can lie or make wrong assumptions.

The third part is the Global Digital Timeline (GDT) to order evidence through time. It is important for the forensics practitioner to provide magistrates and lawyers with a timeline composed of e-evidence.

In conclusion, the study claims that blockchain based e-evidence using the Forensics Confidence Rating can function as trustworthy evidence in court.

As next steps, the article recommends finer tuning of the blockchain protocol, a semi-automated tool for the building of the GDT and a more precise confidence rating by adding error rate probabilities and relevance.

3.3.5. Blockchain technology and IP – investigating benefits and acceptance in governments and legislations (Ref. no. 89)

Reference title: D. Van Aaken, F. Ahlemann, C. Bode, R. Brüh and others, 'Junior Management Science The impact of tax differentials on pre-tax income of Swiss MNEs Blockchain technology and IP-investigating benefits and acceptance in governments and legislations,' Junior Management Science, vol. 3, no. 1, pp. 1-15, 2018

Key words: *intellectual property; patent; copyright; trade secrecy; defensive publication; open innovation; identity; acceptance*

The paper analyses how blockchain technology benefits IP protection strategies used in patents, copyrights, trade secrecy, defensive publication and open innovation. Furthermore, it proposes examples of use cases in IP protection and identifies required institutional support.

The article aims to investigate how blockchain technology can be encompassed in the innovation process and bring huge benefits to the patent system as well as copyrights, trade secrecy, defensive publications, and open innovation.

In terms of methodology, the articles introduces the different aspects in which this blockchain application can be used, then it explores the institutional support for the

technology necessary for a successful implementation. Finally the findings are confirmed by interviews with experts and in comparing the theory with actual practical experience.

The paper describes how blockchain technology can bring benefits to the patent system as well as to copyrights, trade secrecy, defensive publications and open innovation (leveraging the transparent and decentralised nature of the blockchain). On defensive publishing, a new project was launched, the “Smart Defensive Publishing project”, which proposes the “creation of a disclosure service based on the bitcoin blockchain and the Interplanetary File System (IPFS).

To this date, no concrete legislation has been issued by any country or state which supports the use of blockchain for improved copyrights management. Several meetings and workshop have been organised around the matter in order to tackle the issues around it. This shows that governments are at least aware of the copyright situation and hopefully this kind of initiatives will speed up the process for developing legislations leveraging the benefits of blockchain technology. It is also a good sign that a growing number of authorities have started to vote for favourable legislations, recognising the technology as a valid public ledger.

The findings were tested with practical examples and use cases from Estonia, Delaware (USA), Sweden, Dubai, Russia, and others. This together with interviews with experts in the matter confirmed the author’s statements.

In conclusion, the article states that the blockchain technology enables distributed, transparent, cost-effective and resilient environments open to all and where each transaction is auditable. The blockchain technology could help copyrights to be enforced more effectively in the context of digitisation and render the patent system more efficient and less vulnerable to abuse. Blockchain technology can support companies wishing to keep inventions secret as well as provide a reliable infrastructure for defensive publications.

Nevertheless, the impact of blockchain on open innovation remains highly theoretical and needs further exploration. In particular, the concept of identity on the blockchain is still missing from legislation but is at the same time a central issue to IP, innovation and many other fields and will be a necessary step to unlock further use cases.

As next steps, the paper recommends to push research to go further on possible mechanisms and implementations to unlock the potential of blockchain in open innovation, in particular the legislative (and technical) aspects of identity on the blockchain. The article also recommends to keep an eye on progression of acceptance as the use cases multiply and legislations evolve in the next few years.

3.3.6. Towards Using Public Blockchain in Information-Centric Networks: Challenges Imposed by the European Union’s GDPR (Ref. no. 90)

Reference title: D. Schmelz, G. Fischer, P. Niemeier, L. Zhu, T. Grechenig, ‘*Towards Using Public Blockchain in Information-Centric Networks: Challenges Imposed by the European Union’s General Data Protection Regulation*’, Proceedings of 2018 1st IEEE International Conference on Hot Information-Centric Networking (HotICN 2018): Aug 15-17, Institute of Electrical and Electronics Engineers. Beijing Section, Beijing da xue. Shenzhen Graduate School and Institute of Electrical and Electronics Engineers, Shenzhen, Guangdong, China, 2018

Key words: *blockchain; GDPR; data protection*

The article analyses the challenges of keeping personal information private. It elaborates on how blockchain enables new approaches in solving these privacy issues with distributed systems. At the same time the article raises new concerns with its openness and immutability.

The article aims to identify the challenges related to GDPR when implementing a blockchain solution.

In terms of methodology, the article starts from the rules set out in the GDPR and then takes a look at the roles in the blockchain applications and who is accountable.

The paper describes the information which can lead to the direct or indirect identification of a natural person. This information i.e. IP addresses, is considered personal data. Therefore blockchain transactions between IP addresses, cannot mention these addresses anymore in the sent transaction. This results in anonymisation of addresses, or in money related applications (Bitcoin), - anonymity for the buyers or sellers. This particular anonymisation factor is not an attribute welcomed by the supervisory bodies and certainly is not compliant with Anti Money Laundering laws.

Due to the specific characteristics of blockchain solutions, GDPR-related issues emerge. Some of the often named issues: (1) In a blockchain network, a transaction is not only distributed between those who are involved in a transaction but to all nodes. (2) The period of time in which the data is processed is not defined, so it will not be deleted after a certain time period. (3) The right to rectification is also not possible since transactions cannot be changed after they have been transmitted.

Solutions have been proposed to some of the related issues, , however they raise other challenges. For example, it is proposed to only store hashes or other non-invertible derivations of the clear-text on-chain and store the actual private data off-chain. But according to the GDPR, hashing is considered a pseudonymisation technique and therefore the hashed private data on the blockchain is still considered private data.

In conclusion, blockchain technology is capable of implementing high availability and transparency at the cost of data protection. Several ground principles of the GDPR contradict the current fundamentals of blockchain technology.

As next steps, the article suggests that since the GDPR has only been effective for a short time, it still has to be seen if the European Court of Justice decides whether there is a legal basis to the GDPR in a blockchain network as implemented today. Further research is needed to clarify the requirements imposed by the GDPR on the blockchain and to find techniques to protect personal data.

3.3.7. Legal Systems and Blockchain Interactions (Ref. no. 91)

Reference title: K. Hegadekatti, '*Legal Systems and Blockchain Interactions*', Munich Personal RePEc Archive (MPRA), 2017

Key words: *blockchain; legal processes, smart contracts, IoT*

The article analyses the challenges and benefits from simplifying the legal procedures by using blockchain technology, such as cryptocurrencies, and smart contracts, in combination with the Internet of Things (IoT).

The article aims at giving a view on the impact of the use of blockchain technologies in legal systems.

In terms of methodology, the article is a descriptive study on the concept of blockchain and cryptocurrencies in a picture of the present legal services. The ways in which blockchain technology can be applied to legal processes are identified, and the probable impact of blockchain on law systems is evaluated.

The paper discusses the characteristics of controlled and unregulated cryptocurrencies. The unregulated coins are the more commonly known ones, such as Bitcoin. It is a peer-to-peer based cryptocurrency which is not backed by any commodity and carries no sovereign guarantee. The controlled one is a highly secure cryptocurrency regulated and government backed. They are also called 'NationCoins'.

Another use of blockchain in the economy is a smart contract. A smart contract is basically a software package based on blockchain technology that is encoded with definite conditions

and outcomes. A smart contract brings together four important things: (1) it writes a business or legal process as a computer program (1), it is triggered by a particular event to activate the payment procedure which is done automatically by making use of digital signatures to verify who sent the messages (3), and the whole package is set up on a blockchain.

For example, a smart contract can be linked to a smart property, e.g. where a house or car automatically knows its new owner (Internet of Things). Then, on the execution of the smart contract, it will get timestamped, and the entire network can authenticate its legality.

Working with blockchain technology in general, and with smart contracts specifically, will have an impact on legal services and law enforcement. Some examples of impact situations are:

- The work of large law firm will be automated.
- Court procedures will be greatly simplified due to quick verification of legality of certificates, evidence, etc.
- Criminal records put on the blockchain will make identification and case-solving easier.
- Contract execution will be objectivised and become simpler for execution (smart contracts)
- Law firms will have to rebrand themselves into specialist niches.
- It will be possible to bring into the ambit of law even informal word-of-mouth contracts which was hitherto not possible.

In conclusion, with the use of these controlled blockchains combined with smart contracts, a shift is possible from existing systems to newer platforms with minimal disruption and maximal continuity. Unregulated blockchains (Bitcoin, Ethereum) on which governments have no control, can lead to problems in standardisation, security and authenticity when it comes to contract execution.

As next steps, the article suggests seeing the possibilities to include blockchain in all types of objects as part of the next stage of the IoT.

3.3.8. Blockchain Receipts: Patentability and Admissibility in Court (Ref. no. 92)

Reference title: A. Gio, 'Blockchain Receipts: Patentability and Admissibility in Court', Chicago-Kent Journal of Intellectual Property, The Chicago-Kent College of Law, USA, in 2017

Key words: *Blockchain, Intellectual Property, Patents*

The article analyses the challenges of using digital evidence based on blockchain applications, in court, and in parallel the article elaborates on the possibilities of patenting a blockchain application.

The article aims to clarify the challenges when using digital evidence in court, and to clarify the challenges when trying to protect blockchain as intellectual property.

In terms of methodology, this paper provides a descriptive analyse of digital currencies and blockchain in general, after which it specifies the use of digitally generated evidence and blockchain as evidence. Finally, it elaborates on the question if the Bitcoin can be classified as intellectual property and are there patents to take on the blockchain.

The paper discusses the admissibility of blockchain data in court. It would enable transactions to be legally upheld and enforced, thereby giving them 'real life' validity. The overall picture is that if blockchain receipts cannot function as evidence of a transaction for litigation purposes, they are virtually useless, even if it functions.

Evidence introduced in the courtroom (by eyewitnesses and experts) is typically tested and protected by several courtroom tools, including: (1) the requirement that every witness swears under the oath; (2) the jury's ability to assess credibility through observation of a witness's demeanour; and (3) exposure to cross-examination by the opposing party. So, to be validly used in courts digital evidence should be able to undergo the same checks.

For example, a Google Earth tag was considered unimpeachable and not hearsay because the relevant assertion is not made by a person; it is automatically made by the Google Earth program. For a proper authentication of evidence, it is required that the party introducing the evidence shows that a machine is 'reliable and correctly calibrated', and that the data put into the machine is accurate.

The same goes for blockchain technologies. Bitcoin transactions involve interaction between people, but the records of each transaction are generated without human influence, they are entered automatically through a constantly updating algorithm on every computer in the blockchain network.

So also here the relevant assertion is not made by a person, it is automatically made by the program.

The second part of the article focusses on intellectual property, where digital currencies do not fall neatly within any of the main categories of patents, copyrights, trade secrets, or trademarks. The only thing that could come close is that a private key of a Bitcoin owner can be considered as a trade secret, at least when the Bitcoins are at rest with the same owner. The difficulty here is that, still up till now, the US Patent Office has not granted any patent to a blockchain-related application.

In conclusion, the article states that digital blockchain-based evidence could be used in court as it is generated by a machine/program. In view of intellectual property, digital currencies do not fall neatly within any of the main categories of patents and face some challenges being protected as intellectual property.

As next steps, the article foresees that this new digital evidence will be used in court. It also expects that the blockchain technology can be claimed as intellectual property, but time will tell how exactly it will be done.

3.3.9. Copyright in the blockchain era promises and challenges (Ref. no. 93)

Reference title: A. Savelyev, '*Copyright in the blockchain era promises and challenges*', National Research University Higher School of Economics, Moscow, Russia, 2017

Key words: *blockchain; copyright, smart contracts, cryptocurrency, digital content*

The article analyses the existing challenges for the distribution of copyrighted works in the digital environment, how these challenges can be solved with the use of blockchain, and what associated issues need to be addressed in this regard.

The article aims to clarify the challenges when using blockchain to protect copyrighted work.

In terms of methodology, the article describes the blockchain technology in general and shows the core issues of copyright law in digital environment. This is followed by a more focused explanation on how blockchain may solve these issues, and the related challenges this solution may bring.

The paper discusses that copyright law in the digital world suffers from issues related to transparency, piracy and fair compensation. The problem is that information about copyright owners is scattered in various databases and owned by different companies of which some do not even have the incentives to share it. In this age of technology, there are no natural barriers anymore to prevent copying. The current situation also poses difficulties to authors to get compensated fairly. It is very challenging to find cases of piracy and to even take legal charges against it, but also to have a fair system with intermediaries.

The blockchain technology can be a solution for these issues by providing transparent information on copyright ownership. With the use of Trusted Timestamping, which allows interested parties to know without any doubt the creation of a particular document. This process would function as follows: every transaction with a copyrighted work will create a hash of that work which will be included in the transaction. This transaction is then timestamped and the content is encoded on a blockchain. At the moment there are some

alternatives on the market for this procedure. A non-blockchain technology such as 'ContentID' can provide the same timestamp feature. A blockchain solution, however, can provide control over digital copies. It can individualise each digital copy. It also can provide automated payments with the use of smart contracts in combination with a cryptocurrency. Finally, blockchain can provide simplified licensing.

These blockchain solutions still come with some challenges. For example: will the copyrighted work itself be stored on the blockchain, as it will increase the data on the blockchain enormously, or somewhere else (off-chain). On the other hand, there will be an issue of keeping the copyrighted work linked to the blockchain if it is stored off-chain. The records about copyright ownership may potentially change. Another issue from legal perspective may be the immutability of a blockchain. After a court decision, it is possible that something on the blockchain has to be changed. For this situation it is suggested to introduce a 'Super user' in the blockchain for government authorities. This super user has the power to enforce decisions of state authorities in 'offline' (traditional) mode by pursuing the specific users and forcing them to include changes in the blockchain themselves.

In conclusion, blockchain can be a solution in some copyright issues by means of a time stamp and smart contracts with direct payments. Whether the content will be saved on or off the chain is still a question yet to be answered.

As next steps, the article recommends that besides the copyright related work, this application can be used in the fields of certification and administration where documents have to pass different authorities.

3.3.10. Blockchain: How to regulate without authority (Ref. no. 94)

Reference title: P. De Filippi and M. Reymond, '*La Blockchain: comment réguler sans autorité*', Nitot, T. (dir.) and Cercy N. *Numérique: reprendre le contrôle*: Framabook. 2016, p. 81-96

Key words: *blockchain, right to be forgotten (RTBF), data protection, centralised and decentralised authority*

This reference is a chapter in a book dedicated to the right to be forgotten (RTBF). "The right to be forgotten, more aptly designated as a right to de-listing, is a tool of European data protection law aimed at opposing operators present on the network the sovereignty that natural persons have over their personal data. The text explores the interface between this legal development and blockchain technology, which on the contrary tends towards the permanence of data."³¹⁶

The text explores the interface between this legal development and the blockchain technology, which tends, on the contrary, to data permanence.

The paper aims to suggest an approach to regulate the blockchain without a centralised authority.

In terms of methodology, the paper first proposes some definitions of terms such as 'right to be forgotten' and 'blockchain' and goes on to discuss the interaction between these two, as well as the application of the right to be forgotten to blockchain uses other than the bitcoin one. In the end the paper explains the issues arising out of the exercise of the RTBF on the blockchain.

In particular, the authors describe the issue of responsibility for implementation of an individual's request for addition, deletion or modification of their personal data in a

³¹⁶ See : <https://archive-ouverte.unige.ch/unige:90735>

decentralised or half-decentralised network, such as the blockchain network. It also describes the issue of liability for breach of the RTBF in the absence of an intermediary with such authority. It is mentioned that at first glance, since no one has the power to unilaterally delete data from a blockchain, no one can be held responsible for the non-deletion of certain information. However, the authors argue that it is quite simplistic to summarise the links between blockchain and the RTBF. They give an example of the possibility to delete certain data from a blockchain by means of coordinated action/decentralised consensus protocol, which will allow a decision on which transaction to keep and which one to delete – while this clearly involves changing the current state of the blockchain. It is argued that this technique can be applied to the removal of illegal content (copyrighted content, hate speech or child pornography) from a public blockchain. If there is consensus on the fact that some of them are inappropriate for the platform, it is technically possible to remove them from the blockchain. However, the illustrative example of the Ethereum platform shows that even if there was a broad consensus around a modification of the blockchain, a small minority which rejects the modification is enough to maintain a non-modified version of the blockchain.

In conclusion, the reference states that it is finding the consensus within a decentralised network that poses the main challenge. However, sometimes failing to do so has unintended consequences from a technical point of view. European citizens can legitimately invoke the RTBF, if links of this type are stored in a blockchain in the case of inaccurate, inadequate or excessive information. In this specific case, the only possibility to modify or delete the offending data implies agreement and coordinated action of all of the active nodes of a blockchain in order to make the necessary modifications in a consistent manner.

3.3.11. Blockchain: Blueprint for a new economy (Ref. no. 95)

Reference title: M. Swan, *'Blockchain 3.0: Blockchain, blueprint for a new economy'*, O'Reilly, 2015.

Key words: *Blockchain; Blockchain 3.0*

The article analyses justice applications of blockchain beyond currency, economics and markets. It proposes an overview of applications and use cases of blockchain such as digital identity, digital art protection and digital democracy.

The article aims to demonstrate the possibilities of the new generation blockchain.

In terms of methodology, the article describes the use cases of the previous generations of blockchain. Afterwards, it proposes use cases of the new generation blockchain in the field of justice.

The paper discusses the evolution of different generations of blockchain. Starting with the first generation of blockchain, also called 'blockchain 1.0', which is most commonly known for its cryptocurrencies. Then the next generation 'blockchain 2.0' came in and introduced the use of smart contracts. The newest generation of blockchain - 'blockchain 3.0' has the potential, as a worldwide decentralised record, for the registration, inventory, and transfer of all assets. This includes not only finances, but also property and intangible assets such as votes, software, health data, and ideas.

The possibilities of this new generation blockchain will find their way in our daily life, maybe without even noticing it. The article proposes some use cases for the application of this new generation blockchain. For example, it could help in tracking changes and contributions to updated versions of a system. Even the smallest change can be assessed and attributed in an automated way. In the world of internet, which has a very international character, the 'Namecoin' could be an alternative for the traditional Digital Name System (DNS) that verifies names to web spaces. It would not be controlled by any government, whereas the current domain names (.com, .eu, .be, etc.) are controlled by governments. This 'Namecoin' could be a contribution to the freedom of speech in the fight against

ensorship. On the other hand, this service of anonymous DNS verification can lead to bad players and illegality.

In the field of identification and passports, a blockchain solution can act as digital repository to verify the identity, with application such as OneName, or BitID. Related to this, it would be possible to keep a personal health record storage based on blockchain, including access to one's own genomic data in a secured way.

In the fields related to property, notarial acts and contracts can be created via a blockchain solution and this could be a way to facilitate the way of protecting intellectual property and digitally created art. The key concepts of the blockchain solution would be the hashing and timestamping of works and transactions; together with a proof of existence of it.

Election procedures could possibly benefit from the use of blockchain. It can start with the use for random sample elections, in the area of delegative democracy. Or it can be used as an application such as 'Futarchy', a two-step democracy where persons can vote on the one hand for a specific outcome to be aimed for, and on the other, on the approach to reach that outcome.

In conclusion, the next generation blockchain has possibilities beyond the known currencies and smart contracts to be used in all kind of sectors including the justice field.

As next steps, the article recommends that the blockchain technology is rich enough to become part of the standard intellectual vernacular and toolkit.

3.3.12. CRAB: Blockchain Based Criminal Record Management System (Ref. no. 96)

Reference title: M. A. Tasnim et al., '*CRAB: Blockchain Based Criminal Record Management System*', International Conference on Security, Privacy and Anonymity in Computation, Communication and Storage, pp. 294-303, 2018.

Key words: *Blockchain; Criminal Record management; CRAB*

The article analyses the use of blockchain to store criminal records, so as to ensure integrity and security.

The article aims to demonstrate a more secure and safe way to store criminal records.

The paper explains that criminal records are highly sensitive public records. By incorporating criminal records in a blockchain, the authenticity and rigidity of records can be maintained, which also helps to keep the data safe from adversaries. The peer-to-peer cloud network enables the decentralisation of data, and it helps prevent unlawful changes in the data.

The criminal record storage system suggests implementing blockchain technology to store data, which helps to attain integrity and security. The system presents ways in which the authority can maintain the records of criminals efficiently. Authorities (e.g. law enforcement agencies and courts) will be able to add and access criminal data. General users (e.g. selected organisations and/or individuals, airports, visa application centres etc.) will have access to the data so that they can look up criminal records. Proper and timely access to authentic criminal records is essential to enforce the law. The effect of corruption among law enforcement forces will also decrease, as this will cut off an entire area of corruption by removing any possibility of tampering with criminal records data by thorough accountability.

The inclusion of the CRAB application for the creation of the hash is intended to create a fast cipher. This cipher is an encrypted way to save the sensitive data.

In conclusion, by incorporating criminal records in a blockchain, authenticity and rigidity of records can be maintained; which also helps to keep the data safe from adversaries.

As next steps, the article recommends to further research on this topic so it could eventually bring a whole scale implementation in a city, or country.

3.3.13. Analysis of implementing blockchain technology to the Argentinian criminal records information system (Ref. no. 97)

Reference title: Alejandro Tomás Dini et al., '*Analysis of implementing blockchain technology to the Argentinian criminal records information system*', 2018 Congreso Argentino de Ciencias de la Informática y Desarrollos de Investigación (CACIDI), 2018.

Key words: *Blockchain, Argentina, criminal records, information system, decentralised, permissioned blockchain. Data storage, sensitive data, cryptography.*

The paper analyses the prospect of using a permissioned blockchain implementation for storing criminal data in an encrypted way.

The paper aims to provide information on the current functionality of the Argentinian RNR (Registro Nacional de Reincidencia) and present the benefits in using a permissioned blockchain implementation.

In terms of methodology, the paper uses a qualitative approach by presenting a case where the benefits of blockchain could be applicable to the RNR, making processes easier and quicker.

The paper discusses the difficulty of the current way of requesting and receiving a certificate of criminal records. Depending on the case, this could take a significant amount of time for the individual. Hence, the paper introduces the notion of using a permissioned blockchain. In all, the authors point out the following pain points: Centralisation of information, waste of resources, time consumption and waste. Even though the paper raises the points needing attention on blockchain being a new technology paradigm, it emphasises the benefits it could bring for RNR. Among others, the paper illustrates that decentralisation is one of the main characteristics of blockchain. It could potentially put information of criminal records to connected nodes making access easier to authorised personnel and potentially the individuals requesting it. The notion of consensus explains the process of a common acceptance on the correctness of the information. Additionally, as the paper writes, the availability of the information could potentially be used to the generation of statistical information to help improve the judicial system.

In conclusion, the paper briefly illustrates the necessity in investing in new technologies, especially in blockchain. It emphasises that like a hammer, blockchain could have many uses and as such it should be treated with responsibility.

As next steps, the paper leaves room for the reader to contemplate on them.

3.3.14. Blockchain: A Revolution for the Law? (Ref. no. 98)

Reference title: Yv. Pouillet and H. Jacquemin, '*Blockchain: une révolution pour le droit*', Journal Tribunaux, 137, 36 - No.6748, pp. 801 - 819, 10 November 2018

Key words: *blockchain, trust, distributed ledger (technology) (DLT), asymmetric encryption/cryptography, validation process, use cases, smart contracts, data protection, GDPR, third-party trustee*

The article describes blockchain technology and its functions, features and applications.

The article aims to reply whether blockchain technology is 'revolutionary' to the law, by means of analysing the multiple legal implications it triggers in different law domains.

In terms of methodology, the authors analyse, on the one hand, the legal implications, which are horizontal for all law fields, and on the other, the most common specific implications, i.e. crypto currencies and *smart contracts*.

The paper discusses the three main elements of blockchain technology: (1) a *peer-to-peer register*, based on (2) an *asymmetric cryptography* system and (3) on a *validation process*. It demonstrates how its users build trust in it, in the absence of a central body/intermediary to ensure a trustworthy, secure and transparent evolution of the distributed register³¹⁷. This trust relies first on an asymmetric encryption³¹⁸, which guarantees the integrity and the authenticity of the transaction message, and second – on a process of validation by the network actors of the sender's identity and ability to perform the transaction. Furthermore, the article clarifies the difference between public and private blockchains. The paper also describes several use cases of blockchain in different sectors³¹⁹. In addition, the authors comment on a number of horizontal legal implications of the three main functions of blockchain – to serve as a data register, to transfer cryptocurrencies and to execute automatic operations via smart contracts. For instance, the article questions the possibility of any type of intellectual property right, be it a patent, a copyright, a trade secret or a right on a database, to protect or to be applied to blockchain. The same question goes for the applicability of data protection rules to all personal data, which are pseudonymised. The article goes further to discuss specific issues related to the financial sector (bitcoins) and smart contracts and the implications of the latter in the different stages of the contract life (its signing, execution and clauses for non-execution).

In conclusion, the authors underline first that 'trust' is the leitmotiv both of the intervention of the law and its non-intervention in the blockchain domain. The absence of adequate response regarding the legal responsibility of the multiple blockchain actors is a serious obstacle to the users' trust.

As a way forward, the article endorses the Technical Assessment performed by the STOA³²⁰ requested by the European Parliament. This shows that the legislators should take a step back to analyse through a multidisciplinary approach the technology, its applications, social impact, actors and foreseeable solutions. Such an evaluation, if possible at European level, is the path towards the evolution and not the revolution of the law or laws, which need blockchain.

3.3.15. E-residency and blockchain (Ref. no. 99)

Reference title: C. Sullivan and E. Burger, '*E-residency and blockchain*', Computer Law and Security Review, vol. 33, no. 4, pp. 470-481, 1-8-2017

Key words: *blockchain; e-Residency; know your customer (KYC); data protection; digital identity; right to identity*

The article analyses the development of blockchain in e-Residency related to notarial services and examines the legal, policy, and technical implications of this development.

The article aims to explore the key features of e-Residency in the context of the application of blockchain to identity authentication and their implications from a cross-discipline perspective.

In terms of methodology, this paper starts off with the questions 'What is the Estonian e-Residence?', and 'What is the identity authentication in it?'. It then examines the implications of using blockchain in e-Residence with its security implications, the data protection regulation implications and the right to identity under international law.

³¹⁷ Or distributed ledger.

³¹⁸ Also known as a double-key encryption – with the publicly encrypted key of the transaction addressee and with the privately encrypted key of the sender.

³¹⁹ Such as social life, financial sector, works of art and inventions, traceability of luxury goods, energy, e-voting, e-government, collaborative economy.

³²⁰ Science and Technology Options Assessment panel of the European Parliament.

The paper discusses the possibilities of an e-ID on the e-Residence platform. Back in 2014 Estonia opened up the possibility to request e-Residence based on the X-Road platform. This e-ID is provided to e-Residents without aiming to give citizenship or a travel document. Therefore, it can be requested by anyone in the world, and is not strictly limited to the Estonian population only.

The e-ID issued to Estonian e-Residents enables remote commercial activities, including business and company registration, opening of bank accounts and funds transfers, buying and selling real estate and other property, as well as trade of goods and services.

As a next level, the Estonian government is now partnering with Bitnation (Switzerland) to offer a public notary service to Estonian e-Residents based on blockchain technology. One of the goals is to be able to provide a universal authentication service with blockchain technology.

The identity authentication starts as follows: an applicant for e-Residence applies online and is asked to provide fingerprints at a designated collection point (e.g. EE Embassy), as well as a copy of his/her national ID document. At this point the applicant will receive an e-Resident ID card. The idea is that with the use of e-Residence, it is no longer required to conduct a face to face interview, and to produce a range of original documents.

However, falsifications of e-Residence identities occurs. In the fight against falsifications, the Bitnations' blockchain solution has been introduced. This technology aims to provide a new system to vouch for the integrity of identity outside governmental structures. Including the use of distributed ledgers and public-private keys so the data are better controlled and protected.

There is a need for assurance based on a trustworthy root that it is not easy to forge issued certificates. A blockchain approach eliminates this trust problem because it distributes the ledger among hundreds or thousands of servers under various administrative controls.

The e-Residence application is used by people worldwide and has to be in line with the GDPR for EU citizens, but it is not applicable for all users. There are for example, private data regulation differences between the European and Australian regulations, where the stricter one can be applied.

In conclusion, in the global market environment, where no one can be trusted, it is challenging to set up a trustworthy e-Residence solution. Blockchain applications can be of help because of their characteristics, but still there needs to be a trustworthy root for the certificates, identities and documents.

As next steps, the article recommends more activities for open source protocols joining the global market.

STUDY ON THE USE OF INNOVATIVE TECHNOLOGIES IN THE JUSTICE FIELD

ANNEX II: EXPLORED PROJECTS AND USE CASES OF THE MEMBER STATES' AUTHORITIES

September 2020

This Report has been prepared by TRASYS International, part of the NRB Group, under the ABC IV- Lot 3 Framework Contract, for DG JUSTICE and CONSUMERS.

Project manager: Dijana SPASOJEVIC, Head of Business Consulting
(Email: dijana.spasojevic@nrb.be; Tel: 0032 478 490 240)

Report prepared by: Miglena VUCHEVA, Margarida ROCHA, Robrecht RENARD, Dimitrios STASINOPOULOS

Disclaimer: The information and views set out in this report are those of the author(s) and do not necessarily reflect the official opinion of the European Commission. Any person acting on the Commission's behalf may be held responsible for the use that may be made of the information contained herein.

Contents

1. INTRODUCTION.....	6
2. COMPLETED PROJECTS	6
2.1. AT, PROJECT: AUTOMATED ALLOCATION AND PROCESSING OF INCOMING DOCUMENTS	6
2.2. HR, PROJECT NAME: SPEECH-TO-TEXT	7
2.3. FI, PROJECT NAME: ROBOT PROCESS AUTOMATION (RPA)	8
2.4. FI, PROJECT NAME: CHATBOT SERVICE FOR DIVORCE/SEPARATION SITUATIONS	9
2.5. DE, PROJECT NAME: USE OF BLOCKCHAIN TECHNOLOGY IN THE AREA OF THE LAND REGISTER DATABASE.....	10
2.6. DE, PROJECT NAME: POTENTIALS OF BLOCKCHAIN REGARDING AN ELECTRONIC VALIDITY REGISTER.....	11
2.7. IE, PROJECT NAME: AUTOMATIC NUMBER PLATE RECOGNITION (ANPR).....	12
2.8. IT, PROJECT NAME: KNOWLEDGE MANAGEMENT AI SYSTEM	12
2.9. LV, PROJECT NAME: VOICE RECOGNITION.....	13
2.10.MT, PROJECT NAME: LAWYERS' REGISTER.....	14
2.11.NL, PROJECT NAME: JURISPRUDENTIEROBOT (JURISPRUDENCE-ROBOT)	15
2.12.PT, PROJECT NAME: IRENE - WEB PERSONAL ASSISTANT.....	16
2.13.PT, PROJECT NAME: BUPI (BALCÃO ÚNICO DO PRÉDIO) LAB AI UNIQUE HOTPOINT FOR CITIZENS – SIMPLIFIED CADASTRAL INFORMATION SYSTEM	18
2.14.SI, PROJECT NAME: COVL - CENTRAL DEPARTMENT FOR ENFORCEMENT ON THE BASIS OF AUTHENTIC DOCUMENTS	19
2.15.SE, PROJECT NAME: AUTOMATIC TRANSCRIPTION.....	20
2.16.SE, PROJECT NAME: DIGITAL RECEIPT	20
2.17.SE, PROJECT NAME: PERSONNEL REGISTERS.....	21
2.18.SE, PROJECT NAME: REAL-TIME/ SINK	22
2.19.SE, PROJECT NAME: PROXIES	23
2.20.SE, PROJECT NAME: COMPANY INFORMATION SERVICE	24
2.21.SE, PROJECT NAME: INVOICES.....	25
2.22.SE, PROJECT NAME: SMART CONTRACTS FOR LAND REGISTRIES	26
2.23.SE, PROJECT NAME: TEST BALLOON	27
2.24.SE, PROJECT NAME: LEGAL GUIDANCE WITH AI SUPPORT	27
2.25.SE, PROJECT NAME: CHATBOTS	28
3. ONGOING PROJECTS IN THE MEMBER STATES.....	29
3.1. AT, PROJECT NAME: AI FOR ANALYSIS OF INVESTIGATIVE DATA	29
3.2. AT, PROJECT NAME: ANONYMISATION OF COURT DECISIONS.....	30
3.3. AT, PROJECT NAME: SEARCHABLE CASE LAW.....	31
3.4. AT, PROJECT NAME: CHATBOT, A CITIZEN SERVICE PORTAL.....	32
3.5. HR, PROJECT NAME: PROJECT FOR ANONYMISATION	33
3.6. CZ, PROJECT NAME: JUDICIAL ANONYMISATION TOOL	33
3.7. DK, PROJECT NAME: DOMSDATABASE.....	34
3.8. DK, PROJECT NAME: EXPLORING THE USE OF FACE RECOGNITION TECHNOLOGY FOR VICTIM IDENTIFICATION IN CHILD SEXUAL ABUSE MATERIAL	35
3.9. DK, PROJECT NAME: DIGITAL COURT PLANNER.....	36
3.10.DK, PROJECT NAME: PERCEPTUAL HASHING	37

*Study on the use of innovative technologies in the justice field – Annex II: Explored projects
and use cases of the Member States’ authorities*

3.11.DK, PROJECT NAME: PRIORITISATION	37
3.12.EE, PROJECT NAME: AUTOMATED TRANSCRIPTION OF COURT MINUTES	38
3.13.FI, PROJECT NAME: ANOPPI	39
3.14.FR, PROJECT NAME: DATAJUST	40
3.15.FR, PROJECT NAME: PRENIUM	41
3.16.FR, PROJECT NAME: AI-DRIVEN PSEUDONYMISATION OF COURT DECISIONS	42
3.17.DE, PROJECT NAME: RESEARCH PROJECT TO FIGHT CHILD PORNOGRAPHY	43
3.18.DE, PROJECT NAME: IDENTIFICATION OF HATE CRIME ON SOCIAL MEDIA	44
3.19.DE, PROJECT NAME: FUTURE CRIMINAL COURT ROOM	45
3.20.DE, PROJECT NAME: LAND REGISTER ANALYSIS COMPONENT IN THE PROJECT “DEVELOPMENT OF A FEDERAL LAND REGISTER DATABASE”	45
3.21.DE, PROJECT NAME: LEGAL TRANSLATION MACHINE SERVICE	46
3.22.DE, PROJECT NAME: COGNITIVE SYSTEMS AT THE PROSECUTOR'S OFFICE	47
3.23.HU, PROJECT NAME: SPEECH RECOGNITION AND TRANSCRIPTION PROJECT	48
3.24.IE, PROJECT NAME: EVALUATE THE POTENTIAL OF FACIAL MATCHING TECHNOLOGIES AS AN AID TO THE INTELLIGENCE GATHERING PROCESS	48
3.25.IT, PROJECT NAME: AVVOCATURA 2020	49
3.26.IT, PROJECT NAME: PREDICTIVE JUSTICE: A DATABASE TO PROVIDE PREDICTABLE GUIDELINES AND TIMING IN PARTICULAR AREAS	50
3.27.IT, PROJECT NAME: RESEARCH WITHIN THE PROJECT "THE CITY OF SIMPLE JUSTICE: SIMPLIFICATION AND REDUCTION OF ADMINISTRATIVE BURDENS IN THE CONTEXT OF CIVIL DISPUTE RESOLUTION"	51
3.28.IT, PROJECT NAME: PREDICTIVE ALGORITHMS AND JUDICIAL DECISIONS	52
3.29.IT, PROJECT NAME: TELEMATIC CIVIL PROCESS	53
3.30.IT, PROJECT NAME: DIGITAL SIGNATURE	53
3.31.IT, PROJECT NAME: <i>AUT DEDERE AUT JUDICARE</i>	54
3.32.IT, PROJECT NAME: SEMI-AUTOMATED ANONYMISATION OF SENSITIVE NAMED ENTITIES IN TEXT DOCUMENTS	55
3.33.IT, PROJECT NAME: CRIMINAL JUSTICE AND AI	56
3.34.IT, PROJECT NAME: DIGITAL SIGNATURE	57
3.35.LT, PROJECT NAME: REAL TIME NETWORK, TEXT, AND SPEAKER ANALYTICS FOR COMBATTING ORGANISED CRIME - ROXANNE	58
3.36.LU, PROJECT NAME: ANONYMISATION OF CASE LAW	59
3.37.MT, PROJECT NAME: NOTARYPEDIA	60
3.38.MT, PROJECT NAME: SEMANTICS4COURTS	61
3.39.NL, PROJECT NAME: DIGIAKKOORD	62
3.40.NL, PROJECT NAME: THE FINANCIAL EMERGENCY BRAKE	63
3.41.NL, PROJECT NAME: KNOWN TRAVELLER DIGITAL IDENTITY PILOT PROJECT (KTDI) ...	64
3.42.PT, PROJECT NAME: AI TECHNOLOGY FOR EVIDENCE ANALYSIS	65
3.43.PT, PROJECT NAME: MAGISTRATOS	66
3.44.SI, PROJECT NAME: RETURN SERVICE DATA HANDWRITING RECOGNITION	67
3.45.ES, PROJECT NAME: TEXTUALISATION OF AUDIO-VISUAL MEDIA	68
3.46.ES, PROJECT NAME: AUTOMATED DOCUMENT CLASSIFICATION	69
3.47.ES, PROJECT NAME: BUSINESS INTELLIGENCE	69
3.48.ES, PROJECT NAME: AUTOMATED SENTENCE PSEUDONYMISATION	70
3.49.ES, PROJECT NAME: AUTOMATED SENTENCE CLASSIFICATION	71

*Study on the use of innovative technologies in the justice field – Annex II: Explored projects
and use cases of the Member States' authorities*

3.50.ES, PROJECT NAME: CREATION OF STRUCTURED DATA.....	71
3.51.SE, PROJECT NAME: TOOL FOR CHOOSING COMPANY NAMES	72
3.52.SE, PROJECT NAME: PROFILE	73
3.53.SE, PROJECT NAME: TEXT-TO-TEXT TRANSLATION	74
3.54.SE, PROJECT NAME: ANONYMISATION OF COURT DECISIONS.....	75
3.55.SE, PROJECT NAME: DECISION MAKING	75

1. Introduction

This document describes completed and ongoing projects in the Member States using innovative technologies in the justice field.

Out of a total of 93 projects, 25 are completed, 55 are ongoing, 12 are planned and one has been suspended. Projects that are completed are marked in **green**³²¹, while those that are ongoing are marked in **blue**³²². Planned and suspended projects are not included in this document, whereas an overview of all projects is given in Section 6.3. of the Final report.

DISCLAIMER: *Some of the replies included had content in a language other than English. In order to make the entire document comprehensible, these replies have been translated into English from the original text. The translations are the contractor's suggestion and are therefore not official. They are only for indicative purposes. Translated parts are marked with an asterisk (*).*

2. Completed projects



AUSTRIA

2.1. AT, Project: Automated allocation and processing of incoming documents

Project Status: Completed / In Production, 2017 - 2018	
Brief Profile	
Country, Organisation:	Austria, Federal Ministry of Constitutional Affairs, Reforms, Deregulation and Justice
Title of the project:	Automated allocation and processing of incoming documents
Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	Any
AI technology type:	Machine Learning/Deep Learning; Natural Language Processing (NLP)
Project description	
<i>Context and judicial (business) problem:</i>	
<p>The Federal Ministry identified two areas of use for AI technologies: the first, where AI performs supporting functions and humans retain the decision-making power (which applies to most use cases of the Federal Ministry) and the second, where responsibility resides with the AI (e.g. autonomous driving). For the second area of AI use, the Federal Ministry believes there is a need for a new legal framework.</p> <p>In this context the project was the Federal Ministry's first contact with AI technology. The business problem is that the Ministry receives a large number of documents from various communication channels, all of which need to be processed, categorised, and</p>	

³²¹ Red-Green-Blue= 146-208-80

³²² Red-Green-Blue=91-155-213

distributed to different departments. A number of incoming documents do not belong to a specific category and subsequently fall into the "Other" category.

The tool performs a fully automated allocation and processing of incoming documents from electronic channels and/or scanned documents.

Type of IT solution:

Custom development

Solution description:

The tool extracts metadata and can identify case numbers with NLP, categorise documents, and give additional category titles to those that normally fall in the category "Other" in order to ensure better tracking. The tool recognises the type of proceedings a file belongs to and allocates it to the specific proceedings.

Way Forward:

N/A



CROATIA

2.2. HR, Project name: Speech-to-Text

Project Status: Completed / in Production since December 2018

Brief Profile

Country, Organisation:	Croatia, Ministry of Justice
Title of the project:	Speech-to-Text
Field (Blockchain or AI):	AI

Project specifications

Area of justice:	Civil Justice; Administrative Justice; Criminal Justice; Competition Law
AI technology type:	Machine Learning/Deep Learning; Speech Recognition; Language Generation

Project description

Context and judicial (business) problem:

Generating documents, i.e. meeting minutes, and decisions from courts and state attorney offices, takes time and effort as someone has to manually type them. With the help of this Speech-To-Text tool the business processes of courts and state attorney offices can be automated and accelerated by generation of hearing minutes, court decisions, and indictments.

Type of IT solution:

The core of the tool (the algorithm) is built on an existing solution (vendor-based: Newton Technology Adria (NTA)), which is then customised to Croatian vocabulary and language usage, along with special requests from the judicial sector.

Solution description:

The solution is trained to transcribe speech into a text document. It can be used in a variety of contexts, such as the transcription of meeting minutes or the recording of a court decision during the meeting itself. The tool can also be used for dictation as a means of automatically creating an email or a text document. Special equipment and a licence must be installed on a computer before it can be used. This equipment (800 total units have been purchased) is provided by the Ministry of Justice to all the offices. The tool has demonstrated an accuracy rate of 99% and is still improving.

Way Forward:

There are thoughts of expanding the tool for use in other sectors and functions, such as police hearings and interviews. There is also an idea to make the service available as a cloud service, but no specific actions have yet been taken in that respect.



FINLAND

2.3. FI, Project Name: Robot Process Automation (RPA)

Project Status: Completed / In Production (POC completed in September 2019), project completed in January 2020

Brief Profile

Country, Organisation:	Finland, Ministry of Justice
Title of the project:	Sakkomaksujen kohdamisen automatisoint/ Robot Process Automation (RPA)
Field (Blockchain or AI):	AI

Project specifications

Area of justice:	Enforcement of fines
AI technology type:	N/A

Project description

Context and judicial (business) problem:

The Ministry of Justice identified seven business processes in the area of enforcement of fines, which could be automated with a robot, and eventually decided to go with three: unclaimed refunds, payments without reference number, and unallocated payments. They identified a number of business problems, such as the payer failing to provide the fine reference number on the payment order. This sort of omission makes it difficult to link the payment to the sanction (the Ministry has around 12,000 cases like this per year). This is also important in cases of overpayment, double payment, or incorrect payment of fines. The payment may have been made but the sanction could be missing from the system. The robot solves these business problems. It has been estimated that the robot could save approximately two to three person-years and 168,000 EUR per year.

In this context, the Ministry decided to replace repetitive manual tasks with an automated robot. The RPA is currently used in the area of fine enforcement with several purposes: (1) to make enquiries via email to banks and the Finnish Population Centre; (2) to go through data and spot cases of erroneous overpayment in order to facilitate refunds; and (3) to re-allocate uncollected overpayments (300 -700 cases every year).

Study on the use of innovative technologies in the justice field – Annex II: Explored projects and use cases of the Member States’ authorities

Type of IT solution:

Open source “Robot framework”.

Coding was done by the service provider, KnowIT OY, Finland.

Solution description:

Process-wise, what the robot does is collect information from the target system (e.g. internal system of the fines department of the MoJ). It then sends an e-mail to a specified bank, and when it receives an authorisation e-mail back from the bank it sends a request to the population information system (PIS) of the Finnish Population Centre. The robot then forwards the received information to the target system.

Currently there are three robots in place. The first one, known as “Lupu”, has been in production for almost a year (since April 2019). The other two have been in production since January 2020. Lupu was the first experience of process automation (in particular the refund process). It was rolled out rather quickly because it only automates processes within the department and does not interact with other departments. The experiment started in February 2019, and several months later it was fully implemented. It took more time to implement the other robots as they had to interact with external environments, and there were some technical challenges.

The Ministry is very satisfied with the robot “Lupu” and its performance. They anticipate a number of benefits, such as cost reduction, connecting to legacy systems at a low cost, reduced administrative time, and quicker refunds.

Way Forward:

The Ministry is of the opinion that there are many other manual processes that could employ the robot technology. Repetitive and high volume tasks, mainly in account management, could be targeted for future exploration. The next step could be to implement the technology within other departments of the Ministry, which might have processes that can be automated, or within the Finnish authority, which is responsible for enforcement beyond fines. In fact, the whole enforcement process is often a matter of collecting debts directly from bank accounts for salaries/pensions, a process which is already semi-automated but requires a great deal of manual work.

2.4. FI, Project Name: Chatbot service for divorce/separation situations

Project Status: Completed / (2018 – 2019) Not in production	
Brief Profile	
Country, Organisation:	Finland, Ministry of Justice
Title of the project:	Chatbot service for divorce/separation situations (part of Aurora project)
Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	Civil Justice; Family Law and Litigation
AI technology type:	Expert systems and rule-based systems
Project description	
<u>Context and judicial (business) problem:</u>	

This completed pilot of a chatbot service for divorce/separation situations aims to improve access to public services.

Type of IT solution:

The technology behind the chatbot follows pre-specified rules.

Solution description:

This chatbot project is part of the "Aurora" project³²³. It is designed to help individuals facing divorce/separation find the most suitable/effective local services based on their needs.

According to the latest information the project will not go into production.

Way Forward:

N/A



Germany

2.5. DE, Project Name: Use of blockchain technology in the area of the land register database

Project Status: Completed (POC) / August – December 2018³²⁴

Brief Profile

Country, Organisation:	Germany, Commission for information technology in the judiciary (workgroup use of cognitive systems in the judiciary)
Title of the project:	Use of blockchain technology in the area of the land register database
Field (Blockchain or AI):	Blockchain

Project specifications

Area of justice:	Land Registry
DLT technology type:	Public but permissioned

Project description

Context and judicial (business) problem:

The project is a proof of concept, aimed at assessing whether supplementary integrity assurance can be provided for the land register database by means of blockchain technology.

Type of IT solution:

³²³ Aurora is an AI assistant built by and for the Finish public sector. <https://vm.fi/en/auroraai-en>

³²⁴ Information based on replies received to the questionnaire prepared in the course of this study

Study on the use of innovative technologies in the justice field – Annex II: Explored projects and use cases of the Member States' authorities

The tool is custom developed. The technology tested is public but permissioned, in the domain of "Anchoring" data in classical systems to ensure their integrity.

Solution description:

N/A

Way Forward:

N/A

2.6. DE, Project Name: Potentials of blockchain regarding an electronic validity register

Project Status: Completed (POC) / October 2019 – January 2020.	
Brief Profile	
Country, Organisation:	Germany, Commission for information technology in the judiciary (workgroup use of cognitive systems in the judiciary)
Title of the project:	Potentials of blockchain regarding an electronic validity register
Field (Blockchain or AI):	Blockchain
Project specifications	
Area of justice:	Civil Justice (all)
DLT technology type:	Public but permissioned
Project description	
<u>Context and judicial (business) problem:</u>	
<p>This project examined the potential for establishing a public electronic register to check the validity status of documents (valid/revoked) based on blockchain technology. Two examples (certificate of inheritance, notarised certificate of authority) were examined in detail.</p>	
<u>Type of IT solution:</u>	
<p>The tool is custom developed. The technology is public but permissioned, in the domain of "anchoring" of data in classical systems to ensure their integrity.</p>	
<u>Solution description:</u>	
<p>Not adopted at the moment.</p>	
<u>Way Forward:</u>	
<p>N/A</p>	



2.7. IE, Project Name: Automatic Number Plate Recognition (ANPR)

Project Status: Completed in 2010	
Brief Profile	
Country, Organisation:	Ireland, Department of Justice and Equality
Title of the project:	Automatic Number Plate Recognition (ANPR)
Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	N/A
AI technology type:	OCR; AI for energy savings
Project description	
<u>Context and judicial (business) problem:</u>	
<p>This project was focused on the implementation of a tool using optical character recognition (OCR) technology to read vehicle registration plates. Lately, Artificial Intelligence technology has been incorporated for the purpose of optimising the energy usage of devices in relation to a more focused capture of number plate images.</p>	
<u>Type of IT solution:</u>	
N/A	
<u>Solution description:</u>	
N/A	
<u>Way Forward:</u>	
N/A	



2.8. IT, Project Name: Knowledge Management AI system

Project Status: Completed	
Brief Profile	
Country, Organisation:	Italy, Court of Appeal, Milano
Title of the project:	Knowledge Management AI system
Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	Competition Law

Study on the use of innovative technologies in the justice field – Annex II: Explored projects and use cases of the Member States' authorities

AI technology type:	Expert systems and rule-based systems; Natural Language Processing (NLP); Named Entity Recognition; Information Extraction
Project description	
<u>Context and judicial (business) problem:</u>	
<p>The key objective is the collection of case law in the competition field. The system is necessary for the implementation of digitised civil and criminal proceedings. The system is necessary for some administrative functions such as requests to fund justice expenses and to obtain the reimbursement of justice system credits against debtors (sanctions, penalties and legal fees).</p> <p>It functions in the area of case law management and accessibility to court decisions, as well as a particular field: competition judgements.</p>	
<u>Type of IT solution:</u>	
<p>The IT solution was developed in-house as there are teams familiar with the relevant administrative areas. The technology used falls within the domains of legal analysis and advanced search.</p>	
<u>Solution description:</u>	
<p>The system will be implemented soon by collecting the decisions of the Special Courts of Rome and Naples in the field of competition law. More specifically, it is based on expert systems and rule-based systems (symbolic, e.g. manually defined rules in a knowledge base).</p>	
<u>Way Forward:</u>	
N/A	



LATVIA

2.9. LV, Project Name: Voice recognition

Project Status: Completed (in production)	
Brief Profile	
Country, Organisation:	Latvia, Prosecution Office of the Republic of Latvia
Title of the project:	Voice recognition
Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	N/A
AI technology type:	N/A
Project description	
<u>Context and judicial (business) problem:</u>	
<p>During the implementation of this project a tool that applies AI technology for voice recognition has been set up in court administration.</p>	

<u>Type of IT solution:</u>
N/A
<u>Solution description:</u>
N/A
<u>Way Forward:</u>
N/A



2.10. MT, Project Name: Lawyers' Register

Project Status: Completed / but not yet implemented – 2019	
Brief Profile	
Country, Organisation:	Malta, Department of Justice
Title of the project:	Lawyers' register
Field (Blockchain or AI):	Blockchain
Project specifications	
Area of justice:	Lawyers' registration
Blockchain technology type:	Private/consortium, permissioned
Project description	
<u>Context and judicial (business) problem:</u>	
<p>In Malta, this is the first blockchain project in the justice field and is the first electronic register of lawyers. It was a pilot project to assess blockchain technology benefits and challenges. The aim is to create a system of transparency wherein the data (licence information) is shared by all parties (lawyers, the public, and the government) in a transparent, immutable, and decentralised way.</p> <p>Lawyers' Register provides an official list of licensed lawyers on a private blockchain, where:</p> <ul style="list-style-type: none"> · it can be accessed publicly; · lawyers can request to amend their details but only verified individuals can amend it; · the data is publicly verifiable, secure, and immutable; and · a lawyer can opt out of the list as per the 'right to be forgotten' clause of the General Data Protection Regulation 2016/679. <p>Currently, it is a private blockchain; however, its design allows for a public blockchain in the future. The intention is to put the lawyer's name and license on the public blockchain as the latter does not contain personal data. Later on, other data could be added to the public blockchain as long as data protection compliance is ensured.</p>	

The main goal is to provide automatic access to other systems accessible by lawyers, such as an e-court portal.

It is important to highlight that, although everyone can view the data, only specified users have the ability to add/modify data.

Type of IT solution:

It is a custom development tool, based on Ethereum.

Solution description:

The project uses an Ethereum IT solution. It falls in the blockchain domain of trusted applications for data sharing and the "anchoring" of data in classical systems to ensure their integrity.

The project is mainly a ledger of licenses, which is only backed by a traditional system to provide pseudo-anonymity.

It adopts a proof of work consensus security protocol because the main security framework relies on a private blockchain system that is secured by traditional mechanisms such as firewall and access to security levels at node level. Data entry is secured through a smart contract written in solidity, and therefore proof of work was used. Since it is a private blockchain, the genesis file was amended in order to specify the difficulty of the network. This was done in order to achieve higher performance. Data resilience was also aided since every node will have a full copy of the ledger.

The blockchain/DLT-based system complements the existing system and does not completely replace it. A traditional system was used in order to ensure higher resilience of data and also to comply with GDPR. All personal information is contained in the traditional system, and only the equivalent hash is used in the blockchain. When a record needs to be deleted, this is done permanently from the traditional system, and the hash can no longer link to the actual user, thus achieving a virtual delete in the blockchain as well.

Since the traditional system contains the information in the blockchain, should anything happen to one of the systems, each can be fully or partially recovered from the other.

Way Forward:

The Information Management Unit (IMU) and the Department of Justice plan to deepen their knowledge of the blockchain and its potential application to future projects.



THE NETHERLANDS

2.11. NL, Project Name: Jurisprudenterobot (Jurisprudence-robot)

Project Status: Completed / December 2018 – April 2019	
Brief Profile	
Country, Organisation:	The Netherlands, Ministry of Justice and Security
Title of the project:	Jurisprudenterobot (Jurisprudence-robot)
Field (Blockchain or AI):	AI

Study on the use of innovative technologies in the justice field – Annex II: Explored projects and use cases of the Member States' authorities

Project specifications	
Area of justice:	Criminal Justice; Criminal Court Proceedings
AI technology type:	Machine Learning/Deep Learning, with Natural Language Processing (NLP)
Project description	
<u>Context and judicial (business) problem:</u>	
The initial problem is that district attorneys do not easily obtain relevant jurisprudence and other necessary information from underlying data.	
<u>Type of IT solution:</u>	
Custom development with open source data (tool is custom made for DA's, and tested with open source data), in collaboration with a vendor.	
<u>Solution description:</u>	
To ensure district attorneys can quickly obtain relevant jurisprudence and other necessary information from underlying data, the tool will make use of automated business processes (legal workflow automation), improve efficiency and accuracy and provide better insight on the available data. The tool is currently a test version only and is not yet implemented.	
<u>Way Forward:</u>	
It solved the initial problem and has the potential to address many other difficulties at the district attorneys' offices in the Netherlands. A second experiment to address difficulties surrounding bias, ethics, etc. is desirable. Therefore, implementation is not yet planned.	



PORTUGAL

2.12. PT, Project Name: IReNe - Web Personal Assistant

Project Status: Completed / In Production since November 2019	
Brief Profile	
Country, Organisation:	Portugal, Instituto dos Registos e do Notariado (*Institute of Registries and Notaries)
Title of the project:	IReNe - Web Personal Assistant
Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	Civil Justice; Civil registry of citizens
AI technology type:	Machine Learning/ Deep Learning; Natural Language Processing (NLP)
Project description	
<u>Context and judicial (business) problem:</u>	

The project's main objectives are improving the quality of services for citizens, and more efficiently managing the organisation. The main focus is training and providing other channels of contact with citizens, and improving the organisation's relationship with customers and the quality of customer services provided. To this end, this smart channel supports the following activities:

- a. answering frequently asked questions (FAQ'S) based on a knowledge base managed by the IRN;
- b. interpreting the citizen's intention to renew an ID card and assessing the citizen's particular situation; and
- c. suggesting the most suitable method of renewing the card: online, face-to-face or by appointment.

The smart channel allows the citizen to schedule online an appointment if this is the most suitable option. In the case of spontaneous services, it offers average waiting times and is integrated with Google Maps so that, depending on the route and means of travel, one can choose the most appropriate counter.

Type of IT solution:

Custom development – the solution was based on a Microsoft template and was fully customised to fit the organisation's needs while following the recommendations and best practices from Microsoft itself.

Solution description:

When a citizen raises a question using IReNe chatbot, following a defined process the question is answered or the citizen is advised on the next steps, e.g. scheduling an appointment with IRN staff. The appointment is confirmed by email and provides additional information on the location, means of transport, etc. An SMS reminder option is also included. The goal is that citizens are only asked to visit the IRN in person in exceptional circumstances.

Way Forward

- Develop new features in of solution in order to integrate other services, namely the central register of beneficial owners, created in compliance with Directive (EU) 2015/849 on preventing the use of the financial system for money laundering or terrorist financing (4th anti-money laundering Directive).
- IRN is planning further improvements of the IReNe chatbot in the area of civil identification:
 - Possibility to update personal data such as home address. This service already exists in the portal, however, it is envisaged to integrate this service in the IReNe chatbot.
 - Possibility to check the status of processes (e.g. ID card renewal) online.
- For requests regarding nationality, IRN is currently in the beginning phase of the project and is collecting requirements.
- Regarding the Central Registry of Beneficiary³²⁵ (CRB), based on a directive from 2017³²⁶, it is mandatory for all legal entities, i.e. companies, to have a registration. In line with this new Directive and procedure, IRN is identifying the use of AI and chatbots as a potential solution for helping citizens become legally compliant.

³²⁵ Registo Central de Beneficiário Efectivo: <https://www.irn.mj.pt/sections/irn/bc-ft/rcbe-registo-central-do/>;

³²⁶ Directive n°89/2017, 21 August approves the juridical regime of the CRB (Registo Central de Beneficiário Efectivo, in Portuguese translation)

Study on the use of innovative technologies in the justice field – Annex II: Explored projects and use cases of the Member States’ authorities

2.13. PT, Project Name: BUPi (Balcão Único do Prédio) Lab AI Unique Hotpoint for citizens³²⁷ – simplified cadastral information system

Project Status: Completed / In production	
The pilot project ran for a full year – between November 2017 and November 2018 – in 10 municipalities ³²⁸ in the central-northern part of Portugal, corresponding to the areas most affected by the severe wildfires during the summer of 2017. Currently, it is in production and covers the entire continental part of the country’s territory.	
Brief Profile	
Country, Organisation:	Portugal, Ministry of Justice
Title of the project:	BUPi – Balcão Único do Prédio
Field: (Blockchain or AI):	AI
Project specifications	
Area of justice:	Land Registry
AI technology type:	Machine Learning/Deep Learning; Expert systems and rule-based systems; Computer Vision
Project description	
<i>Context and judicial (business) problem:</i>	
<p>Following the intense and severe wildfires in the summer of 2017, the Portuguese governmental authorities attempted to delineate the affected territories. It turned out that large portions of the land were not registered, which made it very difficult to mark borders, identify owners, etc. This posed problems, especially in purchase transactions. It was then made a government priority to address the issue and prevent similar situations in the future. The project therefore focuses on land registration .</p>	
<i>Type of IT solution:</i>	
Custom development	
<i>Solution description:</i>	
<p>The BUPi is an electronic platform that connects all databases and applications that contain relevant information on landowners, land location and area, among other elements. This e-Platform aims to collect and store all information on land registry in one location. In a nutshell, the BUPi is a single e-Platform that articulates and facilitates the relationship between citizens and public administration with regards to land registration.³²⁹</p> <p>The project is described as very advanced from a technical point of view as it uses the latest technologies (such as drones) and employs on-site experts with technical equipment to map, screen, and confirm markings with citizens. The project succeeded in facilitating the process and reducing costs.</p>	
<i>Way Forward:</i>	

³²⁷ Official website: <https://bupi.gov.pt/>

³²⁸ For detailed information on the 10 municipalities: https://www.irn.mj.pt/IRN/sections/irn/a_registral/registo-predial/bupi/faqs/6/

³²⁹ https://www.irn.mj.pt/IRN/sections/irn/a_registral/registo-predial/bupi/faqs/2/

Extend this application to nationality requests and other registries.



SLOVENIA

2.14. SI, Project Name: COVL - Central Department for Enforcement on the basis of Authentic Documents

Project Status: Completed (2004-2008)	
Brief Profile	
Country, Organisation:	Slovenia, Supreme Court of the Republic of Slovenia ³³⁰
Title of the project:	COVL - Central Department for Enforcement on the basis of Authentic Documents
Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	N/A
AI technology type:	OCR; Handwriting recognition
Project description	
<u>Context and judicial (business) problem:</u>	
<p>This completed project focused on an automated system for authenticating documents. It aims to improve efficiency in business processes related to enforcement by introducing a centralised working method, automated document production, and process management.</p>	
<u>Type of IT solution:</u>	
N/A	
<u>Solution description:</u>	
<p>There were judicial backlogs related to numerous requests for enforcement on the basis of authentic documents (e.g., bills, cheques, financial statements, etc.). The use of COVL helped reduce both the number of pending cases and the time for decision-making³³¹</p>	
<u>Way Forward:</u>	
N/A	

³³⁰ The owner of this project is the Supreme Court of the Republic of Slovenia, but information has been provided by the Ministry of Justice of the Republic of Slovenia

³³¹ COVL, <https://rm.coe.int/automated-system-for-enforcement-of-authentic-documents-covl-slovenia/168078b02c>



SWEDEN

2.15. SE, Project Name: Automatic transcription

Project Status: Completed Proof of Concept (PoC)	
Brief Profile	
Country, Organisation:	Sweden, Swedish National Courts Administration (Domstolsverket)
Title of the project:	Automatic transcription
Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	Court meetings
AI technology type:	Machine Learning/Deep Learning; Speech Recognition
Project description	
<u>Context and judicial (business) problem:</u>	
<p>Due to the need to transcribe recorded or live speech-to text, increasing costs and time had become a problem. With automated transcription, information can be cross-referenced with recorded voices such as those in videos. Additionally, as the transcription will be automated, an equally automated translation might be used. This would reduce time and costs since the intelligent systems would be helpful to translators and transcriptionists.</p>	
<u>Type of IT solution:</u>	
Vendor-based.	
<u>Solution description:</u>	
<p>The PoC is based on an existing solution that transcribes and translates recorded voices to English. The results are promising.</p>	
<u>Way Forward:</u>	
<p>The PoC scenario was originally intended for only public courts but administrative courts have identified a number of use cases to which the solution could be applicable.</p>	

2.16. SE, Project Name: Digital receipt

Project Status: Completed POC	
Brief Profile	
Country, Organisation:	Sweden, Skatteverket (*Swedish Tax Agency) Sweden, Kairos Future

Study on the use of innovative technologies in the justice field – Annex II: Explored projects and use cases of the Member States' authorities

Title of the project:	Digital receipt (part of the Blockchain-inspired technical solutions for accounting, auditing and taxation)
Field (Blockchain or AI):	DLT
Project specifications	
Area of justice:	Administrative Justice
DLT technology type:	Different types of technology are used in various sub-projects: Merkle Tree, private blockchain/DLT
Project description	
<u>Context and judicial (business) problem:</u>	
<p>The purpose of the project is to identify challenges with today's operations linked to accounting, auditing, and taxation. The identified areas for which a solution should be found are data integrity, traceability, operational efficiency, and decrease in technical dependence of national systems on the common platform. The use of the technology is primarily to secure data integrity, accountability, simplicity, and security. In particular, the project tries to avoid the negative side effects of fully informed databases within the use cases. For example, a registry with all receipts, all invoices, or all proxies would be a severe threat to privacy and a cyber-security risk.</p> <p>The problem is that currently too many receipts are in paper format, and a trustworthy digital form is desired.</p>	
<u>Type of IT solution:</u>	
<p>Custom made as open source. This was realised with the available experience and knowledge of an internal and external study team and a development team.</p>	
<u>Solution description:</u>	
<p>Digital receipt processing: In Sweden they have a tax control box. Companies are obliged to print out receipts on paper. However, the objective is to replace paper-based receipts with electronic ones.</p>	
<u>Way Forward:</u>	
<p>The "Digital receipt" is a promising solution. It has been decided to continue the project, but an implementation plan is not yet in place/available. The project will, however, stimulate more learning and the development of new thoughts, processes, and systems in the branch of accounting, auditing, and taxation.</p>	

2.17. SE, Project name: Personnel registers

Project Status: Completed POC	
Brief Profile	
Country, Organisation:	Sweden, Skatteverket (*Swedish Tax Agency) Sweden, Kairos Future
Title of the project:	Personnel registers (part of the Blockchain-inspired technical solutions for accounting, auditing, and taxation)
Field (Blockchain or AI):	DLT

Study on the use of innovative technologies in the justice field – Annex II: Explored projects and use cases of the Member States' authorities

Project specifications	
Area of justice:	Administrative Justice
DLT technology type:	Different types of technology are used in various sub-projects: Merkle Tree, private blockchain/DLT
Project description	
<u>Context and judicial (business) problem:</u>	
<p>The purpose of the project is to identify challenges with today's operations linked to accounting, auditing, and taxation. The identified areas for which a solution should be found are data integrity, traceability, operational efficiency, and decrease in technical dependence of national systems on the common platform. The use of the technology is primarily to secure data integrity, accountability, simplicity, and security. In particular, the project tries to avoid the negative side effects of fully informed databases within the use cases. For example, a registry with all receipts, all invoices, or all proxies would be a severe threat to privacy and a cyber-security risk.</p> <p>The law requires that employees should be registered on paper. For inspection purposes, and in the fight against illegal labour, a new digital approach would be helpful.</p>	
<u>Type of IT solution:</u>	
<p>Custom made as open source. This was realised with the available experience and knowledge of the internal and external study team and a development team.</p>	
<u>Solution description:</u>	
<p>The employees of companies would be registered in a system when they start and end their work-day. This will be a national system based on a blockchain where the government can follow up on registered employees and detect illegal employment more easily.</p>	
<u>Way Forward:</u>	
<p>It has been decided to continue the project, but an implementation plan is not yet in place/available.</p>	

2.18. SE, Project Name: Real-time/ SINK

Project Status: Completed POC	
Brief Profile	
Country, Organisation:	Sweden, Skatteverket (*Swedish Tax Agency) Sweden, Kairos Future
Title of the project:	Real-time/SINK (part of the Blockchain-inspired technical solutions for accounting, auditing, and taxation)
Field (Blockchain or AI):	DLT
Project specifications	
Area of justice:	Administrative Justice
DLT technology type:	Different types of technology are used in various sub-projects: Merkle Tree, private blockchain/DLT

Project description
<p><u>Context and judicial (business) problem:</u></p> <p>The purpose of the project is to identify challenges with today's operations linked to accounting, auditing, and taxation. The identified areas for which a solution should be found are data integrity, traceability, operational efficiency, and decrease in technical dependence of national systems on the common platform. The use of the technology is primarily to secure data integrity, accountability, simplicity, and security. In particular, the project tries to avoid the negative side effects of fully informed databases within the use cases. For example, a registry with all receipts, all invoices, or all proxies would be a severe threat to privacy and a cyber-security risk.</p> <p>There is a need to optimise accounting processes by minimising the time between the transaction and the accounting notes.</p> <p><u>Type of IT solution:</u></p> <p>Custom made as open source. This was realised with the available experience and knowledge of an internal and external study team and a development team.</p> <p><u>Solution description:</u></p> <p>Accounting and tax payments can be improved when executed more closely to the moment of the action or transaction, or better yet, in real time. This solution looks at the machine-to-machine communication possibilities in accounting.</p> <p><u>Way Forward:</u></p> <p>It has been decided to continue the project, but more analysis is needed before an implementation plan can be put in place.</p>

2.19. SE, Project Name: Proxies

Project Status: Completed POC	
Brief Profile	
Country, Organisation:	Sweden, Skatteverket (*Swedish Tax Agency) Sweden, Kairos Future
Title of the project:	Proxies (part of the Blockchain-inspired technical solutions for accounting, auditing, and taxation)
Field (Blockchain or AI):	DLT
Project specifications	
Area of justice:	Administrative Justice
DLT technology type:	Different types of technology are used in various sub-projects: Merkle Tree, private blockchain/DLT
Project description	
<p><u>Context and judicial (business) problem:</u></p> <p>The purpose of the project is to identify challenges with today's operations linked to accounting, auditing, and taxation. The identified areas for which a solution should be found are data integrity, traceability, operational efficiency, and decrease in technical dependence of national systems on the common platform. The use of the technology is</p>	

Study on the use of innovative technologies in the justice field – Annex II: Explored projects and use cases of the Member States’ authorities

primarily to secure data integrity, accountability, simplicity, and security. In particular, the project tries to avoid the negative side effects of fully informed databases within the use cases. For example, a registry with all receipts, all invoices, or all proxies would be a severe threat to privacy and a cyber-security risk.

There wasn’t a centralised repository where for storing and accessing personal authorisations.

Type of IT solution:

Custom made as open source. This was realised with the available experience and knowledge of an internal and external study team and a development team.

Solution description:

The proxy solution functions as a tool to help people manage employers’ proxies via one location. These proxies indicate the rights and authorities of persons in companies and organisations and will facilitate the process of employees signing on behalf of their company. This solution will function as an independent authority validation tool.

Way Forward:

It has been decided to continue the project, but an implementation plan is not yet in place/available. It would be best if a third party were to be in charge of the versioning, storage of timestamps, and archiving of proxies.

2.20. SE, Project Name: Company information service

Project Status: Completed POC	
Brief Profile	
Country, Organisation:	Sweden, Skatteverket (*Swedish Tax Agency) Sweden, Kairos Future
Title of the project:	Company information service (part of the Blockchain-inspired technical solutions for accounting, auditing and taxation)
Field (Blockchain or AI):	DLT
Project specifications	
Area of justice:	Administrative Justice
DLT technology type:	Different types of technology are used in various sub-projects: Merkle Tree, private blockchain/DLT
Project description	
<u>Context and judicial (business) problem:</u>	
<p>The purpose of the project is to identify challenges with today’s operations linked to accounting, auditing, and taxation. The identified areas for which a solution should be found are data integrity, traceability, operational efficiency, and decrease in technical dependence of national systems on the common platform. The use of the technology is primarily to secure data integrity, accountability, simplicity, and security. In particular, the project tries to avoid the negative side effects of fully informed databases within the use cases. For example, a registry with all receipts, all invoices, or all proxies would be a severe threat to privacy and a cyber-security risk.</p>	

The **information of companies is available, but often it is not easy to find** the most recent information and obtain it in a standardised form.

Type of IT solution:

Custom made as open source. This was realised with the available experience and knowledge of an internal and external study team and a development team.

Solution description:

The company information services is a method for managing company information in a simple and standardised way on a blockchain and information only needs to be shared once. It can then easily be consulted by the authorities and be available for standardised reporting.

Way Forward:

It was decided to continue the project, but an implementation plan is not yet in place/available.

2.21. SE, Project Name: Invoices

Project Status: Completed POC	
Brief Profile	
Country, Organisation:	Sweden, Skatteverket (*Swedish Tax Agency) Sweden, Kairos Future
Title of the project:	Invoices (part of the Blockchain-inspired technical solutions for accounting, auditing, and taxation)
Field (Blockchain or AI):	DLT
Project specifications	
Area of justice:	Administrative Justice
DLT technology type:	Different types of technology are used in various sub-projects: Merkle Tree, private blockchain/DLT
Project description	
<u>Context and judicial (business) problem:</u>	
<p>The purpose of the project is to identify challenges with today's operations linked to accounting, auditing, and taxation. The identified areas for which a solution should be found are data integrity, traceability, operational efficiency, and decrease in technical dependence of national systems on the common platform. The use of the technology is primarily to secure data integrity, accountability, simplicity, and security. In particular, the project tries to avoid the negative side effects of fully informed databases within the use cases. For example, a registry with all receipts, all invoices, or all proxies would be a severe threat to privacy and a cyber-security risk.</p> <p>Not all goods are traded with an invoice, and some invoices are submitted incomplete or more than once. The paper invoice procedures leave some gaps for fraud against taxation rules.</p>	
<u>Type of IT solution:</u>	

Study on the use of innovative technologies in the justice field – Annex II: Explored projects and use cases of the Member States' authorities

Custom made as open source. This was realised with the available experience and knowledge of an internal and external study team and a development team.

Solution description:

The invoices solution is a tracking tool for taxes on goods being sold in companies and stores. It will help the tax agency detect tax fraud and better secure VAT revenue. All taxes will pass directly through a single server, and only one VAT bill will exist.

Way Forward:

It has been decided to continue the project, but an implementation plan is not yet in place/available.

2.22. SE, Project Name: Smart contracts for land registries

Project Status: Completed (POC)	
Brief Profile	
Country, Organisation:	Sweden, Skatteverket (*Swedish Tax Agency)
Title of the project:	Smart contracts for land registries
Field (Blockchain or AI):	DLT
Project specifications	
Area of justice:	Land registry
DLT technology type:	Public but permissioned
Project description	
<u>Context and judicial (business) problem:</u>	
This project explores the blockchain/DLT technology for Smart Contracts in the context of land properties and transactions.	
<u>Type of IT solution:</u>	
Based on the blockchain technology provided by Kairos Future and related IT companies.	
<u>Solution description:</u>	
The solution aimed to significantly reduce the time and effort of parties participating in real estate transactions and the related acts of contract signing, property registration, and exchange of deeds, etc. by automating and digitalising these activities with blockchain technology.	
The test resulted in a technologically functioning tool using smart contracts and provided an impact analysis as well as stakeholder requirements.	
<u>Way Forward:</u>	
The experimental phase was finalised in 2018. The solution has not yet been analysed in terms of its scaling up, optimisation, and integration development. Also, Swedish law doesn't yet permit digital signing of property transfers, which is necessary for any digital solution to work. Adjacent solutions, such as an apartment registry, are currently being investigated.	

Study on the use of innovative technologies in the justice field – Annex II: Explored projects and use cases of the Member States' authorities

2.23. SE, Project Name: Test Balloon

Project Status: Completed Proof of Concept (POC)	
Brief Profile	
Country, Organisation:	Sweden, Swedish Consumer Agency
Title of the project:	Test Balloon
Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	Consumer law
AI technology type:	N/A
Project description	
<p><u>Context and judicial (business) problem:</u></p> <p>Skimming through the internet looking for hidden advertisements can be a time-consuming job. This Test Balloon is an experimental project to explore the potential for a bot (FairAdBot) to map hidden advertisements. The "FairAdBot" makes use of image recognition and does text analysis.</p> <p><u>Type of IT solution:</u></p> <p>It is a tool based on existing software "FairAdBot", which has been customised for the purposes of the Consumer Agency.</p> <p><u>Solution description:</u></p> <p>The Test Balloon tool is an application based on an existing solution customised for use by the Consumer Agency. The FairAdBot project aims to analyse posts in Instagram accounts of popular Swedish influencers. The task was to identify commercial messages (by using certain keywords). The result indicated that many influencers were indeed linked to "misleading" posts targeting consumers. In the future, solutions such as FairAdBot could help enforcement agencies track and pinpoint potential unfair commercial practices and identify possible "misleading" posts.</p> <p><u>Way Forward:</u></p> <p>Decision pending as to whether the experimental tool will be implemented.</p>	

2.24. SE, Project Name: Legal guidance with AI support

Project Status: Completed (POC)/ April 2019 – December 2019	
Brief Profile	
Country, Organisation:	Sweden, Skatteverket (*Swedish Tax Agency)
Title of the project:	Legal guidance with AI support
Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	Administrative Justice
AI technology type:	Machine Learning/Deep Learning

Study on the use of innovative technologies in the justice field – Annex II: Explored projects and use cases of the Member States' authorities

	Natural Language Processing (NLP)
Project description	
<u>Context and judicial (business) problem:</u>	
<p>The project is creating a solution for the search-for-information problem in the Tax Agency. The aim is to ensure correct information can be found more easily.</p>	
<u>Type of IT solution:</u>	
<p>Custom development, done by in-house experts.</p>	
<u>Solution description:</u>	
<p>The solution makes information more easily found and offers an improvement in two directions: The first is to improve the information itself with added metadata and key words. The second is to improve search methods by providing better search queries and using specific key words, which have been added as metadata.</p> <ul style="list-style-type: none"> • The solution will include a component containing the normal search engine called "Solar" in a normalised environment, and a separate component, which is the AI part of the solution, a Python-based open source technology. • The tool is trained with the legal database to look for not only specific key words, but also related words. <p>The final result of the proof of concept (POC) was presented at the end of 2019.</p>	
<u>Way Forward:</u>	
<p>The project will be implemented for the Tax Agency later this year (2020). A possible next step is to implement the solution in other departments or sectors.</p>	

2.25. SE, Project Name: Chatbots

Project Status: Completed Proof of Concept (POC)	
Brief Profile	
Country, Organisation:	Sweden, Swedish National Courts Administration (Domstolsverket)
Title of the project:	Chatbots
Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	N/A
AI technology type:	Natural Language Processing (NLP)
Project description	
<u>Context and judicial (business) problem:</u>	
<p>Automatic answering of simple and frequently asked questions on the National Courts website.</p>	
<u>Type of IT solution:</u>	

The plan was to deploy different chatbots per usage, which could be deployed either on the premises, in the Cloud or in a hybrid manner.

Solution description:

This completed POC used the Microsoft Bot Framework (open source) to test the potential to provide answers to rather simple and frequently asked questions on the National Courts website. Currently, the solution is under development and is planned to go into production shortly.

Way Forward:

N/A

3. Ongoing projects in the Member States



AUSTRIA

3.1. AT, Project Name: AI for analysis of investigative data

Project Status: Ongoing / from 2017 to end of 2020	
Brief Profile	
Country, Organisation:	Austria, Federal Ministry of Constitutional Affairs, Reforms, Deregulation and Justice
Title of the project:	AI for analysis of investigative data
Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	Criminal investigation
AI technology type:	Machine Learning/Deep Learning; Expert systems and rule-based systems; Natural Language Processing (NLP); Computer Vision
Project description	
<u>Context and judicial (business) problem:</u>	
<p>The public prosecutor's offices in Austria faced difficulties in analysing data obtained from house searches due to the excessive size and quantity of data involved (sometimes several terabytes). They decided to use AI to solve this problem.</p> <p>The Federal Ministry considers the data analysis performed by the technology unique, as the prosecutor is able to train the algorithm with data each day, depending on the case and the information he/she needs to analyse. This could include analysing what documents there are (e.g. invoices) and what persons are involved, or defining whether an e-mail chain contains a formal or informal conversation.</p> <p>So far, 12 actual cases have been piloted in public prosecutor's offices, with very positive feedback from the prosecutors.</p>	

Type of IT solution:

Commercial-off-the-shelf (COTS); the vendor is m2n³³².

Solution description:

The project team follows a "mixed" approach to training the algorithms, employing both supervised and unsupervised learning. The prosecutor (or a supporting expert) trains the system with the business models and entities they think should be captured in the case (e.g. invoices or other documents) – because the prosecutor is most familiar with the case – and indicates the type of search performed and the documents collected during the search. The system then has the fundamental knowledge necessary to indicate the specific result, e.g. 'invoice found'. For new entities, the algorithm learns in a supervised manner.

Way Forward:

N/A

3.2. AT, Project Name: Anonymisation of court decisions

Project Status: Ongoing / from 2018-2020	
Brief Profile	
Country, Organisation:	Austria, Federal Ministry of Constitutional Affairs, Reforms, Deregulation and Justice
Title of the project:	Anonymisation of court decisions
Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	All
AI technology type:	Machine Learning/Deep Learning; Natural Language Processing (NLP)
Project description	
<u>Context and judicial (business) problem:</u>	
<p>In Austria only the Supreme Court publishes its decisions online because only it has the legal obligation as well as the resources to anonymise them. All other decisions of other courts are not published. Following discussions on transparency of court decisions, the Federal Ministry decided to find a solution to this.</p> <p>The 2019-2023 European e-Justice Action Plan envisages applying the initiative of Austria to use AI for anonymisation and pseudonymisation of court judgments.</p> <p>Recently the Federal Ministry approached Member States to find whether they could share libraries. From the Ministry's perspective, some services should be language agnostic, while others would have to be language specific. The Federal Ministry wants to publish their decisions in a publically available court decision database with free-of-charge access, including on the European e-Justice Portal.</p>	

³³² <http://www.m2n.at>

Study on the use of innovative technologies in the justice field – Annex II: Explored projects and use cases of the Member States’ authorities

In terms of challenges encountered so far in the project, the tool still has some difficulties in recognising the names of the parties (e.g. if it is a lawyer’s or a judge’s name, it should not be anonymised), as well as in recognising identical identities in different parts of the document.

Type of IT solution:

The Federal Ministry did a proof of concept (POC) in 2017 with the IBM Watson tool; however, the licence costs were relatively high for the received out-of-the-box features. Therefore, in 2018 they decided to use an open-source-based infrastructure.

Solution description:

The Austrian strategy in the last two to three years is a combination of approaches and services, e.g. standard Natural Language Processing (NLP) libraries (Stanford NLP³³³ and spaCy³³⁴) combined with Machine Learning (ML) approaches.

Way Forward:

The objective is to first publish the Higher Regional Court decisions by next year, following a step-by-step approach. It is important to verify the human resource requirements for such an undertaking. The aim is to rate anonymisation tasks (green tag and red stack/orange stack) in order to decide.

3.3. AT, Project Name: Searchable case law

Project Status: Ongoing / Begun in 2019 – ending in 2020	
Brief Profile	
Country, Organisation:	Austria, Federal Ministry of Constitutional Affairs, Reforms, Deregulation and Justice
Title of the project:	Searchable case law
Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	Criminal justice
AI technology type:	Machine Learning/Deep Learning; Natural Language Processing (NLP)
Project description	
<u>Context and judicial (business) problem:</u>	
<p>This project is also part of the 2019-2023 European e-Justice Action Plan. The Federal Ministry introduced a digital filing system in 13 courts with the objective to introduce it in other civil courts, all criminal courts and public prosecutor’s offices in the next two years.</p>	
<u>Type of IT solution:</u>	
N/A	

³³³ <https://nlp.stanford.edu/software/>

³³⁴ <https://spacy.io/>

<p><u>Solution description:</u></p> <p>The solution will make use of Natural Language Processing (NLP) and Machine Learning to create links to external literature and case law databases. The judge could actuate documents and make use of clickable citations. The digital filing system also provides other (small) AI tools, for example, making workflow suggestions or flagging tasks for the judge (e.g. costs of the proceedings).</p> <p><u>Way Forward:</u></p> <p>N/A</p>

3.4. AT, Project Name: Chatbot, a citizen service portal

Project Status: Ongoing, in Beta-Test Phase; Preparing for Launch 2019 – May 2020	
Brief Profile	
Country, Organisation:	Austria, Federal Ministry of Constitutional Affairs, Reforms, Deregulation and Justice
Title of the project:	Chatbot, a citizen service portal
Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	N/A
AI technology type:	Machine Learning and NLP
Project description	
<p><u>Context and judicial (business) problem:</u></p> <p>The tool will provide digital services regarding court proceedings via a mobile first portal. The objective is for citizens to be able to make file inspections at each stage of the case. Citizens will be guided by a chatbot if they have questions (e.g. for legal terms, platform features, or possible procedural steps).</p> <p><u>Type of IT solution:</u></p> <p>N/A</p> <p><u>Solution description:</u></p> <p>Machine learning and NLP</p> <p><u>Way Forward:</u></p> <p>N/A</p>	



CROATIA

Study on the use of innovative technologies in the justice field – Annex II: Explored projects and use cases of the Member States' authorities

3.5. HR, Project name: Project for anonymisation

Project Status: Ongoing (POC)	
Brief Profile	
Country, Organisation:	Croatia, Ministry of Justice
Title of the project:	Project for anonymisation
Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	Any
AI technology type:	N/A
Project description	
<u>Context and judicial (business) problem:</u>	
<p>An interview was conducted with the Ministry of Justice about a project for anonymisation, which is in the proof of concept phase and negotiations are now ongoing with a vendor.</p> <p>To our understanding the tool would be used for the anonymisation of court documents before their publication. The use of an AI solution for this task would help increase the productivity of the courts.</p>	
<u>Type of IT solution:</u>	
N/A	
<u>Solution description:</u>	
N/A	
<u>Way Forward:</u>	
N/A	



CZECHIA

3.6. CZ, Project Name: Judicial Anonymisation Tool

Project Status: Ongoing – Proof of Concept (POC), started in 2020	
Brief Profile	
Country, Organisation:	Czechia, Ministry of Justice
Title of the project:	Judicial Anonymisation Tool
Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	Civil Justice; Administrative Justice; Criminal Justice; Competition Law

Study on the use of innovative technologies in the justice field – Annex II: Explored projects and use cases of the Member States' authorities

AI technology type:	Expert systems and rule-based systems; Natural Language Processing (NLP)
Project description	
<u>Context and judicial (business) problem:</u>	
<p>Before public court decisions are made public they need to be anonymised. Delegating this anonymisation task to the AI application will help increase productivity.</p>	
<u>Type of IT solution:</u>	
<p>Custom development by an in-house development team.</p>	
<u>Solution description:</u>	
<p>The application will ensure the anonymisation of a large number of public court decisions before their publication. The AI technology will be used to detect data that needs to be anonymised, but a dedicated person will still need to proofread the decision before its publication. Currently the project is in the testing phase.</p>	
<u>Way Forward:</u>	
<p>The aim is to publish all decisions of District, Regional, and High Courts. However, this is a long-term goal, so the solution will first be tested in Regional Courts of first instance in a limited area.</p>	



3.7. DK, Project Name: Domsdatabase

Project Status: Ongoing / January – December 2020	
Brief Profile	
Country, Organisation:	Denmark, Domstolsstyrelsen (*Danish Court Administration)
Title of the project:	Domsdatabase
Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	All
AI technology type:	Supervised Machine Learning
Project description	
<u>Context and judicial (business) problem:</u>	
<p>Pursuant to an order of the Danish government, there should be transparency in the courts, with all rulings made public to Danish citizens. This transparency is currently achieved by court clerks manually removing personal and other confidential data from the rulings before making them public. With this ongoing project, the Court Administration is attempting to train software to remove relevant data and to prompt a human facilitator to validate and accept the changes. The degree of pseudonymisation</p>	

Study on the use of innovative technologies in the justice field – Annex II: Explored projects and use cases of the Member States’ authorities

is being optimised through successive introductions of training datasets, and as such it is expected to reach a higher level of accuracy and become ready for production. The final goal is to expose Danish court verdicts to the public in order to secure a just and fair justice system through transparency. Each verdict is pseudonymised and controlled by two different human participants working with a dataset that has been pre-screened by a software-defined engine that identifies the names, pronouns, phrases, and connotations that are problematic in a privacy context.

So far there has been a technical challenge related to semantics. Sometimes the algorithm does not understand the connotations, e.g. when a street name itself needs to be pseudonymised and replaced with “street name”. In addition, there is still some uncertainty as to which rulings should be pseudonymised, as there are historical rulings and/or rulings in criminal law that should only be disclosed if there is public interest.

Solution description:

The engine is based on an ML model that identifies words connected to privacy rules and is reinforced through manual screening by humans. The model is thereby continuously improved in terms of both the speed and quality of pseudonymisation.

Way Forward:

The steps of the process are performed slowly and carefully to ensure that there is no bias in the training dataset. The project owner acknowledges the importance of achieving trust among future users (judges) and the government in order to achieve the objectives of the project. A discussion-based approach to raise awareness and achieve trust and confidence in the project results is therefore being applied with the relevant stakeholders and users.

In addition to the above, the Danish court administration has an Innovation Roadmap (for work progress), which aims to replace the most essential but out-dated systems that do not currently meet administrative needs. A primary goal is to determine whether technology can support the identified administrative processes and enhance communication and innovation.

3.8. DK, Project Name: Exploring the use of face recognition technology for victim identification in child sexual abuse material

Project Status: Ongoing / Begun in 2016	
Brief Profile	
Country, Organisation:	Denmark, Danish National Police (DNP)
Title of the project:	Exploring the use of face recognition technology for victim identification in child sexual abuse material
Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	Criminal Justice
AI technology type:	N/A
Project description	
<u><i>Context and judicial (business) problem:</i></u>	
The Danish National Police (DNP) is exploring the potential uses for facial recognition technology for identification purposes in child abuse investigations.	

Type of IT solution:

Developed internally.

Solution description:

It is tested whether the technology can be used for victim identification in child sexual abuse material. However, the technology has not yet been implemented in any live cases due to political and legal considerations.

Way Forward:

The project awaits political and legal evaluation. However, the DNP are following the developments in facial recognition technology with a focus on its implications, benefits, etc. to further inform discussions in this area.

3.9. DK, Project Name: Digital Court Planner

Project Status: Ongoing / Begun in February 2019. The project is near the end of the clarification phase and will enter the implementation phase on Monday 3 February 2020

Brief Profile

Country, Organisation:	Denmark, Attorney General (Rigsadvokaten)
Title of the project:	Digital Court Planner
Field (Blockchain or AI):	AI

Project specifications

Area of justice:	Courts and Justice
AI technology type:	N/A

Project description

Context and judicial (business) problem:

The project aims to optimise court meeting schedules. For example, one prosecutor could have ten standard meetings that don't require a lot of preparation but five or fewer meetings that require significant preparation time. As such, scheduling needs to take that into consideration. The project's aim is to have a high-quality system that reduces travel time and balances preparation time for court meetings. It is expected to increase productivity by an overall of 30% compared to the current productivity of court planning personnel. The idea is that the project would be of significant assistance to personnel (a team of 60 people). The project will assist in the allocation of court meetings taking place up to a year in advance.

Type of IT solution:

Combination of commercial-off-the-shelf (COTS) and custom development. It uses Microsoft Outlook/Exchange, with custom development that will use .Net and ML.Net from Microsoft and potentially TensorFlow.

Solution description:

The functionality of the Digital Court Planner is about allocating meeting dates, times, and locations to prosecutors based on their profile (experience, competencies, specific court allocation, case preparation time, number of weekly and biweekly court meetings, bundling of standard meetings, work schedule, availability, case complexity, etc.).

Study on the use of innovative technologies in the justice field – Annex II: Explored projects and use cases of the Member States' authorities

Way Forward:

The project will deliver a system that will enter a pilot phase for two months before going into production. It is expected to go live in October 2020 or earlier.

3.10. DK, Project Name: Perceptual hashing

Project Status: Ongoing	
Brief Profile	
Country, Organisation:	Denmark, Danish National Police
Title of the project:	Perceptual hashing
Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	Criminal justice
AI technology type:	N/A
Project description	
<u>Context and judicial (business) problem:</u>	
<p>There is a large volume of investigative material (such as videos) that investigators need to analyse faster and more efficiently in order to impact the fight against sexual assault and/or child abuse.</p>	
<u>Type of IT solution:</u>	
N/A	
<u>Solution description:</u>	
<p>It is a small-scale project that will be used in the fight against sexual assault and/or child abuse crimes. The tool is currently under development. The goal is to use perceptual hashing to compare the hash of a video (with content related to sexual assault or abuse) with the hashed videos from other computer hard discs and servers. The tool can then automatically detect if the same video is present in other hard disks/servers/drives, even if the video has been shortened or edited.</p>	
<u>Way Forward:</u>	
N/A	

3.11. DK, Project Name: Prioritisation

Project Status: Ongoing	
Brief Profile	
Country, Organisation:	Denmark, Danish National Police
Title of the project:	Prioritisation
Field (Blockchain or AI):	AI

Study on the use of innovative technologies in the justice field – Annex II: Explored projects and use cases of the Member States' authorities

Project specifications	
Area of justice:	Criminal justice
AI technology type:	Machine learning
Project description	
<u>Context and judicial (business) problem:</u>	
Amongst the high volume of material related to child sexual abuse, it is crucial to tackle the most urgent cases first.	
<u>Type of IT solution:</u>	
N/A	
<u>Solution description:</u>	
The project aims to develop a tool to analyse material concerning sexual abuse of children and to prioritise and address the most severe cases first. This tool will use AI (Machine learning) to learn how to assess which cases are worse than others.	
<u>Way Forward:</u>	
N/A	



ESTONIA

3.12. EE, Project Name: Automated transcription of court minutes

Project Status: Ongoing / 2018 - 2020	
Brief Profile	
Country, Organisation:	Estonia, Ministry of Justice on behalf of Estonian courts
Title of the project:	Automated transcription of court minutes
Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	All fields of justice
AI technology type:	Machine Learning/Deep Learning; Natural Language Processing (NLP); Speech Recognition
Project description	
<u>Context and judicial (business) problem:</u>	
To more efficiently produce court hearing minutes and increase productivity.	
<u>Type of IT solution:</u>	

Custom development, based on existing products of the organisation and implemented by an in-house development team.

Solution description:

It can be used in all types of court procedures to automatically produce minutes.

Way Forward:

N/A



FINLAND

3.13. FI, Project Name: Anoppi

Project Status: Ongoing / October 2018 – September 2020, pilot starts in spring 2020

Brief Profile

Country, Organisation:	Finland, Ministry of Justice
Title of the project:	Automated anonymisation and content description of documents containing personal data (Anoppi)
Field (Blockchain or AI):	AI

Project specifications

Area of justice:	All
AI technology type:	Expert systems and rule-based systems; Natural Language Processing (NLP); Named Entity Recognition

Project description

Context and judicial (business) problem:

Currently, court decisions in Finland are manually anonymised and published. The goal is to automate this process with Natural Language Processing (NLP). Depending on the results from the pilot, the plan is to roll out the software in all Finnish courts.

The project will implement two technology-based artificial intelligence language tools for automatic anonymisation and content description of court decisions and other official decisions issued by authorities. With the assistance of the new applications, the electronic availability of documents can be improved, for example for the purposes of decision-making and research.

Because the project is based on open source, the Ministry of Justice does not have access to the back office software, and therefore some technological issues occurred.

Type of IT solution:

Open source technologies run by two Finnish universities

Solution description:

The IT system is based on expert systems and rule-based systems using language technology that recognises words and entities in the court decision and automatically suggests what to anonymise. The project will implement two technology-based AI language tools for automatic anonymisation and content description of court decisions and other official decisions issued by authorities. With the assistance of the new applications, the electronic availability of documents can be improved, for example for the purposes of decision-making and research.

Way Forward:

N/A



3.14. FR, Project Name: DataJust

Project Status: Ongoing POC / 2019 – early 2022	
Brief Profile	
Country, Organisation:	France, Ministry of Justice Project owner: France, Ministry of the Interior
Title of the project:	AI for analysis of investigative data
Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	Civil litigation
AI technology type:	Machine Learning/Deep Learning; Natural Language Processing (NLP); Information Extraction
Project description	
<u>Context and judicial (business) problem:</u>	
<p>The DataJust project aims to predict the amount of compensation for various bodily injury claims and consequently to:</p> <ul style="list-style-type: none"> ○ improve victims' information regarding the compensation they are entitled to claim for bodily injuries, as well as to improve insurers', lawyers' and judges' information in this area by providing an indicative framework for each type of prejudice based on judiciary case law; ○ harmonise these compensations, without prejudice to the judge's sovereign powers, regardless of the event giving rise to the bodily damage (medical liability, traffic accident, terrorism, etc.); and ○ avoid litigation by encouraging alternative dispute resolution. <p>The project would solve a human rather than a business problem. In particular it would assist victims in evaluating the amount of indemnities they could claim for injuries caused by the responsible party and better involve legal professionals in the process. Currently, there are asymmetries of information between the amounts of indemnities claimed by victims and responsible third parties, including insurance companies, due to</p>	

Study on the use of innovative technologies in the justice field – Annex II: Explored projects and use cases of the Member States’ authorities

the technicality of this area of law. This often leads to lengthy and timely compensation procedures.

In addition, in anticipation of reforms in French tort/liability law, the tool will help in the drafting of impact studies accompanying adoption of legal norms.

The project is expected to be open for all types of users – individuals and institutions – and to

- achieve better information for and indemnification of victims in order to address asymmetries of information between victims, insurance companies, and responsible third parties;
- increase the number of out-of-court settlements;
- provide training to legal professionals and serve as a search engine for going through judgements and clarifying amounts depending on the profile of victims; and
- speed up the prejudice compensation process.

The DataJust project raises ethical concerns related to the impact of AI technology within the field of compensation for bodily injury claims. Precise information delivered to the public and judges on the amounts of compensation generally allocated by the courts may have a standardisation effect on the decisions of insurers and courts in the future. Thus, the methodology used in the project must ensure that information generated by the database will not reproduce judgment biases and discriminations (e.g. between men and women).

Type of IT solution:

Custom development, developed by the IT Department of the Ministry of Justice.

Solution description:

The Ministry of Justice aims to develop a user-friendly tool. It would be based on benchmark indicators related to the victim, e.g. gender, age, location, nature and seriousness of the bodily injury based on medical expertise. The tool will analyse these data and match them to data of victims with similar profiles from previous judgments in order to suggest to the victim an optimal amount of indemnities they could claim, for each type of extra-patrimonial prejudice. The respective judgments would also be displayed to the victim for reference. The judgments will be pseudonymised to be accessible to the public. This aligns with the parallel ongoing project under the open-data concept to make all court judgments public.

Way Forward:

At this stage of the DataJust project the Ministry of Justice still does not have the right to use the data. Once the decree on the project is published, algorithms will be developed, and the data will be used to create publicly available statistics.

3.15. FR, Project Name: PreNIUM

Project Status: Ongoing POC / January 2020 – June 2020	
Brief Profile	
Country, Organisation:	France, Ministry of Justice Project owner: France, Ministry of the Interior

Study on the use of innovative technologies in the justice field – Annex II: Explored projects and use cases of the Member States' authorities

Title of the project:	PreNIUM
Field (Blockchain or AI):	Blockchain
Project specifications	
Area of justice:	Civil justice
Blockchain technology type:	N/A
Project description	
<u>Context and judicial (business) problem:</u>	
<p>This is a feasibility study to create a prototype of a civil information register. The project aims to communicate the use of innovative technologies in the administration and to demonstrate how blockchain/DLT can be further used in other administrations.</p>	
<u>Type of IT solution:</u>	
N/A	
<u>Solution description:</u>	
N/A	
<u>Way Forward:</u>	
<p>The results as to whether or not to proceed further with the PreNIUM project implementation will be communicated in the end of 2020.</p>	

3.16. FR, Project Name: AI-driven pseudonymisation of court decisions

Project Status: Ongoing	
Brief Profile	
Country, Organisation:	France, Cour de Cassation (*Court of Cassation)
Title of the project:	AI-driven pseudonymisation of court decisions
Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	Civil justice, Sentence Enforcement, Competition law
AI technology type:	Machine Learning/Deep Learning; Natural Language Processing (NLP); Named Entity recognition
Project description	
<u>Context and judicial (business) problem:</u>	
<p>The goal of the project is to provide an automated and faster pseudonymisation of French court decisions. The tool solves the business problem with more than 70% accuracy and increased productivity (with AI automating low-value, routine activities), in particular ensuring consistency in decisions (e.g. judgements) and ensuring</p>	

Study on the use of innovative technologies in the justice field – Annex II: Explored projects and use cases of the Member States' authorities

repeatability/reproducibility (e.g. judgements) for verification purposes. It meets the expectations.

With the tool in place, more than 4 million court sentences a year will be published in line with the law pertaining to open data of sentences. Anonymisation is currently done by ten agents and a machine, which is not appropriate for the volume of decisions.

Type of IT solution:

Open source solution

Solution description:

The domain of application of the AI technology is Anonymisation/Pseudonymisation (Document Automation). The tool is in its testing phase, and so far it has shown extreme accuracy, comparable to human-level performance. The technology applied for Machine Learning is Named Entity Recognition and algorithms for classification (deep neural networks). The solution is trained with a structured dataset containing sensitive personal information, which is kept indefinitely by the High French Court for archiving and public interest purposes. It is transmitted to a public website after pseudonymisation.

Technical challenges encountered include the outdated IT infrastructure and the reluctance of the previous provider of the pseudonymisation software to cooperate with the technical team in charge of the AI development.

Way Forward:

N/A



GERMANY

3.17. DE, Project Name: Research project to fight child pornography

Project Status: Ongoing / April 2019 (**operative phase**) (POC and testing); Began building the process in first quarter of 2019 and began training in last quarter of 2019.

Brief Profile

Country, Organisation:	Germany, Ministry of Justice North-Rhine-Westphalia
Title of the project:	Research project to fight child pornography
Field (Blockchain or AI):	AI

Project specifications

Area of justice:	Criminal Justice/Criminal Investigation
AI technology type:	Machine Learning/Deep learning; Computer Vision

Project description

Context and judicial (business) problem:

Every magistrate has the right to address the Central Cybercrime Department team with a general question. At the end of 2016 and beginning of 2017 the Central Cybercrime Department was approached by colleagues indicating that the time required to manually review individual child pornography case files was too long, resulting in a negative impact

Study on the use of innovative technologies in the justice field – Annex II: Explored projects and use cases of the Member States' authorities

on the length and efficiency of investigations. Therefore, the main objectives are to improve the efficiency of justice by achieving a faster time-to-trial and increasing the number of rulings in less time.

Type of IT solution:

Custom development

Solution description:

Creation of a system that independently identifies data, especially photo files that have child pornography content, by means of AI.

Way Forward:

The current stage of the project is the training of the AI solution. The next stage would be to test the solution on an actual case. The subsequent step would be development in a production environment. This has to be reviewed by the responsible authorities. Evaluation of AI skills is expected by the end of Q1, 2020, after which the research part of the project will be complete.

3.18. DE, Project Name: Identification of hate crime on social media

Project Status: Ongoing / Begun in Q3 2013 (Currently training AI to have a scoring system)	
Brief Profile	
Country, Organisation:	Germany, Ministry of Justice, North-Rhine-Westphalia
Title of the project:	Identification of hate crime on social media
Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	Criminal Justice
AI technology type:	Machine Learning/Deep learning
Project description	
<u>Context and judicial (business) problem:</u>	
<p>In a continuing and escalating situation, social media is being used to propagate hate speech and messaging. The Central Cybercrime Department of North-Rhine-Westphalia started a project that aims to screen posts containing hate speech, as reported to the authorities, and which could be categorised as criminal acts.</p>	
<u>Type of IT solution:</u>	
Custom development	
<u>Solution description:</u>	
<p>The organisation teamed up with a university (engineers and lawyers) to rate the posts and the probability that they qualify as illegal offences. They provided these experts with all the material (approximately 800 case files) from hate crime cases to train the system, which will be a scoring system. The main goal will be to develop an autonomous system</p>	

Study on the use of innovative technologies in the justice field – Annex II: Explored projects and use cases of the Member States' authorities

that could help to better screen and identify hate speech appearing in posts/comments on news and media platforms, and to efficiently report such instances to prosecutors.

Way Forward:

The Central Cybercrime Department of the North-Rhine-Westphalia team is very confident about the project's goal and its future results, and a workshop is anticipated in the near future to evaluate what else can be provided/improved.

3.19. DE, Project Name: Future criminal court room

Project Status: Ongoing / Begun in Q1 2020	
Brief Profile	
Country, Organisation:	Germany, Ministry of Justice, North-Rhine-Westphalia
Title of the project:	Future criminal court room
Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	Criminal Justice
AI technology type:	N/A
Project description	
<u>Context and judicial (business) problem:</u>	
Courtrooms do not currently allow video tapings; everything in criminal proceedings is done orally and transcribed manually. This results in a situation where facts and evidence might not be accurately conveyed, and a lot of time and effort is invested in manually taking notes of the main events and evidence of the proceedings.	
<u>Type of IT solution:</u>	
Custom development.	
<u>Solution description:</u>	
The aim is to create modern court rooms that allow videotaping and speech-to-text recognition. All participants will have a hybrid PDF of the transcription and the audio file embedded will be in the PDF protocol. 3D-projection of crime scenes is also under consideration.	
<u>Way Forward:</u>	
N/A	

3.20. DE, Project Name: Land register analysis component in the project "Development of a federal land register database"

Project Status: Ongoing / Begun May 2016. Planned to end in December 2020.
Brief Profile

Study on the use of innovative technologies in the justice field – Annex II: Explored projects and use cases of the Member States' authorities

Country, Organisation:	Germany, Commission for information technology in the judiciary (workgroup use of cognitive systems in the judiciary)
Title of the project:	Land register analysis component in the project "Development of a federal database land register"
Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	Land Registry
AI technology type:	Expert systems and rule-based systems
Project description	
<u>Context and judicial (business) problem:</u>	
The aim of the project is to implement an automatic analysis of existing PDF land registers, to fragment them and to assign the values to a database field. This process will enable the contents to be stored in a more structured way in a database.	
<u>Type of IT solution:</u>	
A commercial 'off-the-shelf' solution (COTS).	
<u>Solution description:</u>	
N/A	
<u>Way Forward:</u>	
N/A	

3.21. DE, Project Name: Legal Translation Machine Service

Project Status: Ongoing / Begun June 2018. End date: December 2020. Currently in testing phase of the IT system.	
Brief Profile	
Country, Organisation:	Germany, Commission for information technology in the judiciary (workgroup use of cognitive systems in the judiciary)
Title of the project:	Legal Translation Machine Service
Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	N/A
AI technology type:	Machine Learning/Deep Learning; Expert systems and rule-based systems
Project description	
<u>Context and judicial (business) problem:</u>	
Provide a secure machine translation service, with the goal of improving the efficiency of justice. The tool will facilitate obtaining better and faster insight on the available data.	

Study on the use of innovative technologies in the justice field – Annex II: Explored projects and use cases of the Member States' authorities

The Machine translation will be the first access to foreign language documents, but human translations will also continue to be needed in the future.

Type of IT solution:

It is a commercial 'off-the-shelf' solution (COTS); no customisation was needed.

Solution description:

N/A

Way Forward:

N/A

3.22. DE, Project Name: Cognitive systems at the prosecutor's office

Project Status: Ongoing / Begun April 2019. Ending April 2020.

Currently in the testing phase of the IT system.

Brief Profile

Country, Organisation:	Germany, Commission for information technology in the judiciary (workgroup use of cognitive systems in the judiciary)
Title of the project:	Cognitive systems at the prosecutor's office
Field (Blockchain or AI):	AI

Project specifications

Area of justice:	Criminal Justice: Criminal Law Enforcement, Criminal Investigation
AI technology type:	Expert systems and rule-based systems; Natural Language Processing (NLP)

Project description

Context and judicial (business) problem:

This ongoing project focuses on providing a secure machine translation service aiming to: support prosecutors' investigations by structuring files; improving efficiency in justice; acquiring insights from available data; and providing reporting and visualisation. In terms of technology, the solution is rule-based.

Type of IT solution:

The tool is a customised commercial solution, based on Machine Learning and Expert systems and rule-based system technology.

Solution description:

N/A

Way Forward:

N/A



HUNGARY

3.23. HU, Project Name: Speech recognition and transcription project

Project Status: Ongoing	
Brief Profile	
Country, Organisation:	Hungary, National Office for the Judiciary
Title of the project:	Speech recognition and transcription project
Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	N/A
AI technology type:	N/A
Project description	
<u>Context and judicial (business) problem:</u>	
<p>This project is exploring the use of speech recognition and transcription software in the courts and aims to facilitate compliance with deadlines associated with the obligation to put decisions and minutes into writing. It would also result in more efficient use of work time by reducing time spent on transcription. In 2018, 726 speech recognition and transcription licenses were purchased for the courts.</p>	
<u>Type of IT solution:</u>	
N/A	
<u>Solution description:</u>	
N/A	
<u>Way Forward:</u>	
N/A	



IRELAND

3.24. IE, Project Name: Evaluate the potential of facial matching technologies as an aid to the intelligence gathering process

Project Status: Ongoing (POC)	
Brief Profile	
Country, Organisation:	Ireland, Department of Justice and Equality
Title of the project:	Evaluate the potential of facial matching technologies as an aid to the intelligence gathering process

Study on the use of innovative technologies in the justice field – Annex II: Explored projects and use cases of the Member States' authorities

Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	N/A
AI technology type:	N/A
Project description	
<u>Context and judicial (business) problem:</u>	
<p>This ongoing proof of concept (PoC) aims to evaluate the potential of facial matching technologies as an aid to the intelligence gathering process, by identifying persons from high volumes of data.</p>	
<u>Type of IT solution:</u>	
N/A	
<u>Solution description:</u>	
N/A	
<u>Way Forward:</u>	
N/A	



3.25. IT, Project Name: Avvocatura 2020

Project Status: Ongoing / 20 June 2018 – 31 December 2020 (first release)	
Brief Profile	
Country, Organisation:	Italy, Avvocatura dello Stato (*Governmental Legal Service)
Title of the project:	Avvocatura 2020
Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	Dispute resolution procedures
AI technology type:	Machine Learning/Deep Learning; Natural Language Processing (NLP)
Project description	
<u>Context and judicial (business) problem:</u>	
<p>The State Advocacy uses a Case Management System (CMS) called Nuovo Sistema Informativo, which includes collaboration features and document management etc. It</p>	

Study on the use of innovative technologies in the justice field – Annex II: Explored projects and use cases of the Member States' authorities

allows different types of searches through the entire database containing more than 400,000 documents.

Avvocatura 2020 will be built on the CMS and will implement AI technology in terms of roles management, classification and categorisation of documents, pattern recognition, and text analysis using Machine Learning. Compared to the current CMS, which allows for searches only on structured data, the new one will perform text mining in unstructured documents.

The project aims to transform the Attorney General's operating model to

- improve efficiency and ensure efficacy of the organisation's internal processes,
- increase transparency and efficacy in its relationship with public administrations and external stakeholder's, and
- improve employee skills.

So far, some challenges have been encountered in terms of legal language, typos, page numbering, recognising some entities, and data protection. A technical committee was established to draft rules to be followed in order to address these challenges and make changes.

Type of IT solution:

Custom development by an external provider (consortium between Leonardo, IBM, and Accenture, led by the latter).

Solution description:

The solution will apply NLP, in particular Named Entity Recognition and Information Extraction. It will make use of Algorithms for Classification. The format of the training dataset is unstructured (texts, images). The dataset has been built on heterogeneous data, covering all kinds of targets.

Way Forward:

N/A

3.26. IT, Project Name: Predictive justice: a database to provide predictable guidelines and timing in particular areas

Project Status: Ongoing / April 2018 – December 2020	
Brief Profile	
Country, Organisation:	Italy, Court of Appeals, Brescia
Title of the project:	Predictive justice: a database to provide predictable guidelines and timing in particular areas
Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	Civil Justice
AI technology type:	Expert systems and rule-based systems; Natural Language Processing (NLP) (Named Entity Recognition; Information Extraction)
Project description	

Study on the use of innovative technologies in the justice field – Annex II: Explored projects and use cases of the Member States' authorities

Context and judicial (business) problem:

The objective is streamlining administrative work for more efficient timing and more effective jurisprudence practices.

Type of IT solution:

The IT solution is custom developed, since no COTS or open source solution could satisfy administrative needs.

Solution description:

The solution is using Named Entity Recognition (e.g. detecting entities such as persons and locations in texts) and Information Extraction (e.g. extracting various types of information such as patterns and trends in texts).

Way Forward:

N/A

3.27. IT, Project Name: Research within the project "The city of simple justice: simplification and reduction of administrative burdens in the context of civil dispute resolution"

Project Status: Ongoing / December 2018-December 2019 - renewable	
Brief Profile	
Country, Organisation:	Italy, Tribunale di Firenze (*Court of Florence)
Title of the project:	Ricerca nell'ambito del progetto "La città della Giustizia semplice: semplificazione e riduzione degli oneri amministrativi nell'ambito della risoluzione delle controversie civili" *Research within the project "The city of simple justice: simplification and reduction of administrative burdens in the context of civil dispute resolution"
Field (Blockchain or AI):	AI
Project specifications	
Area of justice	Competition Law
AI technology type:	Machine Learning/Deep Learning; Natural Language Processing (NLP) (Named Entity Recognition; Information Extraction; Sentiment Analysis); Speech Recognition; Computer Vision; Optimisation
Project description	
<u>Context and judicial (business) problem:</u>	
The key objectives of the project are the creation of models or algorithms capable of incorporating the preventive assessments of mediators, as well as the ability to assess disputes in order to anticipate the probability of successful mediation for the benefit of the parties and/or the judge.	

Study on the use of innovative technologies in the justice field – Annex II: Explored projects and use cases of the Member States' authorities

Type of IT solution:

The IT solution is being developed in-house as there are teams familiar with the administrative needs.

Solution description:

The system will be implemented soon by gathering the decisions of Spec. Courts of Rome and Naples in the competition field. More specifically, it is using expert systems and rule-based systems (symbolic, e.g. manually defined rules in a knowledge-base).

Way Forward:

N/A

3.28. IT, Project Name: Predictive Algorithms and Judicial Decisions

Project Status: Ongoing (Research) / 2018 – renewable every year	
Brief Profile	
Country, Organisation:	Italy, Tribunale di Genova(*Court of Genoa)
Title of the project:	Predictive Algorithms and Judicial Decisions
Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	Civil Justice; Criminal Justice; Competition Law
AI technology type:	Prediction; Legal Analytics (e.g. extract patterns, trends from past judgements); Advanced Search
Project description	
<u>Context and judicial (business) problem:</u>	
<p>This is a joint project with the Sant'Anna School of Advanced Studies in Pisa and CNR, authorised by the Ministry. It concerns a predictive algorithm for judicial decisions based on semantic analysis of previous decisions.</p> <p>The primary objective is to build analytical and predictive algorithms for jurisprudence. The secondary objective is to ensure the necessary knowledge of the algorithm. In other words, the organisation intent not only to develop analysis tools, but also to be able to explain how they work. Many of the data science tools that can be used to extract knowledge from data produce results whose logic is difficult for humans to understand given the number of variables used. The project intends not only to devote itself to constructing analytical algorithms but also to developing suitable tools to explain their operating logic. For this reason, the collaboration of the magistrates is fundamental.</p>	
<u>Type of IT solution:</u>	
<p>The IT solution is custom developed. No COTS or open source solution could satisfy the administrative needs; Trust/confidentiality concerns with a COTS solution; Pre-existing culture of using custom products in the organisation; In-house development team exists and is familiar with the administrative needs.</p>	
<u>Solution description:</u>	

Study on the use of innovative technologies in the justice field – Annex II: Explored projects and use cases of the Member States' authorities

The system will improve the efficiency of justice, acquire insights from available data, and create reports and visualisations.

Way Forward:

N/A

3.29. IT, Project Name: Telematic civil process

Project Status: Ongoing / 2015-	
Brief Profile	
Country, Organisation:	Italy, Court of Ravenna
Title of the project:	PCT - Processo Civile Telematico (*Telematic civil process) The Italian justice system has a program called "PCT" and other policies to promote remote and on-line justice services.
Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	Civil Justice
AI technology type:	Machine Learning/Deep Learning; Computer Vision
Project description	
<u>Context and judicial (business) problem:</u>	
The key objectives of the project are: improved efficiency of justice; increased productivity (with AI automating low-value, routine activities); faster time-to-trial; and enhanced 'clearance rate', e.g. the number of cases processed.	
<u>Type of IT solution:</u>	
The solution is custom developed. No COTS or open source solution could satisfy the administrative needs; there are trust/confidentiality concerns with a COTS solution.	
<u>Solution description:</u>	
N/A	
<u>Way Forward:</u>	
N/A	

3.30. IT, Project Name: Digital Signature

Project Status: Ongoing / 2015-	
Brief Profile	
Country, Organisation:	Italy, Court of Ravenna

Study on the use of innovative technologies in the justice field – Annex II: Explored projects and use cases of the Member States' authorities

Title of the project:	Digital Signature
Field (Blockchain or AI):	DLT
Project specifications	
Area of justice:	N/A
Blockchain Technology Type:	Private/consortium, permissioned
Project description	
<u>Context and judicial (business) problem:</u>	
This ongoing project complements the existing IT system of the Court of Ravenna by introducing a digital signature solution and data storage on a private/consortium, permissioned blockchain.	
<u>Type of IT solution:</u>	
N/A	
<u>Solution description:</u>	
N/A	
<u>Way Forward:</u>	
N/A	

3.31. IT, Project Name: *Aut Dedere Aut Judicare*³³⁵

Project Status: September 2017 – Ongoing	
Brief Profile	
Country, Organisation:	Italy, Ministry of Justice, Department of Justice Affairs
Title of the project:	<i>Aut Dedere Aut Judicare</i> ³³⁶
Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	Criminal Justice
AI technology type:	Expert systems and rule-based systems
Project description	
<u>Context and judicial (business) problem:</u>	
The key objectives of the project are the development of an AI system aimed at providing statistics in the field of judicial cooperation in criminal matters; and data analysis in the field of international cooperation in criminal matters, achieved by detecting certain data in different documents, such as such as arrest warrants, transfers, extraditions, etc.	

³³⁵ From Latin: legal principle of "either extradite or prosecute"

³³⁶ *Idem*

Study on the use of innovative technologies in the justice field – Annex II: Explored projects and use cases of the Member States' authorities

Type of IT solution:

The solution is a commercial 'off-the-shelf' solution (COTS) using IBM Watson. It is customised to adapt the system characteristics to that of international cooperation in criminal matters.

Solution description:

Improving efficiency of justice; Enhancing 'client' satisfaction, where client refers to all involved stakeholders in a case; Acquiring insights from available data, reporting, and visualisation; Providing statistics on international cooperation in criminal matters, through the "intelligent" reading of actions included in the ministerial organisation's computer protocol (arrest warrants, transfers, extraditions, etc.)

Way Forward:

N/A

3.32. IT, Project Name: Semi-automated anonymisation of sensitive named entities in text documents

Project Status: Ongoing / 01 September 2019 – 31 October 2020	
Brief Profile	
Country, Organisation:	Italy, Ministry of Justice
Title of the project:	Semi-automated anonymisation of sensitive named entities in text documents
Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	Civil Justice; Criminal Justice
AI technology type:	Machine Learning/Deep Learning; Expert systems and rule-based systems; Anonymisation / Pseudonymisation; Natural Language Processing;
Project description	
<u>Context and judicial (business) problem:</u>	
<p>The project aims to investigate and utilize innovative NLP and AI techniques – supervised and unsupervised, including both Machine Learning and Deep Learning – to automatically identify sensitive named entities (both physical and legal entities) and related sensitive information as candidates for anonymisation.</p> <p>The approach and methodology aim to achieve a mostly automated process, tailored and customised with respect to the kind and categories of documents subject to anonymisation, and to the policies of the judicial entity responsible for the anonymisation. Manual human validation might still be necessary in some cases, with the support of a feasible user interface.</p>	
<u>Type of IT solution:</u>	

Study on the use of innovative technologies in the justice field – Annex II: Explored projects and use cases of the Member States’ authorities

<p>The solution is custom developed. Experimental AI methodologies and techniques on the cutting edge of or advancing the scientific state of the art. In any event, utilizing Open Source NLP and Analytical libraries (following organizational OS policies and constraints).</p> <p><u>Solution description:</u></p> <p>Automating administrative processes, in particular legal workflow automation; Improving efficiency of justice; Enhancing 'client' satisfaction, where client refers to all involved stakeholders in a case; Accuracy; Increased productivity (with AI automating low-value, routine activities).</p> <p><u>Way Forward:</u></p> <p>N/A</p>

3.33. IT, Project Name: Criminal justice and AI

Project Status: Ongoing / December 2019 - December 2021	
Brief Profile	
Country, Organisation:	Italy, Procura della Repubblica c/o Tribunale di Cosenza (*Public prosecutor’s office at the Court of Cosenza)
Title of the project:	Giustizia penale e intelligenza artificiale (*Criminal justice and AI)
Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	Criminal Justice
AI technology type:	Machine Learning/Deep Learning; Supervised Learning. Natural Language Processing (NLP); Optimisation; Sequence and process mining
Project description	
<u>Context and judicial (business) problem:</u>	
The solution targets situations where it is necessary to link data related to different procedures.	
<u>Type of IT solution:</u>	
The solution is an open source solution using TensorFlow, Keras, and Scikit.	
<u>Solution description:</u>	
Open source solution.	
An indicative description of activities carried out during the project include the following:	
<ul style="list-style-type: none"> • conceptual modelling of data related to procedures from past provisions along with the development of a taxonomy; • design of an IT system supporting procedures and provisions based on raw data; • definition of similarity metrics among procedures; 	

Study on the use of innovative technologies in the justice field – Annex II: Explored projects and use cases of the Member States' authorities

- design of data mining and/or machine learning algorithms in order to identify the similarities among procedures;
- elaboration of interpretative models, which can be useful in reducing contrasts, potentially capable of being elaborated through IT tools; and
- design of a dashboard in order to monitor the interpretative behaviour and the identification of uneven behaviour.

Currently the development of a 'pilot case' related to gender violence is ongoing. The solution is using Decision Trees, Support Vector Machines (SVM) and Deep Neural Networks (Deep Learning, e.g. Convolutional Neural Networks and Recurrent Neural Networks).

Way Forward:

N/A

3.34. IT, Project Name: Digital Signature

Project Status: Ongoing / Begun in 2015	
Brief Profile	
Country, Organisation:	Italy, Procura della Repubblica presso il Tribunale di Monza (*Public prosecutor's office at the Court of Monza)
Title of the project:	Digital Signature
Field (Blockchain or AI):	DLT
Project specifications	
Area of justice:	Civil Justice; General Civil Litigation
DLT Technology Type:	Private/consortium, permissioned
Project description	
<u>Context and judicial (business) problem:</u>	
To our understanding, the tool would help with document management, specifically in digitally signing documents, where it would tackle high volumes of documentation in a secure and traceable way.	
<u>Type of IT solution:</u>	
The tool is custom developed, based on technologies such as trusted data sharing and "anchoring" of data in classical systems to ensure their integrity. It functions with a private network of nodes.	
<u>Solution description:</u>	
The main aim of the tool is to provide digital signature and data storage.	
<u>Way Forward:</u>	
N/A	



LITHUANIA

3.35. LT, Project Name: Real time network, text, and speaker analytics for combatting organised crime - ROXANNE

Project Status: Ongoing / September 2019 – August 2022	
Brief Profile	
Country, Organisation:	Lithuania, Forensic Science Centre of Lithuania
Title of the project:	Real time network, text, and speaker analytics for combatting organised crime - ROXANNE
Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	Criminal Law Enforcement; Criminal Investigation
AI technology type:	Machine Learning/Deep Learning; Natural Language Processing (NLP); Speech Recognition
Project description	
<p><u>Context and judicial (business) problem:</u></p> <p>The project will produce a tool for the investigation and mitigation of organised crime and illegal activities. It will allow the visualisation of generated maps of criminal relations and will allow interoperability and integration with more conventional tools already used by law enforcement.</p> <p>Usage of this tool will speed up investigations, reduce the workload per investigative case, and help map relationships based on speech, language, and video analysis.</p> <p><u>Type of IT solution:</u></p> <p>N/A</p> <p><u>Solution description:</u></p> <p>ROXANNE will provide law enforcement agencies with new technical tools and a clear and efficient legal framework for tracking and uncovering organised (often cross-border) criminal networks. The system will make use of the combined strengths of available technologies. The ROXANNE system will:</p> <ul style="list-style-type: none"> • include an analytics platform for enhancing investigation capabilities, especially for large criminal cases; • improve identification of persons of interest by developing a bi-directional interface between multimodal technologies (such as speaker identification, automatic speech recognition, entity recognition and resolution, as well as face/place/background identification) and criminal network analysis (such as crime pattern and graph theories); and • enhance the criminal network analysis technology to facilitate the decision-making process for enforcement authorities (police). <p>The system will include a dashboard for visualisation of investigation output and integration with existing tools.</p> <p><u>Way Forward:</u></p>	

The platform is under development; implementation is expected in 2022.

LUXEMBOURG

3.36. LU, Project Name: Anonymisation of case law

Project Status: Ongoing. In production in French Court of Cassation, currently being tested in Luxembourg between November 2019 and May 2020

Brief Profile

Country, Organisation:	Luxembourg, Ministry of Justice
Title of the project:	Anonymisation of case law
Field (Blockchain or AI):	AI

Project specifications

Area of justice:	Civil Justice
AI technology type:	Machine Learning/Deep Learning; Natural Language Processing (NLP)

Project description

Context and judicial (business) problem³³⁷:

Currently, Luxembourg has a database³³⁸ where one can find publically available case law. However, not all court judgments are published online yet. Some are only available on request of the interested party. Judgments are anonymised manually by court administrations throughout Luxembourg.

The AI tool, which the Ministry of Justice is currently testing, is used by the French Court of Cassation to anonymise court judgments. It was presented to the Ministry by the company LEFEBVRE-SARRUT³³⁹, which developed the tool for the French Court of Cassation. The solution provider trained the algorithm with the anonymisation rules that the Luxembourgish courts follow. Once a judgment is anonymised by the machine, court clerks can go through it and verify the results.

The final goal is to increase the number of court decisions published online by using an AI anonymisation tool.

So far, it has been detected that the software does not properly recognise certain data in order to anonymise them, e.g. vehicle registration plates. Therefore, the parties will continue the process of rules annotation and training the algorithm.

The multilingual Luxembourgish environment makes it more difficult to lay down the rules of the algorithm, as a decision can contain text passages in different languages.

The Ministry of Justice sees the lack of manpower as a main challenge in their work. All IT projects are handled by a total of eight people at the judicial authorities, three of whom work for the IT helpdesk department and are responsible for 900 people (judges, prosecutors, and administrative staff).

³³⁷ See also Project of Court of Cassation, France, AI-driven pseudonymisation of court decisions.

³³⁸ <https://justice.public.lu/fr/jurisprudence.html>

³³⁹ <https://www.lefebvre-sarrut.eu/en/homepage/>

The other five people are IT engineers who manage various IT projects and administrative applications, including European projects such as ECRIS-TCN, EPPO, e-Evidence/EXEC etc.

Type of IT solution:

Open source solution

Way Forward:

The Ministry of Justice prefers to explore the innovation technology projects other Member States have implemented in order to re-employ them in the best possible way.

Some adaptations to the national regulations are being considered, e.g. forbidding predictive justice or adapting open data regulations regarding search results for court judgments to increase security. As an example of a security measure, currently jurisprudence is searchable only via the search engine on the judicial authorities' website but not via public search engines such as Google.

The judicial authorities are also willing to create a common repository for criminal cases and a properly handled document management system aligned with their archiving rules. The Ministry of Justice and the judicial authorities plan to connect to the e-CODEX³⁴⁰.



3.37. MT, Project Name: Notarypedia

Project Status: Ongoing / March 2018 – March 2020	
Brief Profile	
Country, Organisation:	Malta, Department of Justice Project owner: Notary to the government
Title of the project:	Notarypedia ³⁴¹
Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	Notarial Research
AI technology type:	Supervised Machine Learning/Deep Learning; Natural Language Processing (NLP); (Named Entity Recognition and Information Extraction)
Project description	
<u>Context and judicial (business) problem:</u>	
<p>The Notarypedia Project is using AI to make Maltese history and culture more accessible. The aim behind this project is to digitalise historic manuscript documents and to investigate how to make searches in digital libraries more versatile using of graph-based representations that allow for the automatic generation of different logical views, which</p>	

³⁴⁰ <https://www.e-codex.eu/>

³⁴¹ <https://notarypedia.mt/>

Study on the use of innovative technologies in the justice field – Annex II: Explored projects and use cases of the Member States’ authorities

would integrate information items in order to provide a more interesting and useful user experience.

The tool identifies data of interest for notaries, such as names, dates, and places. The project is available online. The first preview includes three notarial manuscripts transcribed by volunteers from the University of Malta. These are the only complete set of transcribed and published manuscripts from the collection dating back to the 15th century, with a total of 981 deeds.

In terms of challenges, a large number of documents needs to be structured, scanned, and transcribed into English. The data is manually fed into the tool by humans and is therefore scarce at this stage due to the small number of volunteers. The Department of Justice is therefore working in close collaboration with the University of Malta toward finding more volunteers.

Type of IT solution:

Custom development

Solution description:

The solution was evaluated based on a number of criteria and was estimated as “accurate” with the following performance scores:

- Named Entity Recognition: F1 score 0.985,
- Keyword Extraction: F1 score 0.821,
- Relation extraction: F1 score 0.661, and
- Link prediction: 49% accuracy.

The training dataset is classified as semi-structured (e.g. XML, JSON). It applies an NLP ML technology, in particular Named Entity Recognition and Information Extraction, and uses algorithms for classification, such as KNN, TensorFlow, and Support Vector Machines.

Way Forward:

The potential to use Notarypedia in other fields of justice in the future is being explored.

3.38. MT, Project Name: Semantics4Courts

Project Status: Ongoing (POC) / November 2018 – June 2021	
Brief Profile	
Country, Organisation:	Malta, Department of Justice
Title of the project:	Semantics4Courts
Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	Court judgments in general/All
AI technology type:	Supervised Machine Learning/Deep Learning; Natural Language Processing (NLP); (Named Entity Recognition and Information Extraction)
Project description	

Context and judicial (business) problem:

Malta is now in the process of converting digitally available versions of Maltese legislation, which are presently in PDF format, into a machine-readable format, starting with older legislation. The aim is to create readable digital versions of case law. Currently, legal professionals and the general public use the e-courts portal³⁴² to consult case law, pay court fees, obtain information on insolvency procedures, etc. E-courts is used as a one-stop-shop portal; however, lawyers have extended access to it and can, for instance, obtain document templates. Semantics4courts is intended to assist the judiciary in identifying laws linked to the case in question. It will use legislation.mt³⁴³ and the European Legislation Identifier (ELI)³⁴⁴ as data sources. Currently, the judiciary uses its own systems for manually researching information. Semantics4Court will extract information from the e-courts portal and legislation.mt and will reference cases to other cases and legislation.

The idea is to implement a semantic layer for the courts' services through which legal documents such as judgments are semantically enriched, linked, and thus more easily searchable.

Type of IT solution:

Custom development for the PoC.

After identifying the needs via the PoC, the Department of Justice may use a tool available on the market.

Solution description:

The solution uses Named Entity Recognition and Information Extraction as ML technology for NLP with a semi-structured (e.g. XML, JSON) dataset. The algorithms for classification used are Random Forests, Support Vector Machines, and Deep Neural Networks.

Way Forward:

N/A



THE NETHERLANDS

3.39. NL, Project Name: DigiAkkoord

Project Status: Ongoing / 2018 – present	
Brief Profile	
Country, Organisation:	The Netherlands, Ministry of Justice and Security
Title of the project:	DigiAkkoord
Field (Blockchain or AI):	DLT
Project specifications	

³⁴² <https://ecourts.gov.mt/onlineservices/>

³⁴³ <https://legislation.mt/>

³⁴⁴ https://ec.europa.eu/isa2/solutions/european-legislation-identifier-eli_en

Study on the use of innovative technologies in the justice field – Annex II: Explored projects and use cases of the Member States' authorities

Area of justice:	Any field or domain where an approval is needed as part of an administrative process
DLT Technology Type:	Public but permissioned. In the domain of Trusted data sharing, Anchoring; Provenance and ownership of assets, and Proof of existence
Project description	
<u>Context and judicial (business) problem:</u> The solution aims to remove or reduce the need for a central entity or intermediary.	
<u>Type of IT solution:</u> The solution is based on the open source solution 'Guard Time'.	
<u>Solution description:</u> DigiAkkoord is a government-wide reusable application that supports the approval process in a uniform way for all different types of workflows, transactions, and documents, for the entire government and all of its ecosystem stakeholders and applications. Its aim is to reduce the need for intermediaries, increase data integrity and operational efficiency, and provide more traceability. The expected gain is to have a non-repudiable registration of a decision in response to an approval request, including the exact information position on which the decision was based, in a time when it is becoming increasingly important for governments to demonstrate compliance and fully informed consent. The project is still in the testing phase. The blockchain aspect mostly addresses the need for traceability. The application itself supports informed consent, of which traceability is a mere prerequisite.	
<u>Way Forward:</u> N/A	

3.40. NL, Project Name: The Financial Emergency Brake

Project Status: Ongoing (PoC)/ 2017 – expected implementation in 2020/2021	
Brief Profile	
Country, Organisation:	The Netherlands, Ministry of Justice and Security
Title of the project:	The Financial Emergency Brake
Field (Blockchain or AI):	DLT
Project specifications	
Area of justice:	Administrative Justice and Proceedings
DLT technology type:	Private/consortium, permissioned Cyber security (Trusted data sharing); Proof of existence of information or documents (zero knowledge proof)
Project description	

Study on the use of innovative technologies in the justice field – Annex II: Explored projects and use cases of the Member States' authorities

Context and judicial (business) problem:

This project tackles the issue of how government agencies can exchange information to protect vulnerable citizens without violating GDPR legislation.

Type of IT solution:

A customised 'off-the-shelf' solution, with a Hyperledger (Fabric or other Hyperledger sub-project) IT solution.

Solution description:

Providing citizens with a GDPR-proof way to declare payment inability. The project deals with a group of vulnerable citizens who have difficult financial situations and loan re-payment issues. Use of the solution will allow responsible debt-collecting organisations to obtain timely information about the debtor in order to contact him/her to arrange other loan re-payment arrangements. The debtor would have a personal digital wallet (based on blockchain) able to send specific information regarding his/her situation to the debt-collecting organisation, in line with GDPR provisions, enabling the debt-collecting organisation to discuss the situation and make arrangements directly with the debtor.

Way Forward:

The project is now in the pilot stage. Implementation is planned in 2020/2021.

3.41. NL, Project Name: Known Traveller Digital Identity Pilot Project (KTDI)

Project Status: Ongoing / Summer 2020 – end of 2020 (possible 6 month+ prolongation)

Brief Profile

Country, Organisation:	The Netherlands, Ministry of Justice and Security
Title of the project:	Known Traveller Digital Identity Pilot Project (KTDI)
Field (Blockchain or AI):	DLT

Project specifications

Area of justice:	General Civil Litigation
DLT technology type:	Private/consortium, permissioned ledger; Hyperledger More specifically: Trusted data sharing; Provenance and ownership of (digital or physical) assets; Proof of existence of information or documents.

Project description

Context and judicial (business) problem:

The potential for passengers to travel through the airport following a streamlined security process would contribute to the efficiency and effectiveness of the whole process. This is from the perspective of both the traveller (who wants as seamless an experience as possible) and public and private organisations (making use of decentralised technologies).

Type of IT solution:

It is a customised 'off-the-shelf' solution, based on open source technology (Hyperledger Fabric).

Solution description:

The project aims to test the feasibility of a digital identity during an end-to-end passenger journey, from the perspective of the traveller, as well as public and private organisations. All passenger information would be uploaded upfront. Dutch and Canadian Border Authorities have Border Control Systems in place that will be connected to the blockchain solution. Airlines have Departure Control Systems in place that will also connect to the blockchain solution. Fed by these systems, the tool would know passenger data and would be able to recognise a passenger based on a facial image. Passengers passing through airport check-in and passport control would be recognised by the system via a visual scan, allowing check-in and passport control to be conducted automatically.

The project is a collaboration between the Dutch government, KLM, the Schiphol airport, and a Canadian organisation. For this pilot project, the technical part is planned to run at the Schiphol airport. The actual pilot program has not yet started; it is still in the preparatory phase. The test is foreseen for later this year when approximately 10,000 people will fly to Canada.

Way Forward:

If this project proves successful, the Schiphol airport would be able to handle more passengers than it does today, and the security and check-in process would be safer. The optimal idea would be to also connect the system to other services, such as hotels or car rental agencies.



PORTUGAL

3.42. PT, Project Name: AI technology for evidence analysis

Project Status: Ongoing / 2019 – 2021	
Brief Profile	
Country, Organisation:	Portugal, General Public Prosecutors Office
Title of the project:	AI technology for evidence analysis
Field (Blockchain or AI):	AI
Project specifications	
Area of justice	Criminal justice
AI technology type:	N/A
Project description	
<u>Context and judicial (business) problem:</u>	
<p>In 2019, the Public Prosecutor's Office (PPO) completed a project for a PPO Case Management System (CMS)(Version 1.0). In an ongoing project for further development, the PPO will make use of AI technology for evidence analysis (classification, indexing, and advanced search). Version 1.0 is now in the implementation phase and will be implemented only within the General PPO at national</p>	

Study on the use of innovative technologies in the justice field – Annex II: Explored projects and use cases of the Member States’ authorities

level and, for the time being, not further down at the level of local prosecution offices. The first version of this project is expected to create more comprehensive and intensive ways to visualise physical documents, and it is expected to be in production by the end of this year.

A transition tool will be implemented phase-by-phase.

In terms of challenges,

- The PPO has every intention to continue implementing the use of AI. However, there isn’t a specific law or statute to regulate its application, and there are yet no plans in place. Once in place, the PPO would be able to calculate a budget and allocate resources, etc.
- The main issue is a limited execution capability regarding implementation (not enough human capacity). Therefore, external manpower is being hired.
- All in all, the goal is to achieve functionalities compatible with a digital process, prompting a reduction of paper-based formalities. It must be noted, however, that the current legal procedural rules of criminal proceedings require a paper-based case file. This adds a layer of complexity to the procedures in the area of criminal law, which must be reflected in the CMS.
- A concrete tool is needed to address evidence, which takes into account the procedural rules of the judiciary. In particular, the PPO has a lot of cases in digital format, so it is virtually impossible to read everything, thus very good tools are necessary to extract data. The PPO is a judicial authority, which has competence to perform computer searches. Also, the internal procedural rules must be contemplated in the design of the CMS (for instance, if e-mail evidence is found, the PPO needs a judge’s validation).
- The PPO is legally obliged to develop its IT systems on an open source basis. This presents a challenge since it is not possible to acquire components from companies whose source code is proprietary. This implies that development time must be extended. At the same time, it is critical to ensure the safety of IT systems.

Way Forward:

Other two projects related to the CMS envisage the setting up of secure and safe connections and usage of e-Evidence and e-Codex for judicial cooperation purposes, as well as connection to the main judiciary police. These projects are planned to end next year (2021).

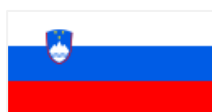
The development projects regarding the PPO’s CMS, related to safety and the first level of evidence search and visualisation, are funded by Horizon 2020. There is a plan to have a portal for citizens to view the process respecting legal procedural rules, for which a collaboration with other entities, mainly the bar association, is expected.

3.43. PT, Project Name: Magistratos

Project Status: Ongoing / until December 2020	
Brief Profile	
Country, Organisation:	Portugal, Ministry of Justice
Title of the project:	Magistratos
Field (Blockchain or AI):	AI
Project specifications	

Study on the use of innovative technologies in the justice field – Annex II: Explored projects and use cases of the Member States' authorities

Area of justice:	Criminal justice
AI technology type:	N/A
Project description	
<u>Context and judicial (business) problem:</u>	
<p>This ongoing project aims to deliver a unique interface for magistrates, either prosecutors or judicial magistrates, with AI enabling the indexing of documents and information, which form part of the judicial case. It also allows for the fast search of documents and content. The technology applies to the domain of judicial inquiry and judicial decisions. The expected gain is a reduction in the time required for rendering court decisions.</p>	
<u>Type of IT solution:</u>	
N/A	
<u>Solution description:</u>	
N/A	
<u>Way Forward:</u>	
N/A	



SLOVENIA

3.44. SI, Project Name: Return Service Data Handwriting Recognition

Project Status: Ongoing (In production)/ 2014 – present	
Brief Profile	
Country, Organisation:	Slovenia, Supreme Court of the Republic of Slovenia ³⁴⁵
Title of the project:	Return Service Data Handwriting Recognition
Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	Supreme Court
AI technology type:	OCR; Handwriting recognition
Project description	
<u>Context and judicial (business) problem:</u>	
<p>The law indicates that dates must be manually written. In these cases, the tool could scan that handwritten text and create a digital version.</p>	

³⁴⁵ The owner of this project is the Supreme Court of the Republic of Slovenia, but information has been provided by the Ministry of Justice.

Type of IT solution:

The IT department of the Supreme Court is responsible for developing and implementing this solution.

Solution description:

The aim of the tool is to recognise handwritten dates on documents. The tool could scan the handwritten date and recognise the day and month. It does not recognise any other text on the documents, only the date, if provided in a specific placeholder in the document.

Way Forward:

The tool is currently implemented and functions with satisfaction. No other future plans, scale-up, or usage in other domains is mentioned.



SPAIN

3.45. ES, Project Name: Textualisation of audio-visual media

Project Status: Ongoing / Begun December 2018 – Ending December 2020.
IT system in testing phase.

Brief Profile

Country, Organisation:	Spain, Ministry of Justice
Title of the project:	Textualisation of audio-visual media
Field (Blockchain or AI):	AI

Project specifications

Area of justice:	Any/All
AI technology type:	Machine Learning/Deep Learning

Project description

Context and judicial (business) problem:

This project focuses on providing a tool that would transcribe audio and video files and then allow possible search in the text.

Type of IT solution:

It is custom developed, using ML technologies, specifically reinforcement learning, in the domain of advanced and semantic search techniques.

Solution description:

N/A

Study on the use of innovative technologies in the justice field – Annex II: Explored projects and use cases of the Member States' authorities

Way Forward:

N/A

3.46. ES, Project Name: Automated document classification

Project Status: Ongoing / begun November 2018 – End December 2021	
Brief Profile	
Country, Organisation:	Spain, Ministry of Justice
Title of the project:	Automated document classification
Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	Any/All
AI technology type:	Machine Learning/Deep Learning; Natural Language Processing (NLP)
Project description	
<u>Context and judicial (business) problem:</u>	
This project is focused on document automation to expedite judges' office procedures.	
<u>Type of IT solution:</u>	
Custom development. The solution makes use of algorithms for classification, including Decision Trees, Standard Neural Networks, and Deep Neural Networks.	
<u>Solution description:</u>	
N/A	
<u>Way Forward:</u>	
N/A	

3.47. ES, Project Name: Business Intelligence

Project Status: Ongoing / Begun 2018 – Ending 2022. IT system in testing phase.	
Brief Profile	
Country, Organisation:	Spain, Judicial Documentation Centre (Centro de Documentación Judicial [CENDOJ])
Title of the project:	Business Intelligence
Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	Any/All
AI technology type:	Machine Learning/Deep Learning; Optimisation

Project description
<p><u>Context and judicial (business) problem:</u></p> <p>This project aims to obtain knowledge about the use of the application as well as about the content of documents such as sentencing decisions, legislation, publications, and prosecutors' documents. Part of improving the quality of the search application is to ensure accurate results and to offer a friendly and intuitive application.</p> <p><u>Type of IT solution:</u></p> <p>A commercial 'off-the-shelf' solution (COTS) "PENTAHO"³⁴⁶ from a vendor, Hitachi. The tool makes use of ML technologies and Supervised Learning.</p> <p><u>Solution description:</u></p> <p>N/A</p> <p><u>Way Forward:</u></p> <p>N/A</p>

3.48. ES, Project Name: Automated sentence pseudonymisation

Project Status: Ongoing / Begun 2018 – Ending 2022.	
Brief Profile	
Country, Organisation:	Spain, Judicial Documentation Centre (Centro de Documentación Judicial[CENDOJ])
Title of the project:	Automated sentence pseudonymisation
Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	Any/All
AI technology type:	Machine Learning/Deep Learning; Expert systems and rule-based systems; Natural Language Processing
Project description	
<p><u>Context and judicial (business) problem:</u></p> <p>The goal of this project is to reduce the cost and time associated with the pseudonymisation of sentences. The aim is to offer users speedier access to and processing of urgently needed sentencing decisions. Due to the cost, this cannot currently be done within the organisation and therefore must be outsourced to an external enterprise.</p> <p><u>Type of IT solution:</u></p> <p>Custom development</p>	

³⁴⁶ PENTAHO - <https://www.hitachivantara.com/en-us/products/data-management-analytics/pentaho-platform.html>

Study on the use of innovative technologies in the justice field – Annex II: Explored projects and use cases of the Member States' authorities

<p><u>Solution description:</u></p> <p>N/A</p> <p><u>Way Forward:</u></p> <p>N/A</p>
--

3.49. ES, Project Name: Automated sentence classification

Project Status: Ongoing / Begun 2018 – Ending 2022.	
Brief Profile	
Country, Organisation:	Spain, Judicial Documentation Centre (Centro de Documentación Judicial [CENDOJ])
Title of the project:	Automated sentence classification
Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	N/A
AI technology type:	Machine Learning/Deep Learning; Natural Language Processing
Project description	
<p><u>Context and judicial (business) problem:</u></p> <p>This ongoing project focuses on classification of sentences in order to provide users with more accurate search results as well as to link a sentences with other documents (other relevant sentences, legislation, publications, etc.) that are related to the same subject.</p> <p><u>Type of IT solution:</u></p> <p>It is an open source, vendor-based, 'off-the-shelf' solution, "Apache Solr."³⁴⁷, from Apache.</p> <p><u>Solution description:</u></p> <p>N/A</p> <p><u>Way Forward:</u></p> <p>N/A</p>	

3.50. ES, Project Name: Creation of Structured Data

Project Status: Ongoing / Begun 2018 – Ending 2022.
--

³⁴⁷ <https://lucene.apache.org/solr/>

Brief Profile	
Country, Organisation:	Spain, Judicial Documentation Centre (Centro de Documentación Judicial [CENDOJ])
Title of the project:	Creation of Structured Data
Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	Any
AI technology type:	Machine Learning/Deep Learning; Expert systems and rule-based systems; Natural Language Processing (NLP)
Project description	
<p><u>Context and judicial (business) problem:</u></p> <p>Based on our understanding, this ongoing project focuses on document automation and the creation of structured data, with the aim of providing users of the tool with more accurate search results.</p> <p><u>Type of IT solution:</u></p> <p>This custom developed tool is based on Machine Learning technologies, such as NLP and Supervised Learning.</p> <p><u>Solution description:</u></p> <p>The project involves finding personal data such as an identity number or home address in order to create a document's structured data. The project is currently in the testing phase.</p> <p><u>Way Forward:</u></p> <p>N/A</p>	



SWEDEN

3.51. SE, Project Name: Tool for choosing company names

Project Status: Ongoing / January 2019 – December 2020 (with possible extension)	
Brief Profile	
Country, Organisation:	Sweden, Bolagsverket (* The Swedish Companies Registration Office)
Title of the project:	Tool for choosing company names
Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	Civil Justice, Company Law

Study on the use of innovative technologies in the justice field – Annex II: Explored projects and use cases of the Member States' authorities

AI technology type:	Machine Learning/Deep Learning; Natural Language Processing (NLP)
Project description	
<u>Context and judicial (business) problem:</u>	
<p>Swedish legislation is complex, with many requirements to be taken into consideration when a company applies for a company name. A proposed company name may be rejected, e.g. due to its similarity to another company with the same business model. The tool for selecting a company name will therefore aim to facilitate choosing a name that is not likely to be rejected, based on the business description that the company provides.</p>	
<u>Type of IT solution:</u>	
<p>The tool will be custom developed by internal specialists. It will include a search component with both weighted and fuzzy search functions.</p>	
<u>Solution description:</u>	
<p>With the help of AI, the Swedish Company Registration Office wants to create a service that simulates its manual processes for examining and deciding on company names. The service should allow an entrepreneur to examine and choose a company name, which stands a good chance of being approved by the manual process carried out by the Swedish Company Registration Office.</p>	
<p>The purpose is to promote and simplify entrepreneurship by offering more individually tailored services to entrepreneurs and potential entrepreneurs.</p>	
<p>The project is ongoing, and is in the early stage of elaborating a roadmap. Development has not yet started.</p>	
<u>Way Forward:</u>	
<p>By extension, the experience of this project can be the basis for fully or partially automating the manual process.</p>	

3.52. SE, Project Name: PROFILE

Project Status: Ongoing / Begun August 2019 - Ending July 2021	
Brief Profile	
Country, Organisation:	Sweden, Tullverket (*Swedish Customs Service)
Title of the project:	PROFILE: work package on fiscal risk management, illegal waste transport, and fraud in the fishing trade
Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	Administrative Law; Administrative Proceedings; Criminal Law Enforcement; Criminal Investigation
AI technology type:	Machine Learning/Deep Learning; Natural Language Processing (NLP)
Project description	
<u>Context and judicial (business) problem:</u>	

Study on the use of innovative technologies in the justice field – Annex II: Explored projects and use cases of the Member States’ authorities

Due to the lack of integration between Swedish and Norwegian Customs systems, the capacity to compare exports from Sweden to imports to Norway has been limited.

The project aims to leverage state-of-the-art data analytics and incorporate new data sources for effective customs risk management. The main objectives are to develop new methods for analysing cross-border traffic of goods between Sweden and Norway and to improve the potential to discover error in customs declarations by matching good descriptions with their respective codes.

Swedish customs is responsible for one work package (of eight) within the Project, and it has teamed up with the Swedish Defence Research Agency (FOI), Norwegian Customs, and Norwegian Defence Research Establishment (FFI). The work package is focused on fiscal risk management but also includes, e.g. illegal waste transport and fraud in the fishing trade.

Type of IT solution:

The Project uses combinations of open source solutions and custom development.

Solution description:

N/A

Way Forward:

At the moment the project is in the research phase, and thus there are no challenges to mention.

3.53. SE, Project Name: Text-to-Text translation

Project Status: Ongoing Proof of Concept	
Brief Profile	
Country, Organisation:	Sweden, Swedish National Courts Administration (Domstolsverket)
Title of the project:	Text-to-Text translation
Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	High Court decisions
AI technology type:	Text-to-text, Machine Learning, Natural Language Processing (NLP)
Project description	
<u>Context and judicial (business) problem:</u>	
<p>The process of translating existing court decisions is costly and time consuming. A request was made by the highest courts to investigate the potential use of an AI tool.</p>	
<u>Type of IT solution:</u>	
Vendor based.	
<u>Solution description:</u>	
<p>The PoC is based on an existing solution from Microsoft, which was customised to meet the needs of the courts’ request. The solution produced satisfactory results, and as such the adoption to actual court proceedings was requested. However, the solution is Cloud-based and not entirely suitable for sensitive data in real-time proceedings.</p>	

Study on the use of innovative technologies in the justice field – Annex II: Explored projects and use cases of the Member States' authorities

Way Forward:

Under investigation aiming at a wider, production-like adoption.

3.54. SE, Project Name: Anonymisation of court decisions

Project Status: Ongoing (POC)	
Brief Profile	
Country, Organisation:	Sweden, Swedish National Courts Administration (Domstolsverket)
Title of the project:	Anonymisation of court decisions
Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	All
AI technology type:	Text-to-text, Machine Learning, Natural Language Processing, anonymisation
Project description	
<u>Context and judicial (business) problem:</u>	
Due to the anonymisation need for a court decision to be published, an AI tool could be used in order to expedite and facilitate the work of administrators.	
<u>Type of IT solution:</u>	
Vendor based. Open Source.	
<u>Solution description:</u>	
A demo was created, and the results were highly satisfactory with the caveat that the perseverance of the context needs improvement.	
<u>Way Forward:</u>	
Further investigate the improvement of the solution regarding context alignment with estimated production deployment in the end of 2020.	

3.55. SE, Project Name: Decision making

Project Status: Ongoing Proof of Concept	
Brief Profile	
Country, Organisation:	Sweden, Swedish National Courts Administration (Domstolsverket)
Title of the project:	Decision making
Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	N/A

Study on the use of innovative technologies in the justice field – Annex II: Explored projects and use cases of the Member States' authorities

AI technology type:	Machine Learning; Recursive neural networks Bayes Naïve Indicator
Project description	
<p><u>Context and judicial (business) problem:</u></p> <p>This ongoing PoC aims to explore how AI/ML technology can be used in the decision-making process of courts and whether there are data-driven insights that can be exposed with the help of AI. The project is of an explorative nature, and as such does not necessarily need to lead to a finished product.</p> <p><u>Type of IT solution:</u></p> <p>N/A</p> <p><u>Solution description:</u></p> <p>N/A</p> <p><u>Way Forward:</u></p> <p>N/A</p>	

STUDY ON THE USE OF INNOVATIVE TECHNOLOGIES IN THE JUSTICE FIELD

ANNEX III: EXPLORED PROJECTS AND USE CASES OF LEGAL PROFESSIONAL ORGANISATIONS

September 2020

*Study on the use of innovative technologies in the justice field – Annex III: Explored projects
and use cases of Legal professional organisations*

This Report has been prepared by TRASYS International, part of the NRB Group, under the ABC IV-Lot 3 Framework Contract, for DG JUSTICE and CONSUMERS.

Project manager: Dijana SPASOJEVIC, Head of Business Consulting
(Email: dijana.spasojevic@nrb.be; Tel: 0032 478 490 240)

Report prepared by: Miglena VUCHEVA, Margarida ROCHA, Robrecht RENARD, Dimitrios STASINOPOULOS

Disclaimer: The information and views set out in this report are those of the author(s) and do not necessarily reflect the official opinion of the European Commission. Any person acting on the Commission's behalf may be held responsible for the use that may be made of the information contained herein.

Contents

1. INTRODUCTION	3
2. COMPLETED PROJECTS OF THE LEGAL PROFESSIONAL ORGANISATIONS	3
2.1. CZ, JUDICIAL ACADEMY, PROJECT NAME: E-LEARNING EDUCATION FOR THE JUDICIARY	3
3. ONGOING PROJECTS OF THE LEGAL PROFESSIONAL ORGANISATIONS	4
3.1. EUROPEAN LAWYERS' FOUNDATION, PROJECT NAME: AI4LAWYERS	4
3.2. UEHJ AND EUBF, PROJECT NAME: RECOVERY OF UNCONTESTED CLAIMS (RUC).....	6
3.3. UEHJ AND EUBF, PROJECT NAME: ONLINE DISPUTE RESOLUTION (ODR) FOR MEDICYS-CONSOMMATION.FR	7
3.4. UEHJ AND EUBF, PROJECT NAME: ALERTCYS.IO	8
3.5. IT, NATIONAL COUNCIL OF NOTARIES, PROJECT NAME: NOTAIO SMART.....	9
3.6. IT, NATIONAL COUNCIL OF NOTARIES, PROJECT NAME: NOTAIO SMART.....	10
3.7. IT, SANT'ANNA SCHOOL OF ADVANCED STUDIES – PISA (LIDER-LAB OF DIRPOLIS INSTITUTE), PROJECT NAME: PREDICTIVE JURISPRUDENCE	10
3.8. IT, NATIONAL COUNCIL OF AGRICULTURAL EXPERTS, AND GRADUATED AGRICULTURAL EXPERTS, PROJECT NAME: DESKTOP ASSISTANCE FOR END USERS.....	13

1. Introduction

This document describes completed and ongoing projects of legal professional organisations using innovative technologies in the justice field.

Projects that are completed are marked in **green**, while those that are ongoing are marked in **blue**.

DISCLAIMER: *Some of the replies included had content in a language other than English. In order to make the entire document comprehensible, these replies have been translated into English from the original text. The translations are the contractor's suggestion and are therefore not official. They are only for indicative purposes. Translated parts are marked with an asterisk (*).*

2. Completed projects of the legal professional organisations



CZECH REPUBLIC

2.1. CZ, Judicial Academy, Project Name: e-Learning Education for the Judiciary

Status: Completed 2008-2011	
Brief Profile	
Country, Organisation, and Contact Person:	CZ, Justiční akademie (*Judicial Academy)
Title of the project:	e-Learning Education for the Judiciary
Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	Judicial training
AI technology type:	Machine Learning/Deep Learning
Project description	
<u>Context and judicial (business) problem:</u>	
<p>The e-Learning portal offers fully online registration for participants from the judiciary for training events. Each training event task is done online through the portal. It also provides mechanisms for evaluating information. It is used by different categories of users: judges, current and future prosecutors, judicial clerks; i.e. all target groups in the judiciary are covered.</p> <p>The e-Learning portal provides training e-books, e-learning modules in different fields of law, as well as soft skills training (e.g. languages), and video and audio training sequences.</p> <p>It is a seamless portal for registration, online search, and online training.</p> <p>The solution aims to solve business problems related to accuracy, acquiring insights from available data, reporting and visualisation, and data assessment by offering more</p>	

effective searches, improving data analysis and data administration, and providing more efficient training.

Type of IT solution:

The solution is open to the Czech judiciary. It is based on LMS Unifor.³⁴⁸ It is in production and has more than 1000 users.

Solution description:

The portal makes use of AI in the field of Advanced Search (question-answer systems and semantic search), evaluation of trainings and identification of participants. The solution is based on supervised and unsupervised Machine Learning (ML)/Deep Learning. The technology for ML used is Natural Language Processing (NLP), more precisely Named Entity Recognition or entity linking, Information Extraction, and Dialogue Construction. The dataset format is structured.

The training dataset was constituted by internal specialists and external consultants. Sensitive information is excluded or anonymised.

The performance of the solution is evaluated through ad-hoc procedures verifying precision, recall, and accuracy. The solution performance is classified as accurate.

Training is possible by end users for further refinement, but one can also use the solution independent of training. The AI technology solves the administrative problem with 31-50% success and thus meets expectations.

Way Forward:

The Czech Judicial Academy is considering improvements through AI, e.g. automation of some procedures, but this requires funding and human resources, which is an issue.

3. Ongoing projects of the legal professional organisations

European Lawyers' Foundation

3.1. European Lawyers' Foundation, Project Name: AI4Lawyers

Status: Ongoing – 1 April 2020 – 31 March 2022

Brief Profile

Country, Organisation:	European Lawyers' Foundation (ELF) Project owner: the European Lawyers' Foundation (ELF) and the Council of Bars and Law Societies of Europe (CCBE)
Title of the project:	AI4Lawyers
Field (Blockchain or AI):	AI

³⁴⁸ <http://unifor.upol.cz/>

Study on the use of innovative technologies in the justice field – Annex III: Explored projects and use cases of Legal professional organisations

Project specifications	
Area of justice:	Judicial training
AI technology type:	N/A
Project description	
<p><u>Context and judicial (business) problem:</u></p> <p>The CCBE together with the European Lawyers Foundation submitted the project proposal, "AI4Lawyers". It has been evaluated successfully and has reached the stage of grant agreement preparation. The proposal was submitted in response to the European Commission's call for proposals for action grants to support national or transnational e-Justice projects. This joint CCBE-ELF project targets the necessity for European lawyers and law firms to have a clear understanding of the use of AI and other novel IT technologies in their daily practice. The project will last 24 months and has the following main objectives:</p> <ul style="list-style-type: none"> • To create an overview of the average state of the art of the IT capabilities of lawyers and law firms in ten Member States: France, Spain, Italy, Germany, the Czech Republic , Austria, The Netherlands, Estonia, Hungary, and Belgium; as well as a gap analysis using comparisons with other non-EU countries: the United Kingdom, Canada, and the United States. • To identify the opportunities and barriers in the use of AI tools in small and medium-sized law practices. • The drafting of a guide on the use of AI for lawyers and law firms in the EU, as specifically mentioned as a priority in the European e-Justice Action Plan 2019-2023. • To keep European lawyers and law firms, Bars and Law Societies, and other stakeholders informed about the state of play of the project and its outcomes. • To promote the guide on the use of AI for EU lawyers and law firms by using the different partners' tools and by holding an event where the guide will be presented to these target groups. The guide will also address any possible measures that need to be taken in order to ensure that the use of AI tools does not undermine lawyers' professional obligations. <p><u>Type of IT solution:</u></p> <p>Not applicable.</p> <p><u>Solution description:</u></p> <p>Not applicable</p> <p><u>Way Forward:</u></p> <p>The guide is expected to be prepared by the end of 2021. Its aim is to inform lawyers, in the broadest way possible, on all the potential risks that AI uses may hide and which business areas may actually need AI. The idea is to eventually link the guidelines that will be drafted in the scope of the project to EU training in the context of the EU training platform to be launched by the Commission.</p>	

European Union of Judicial Officers (UEHJ), and European Bailiffs’ Foundation (EUBF)

3.2. UEHJ and EUBF, Project Name: Recovery of Uncontested Claims (RUC)

Status: Begun 2016 – Ongoing	
Brief Profile	
Country, Organisation:	Union européenne des huissiers de justice (UEHJ) + Fondation européenne des huissiers de justice (EUBF)/European Union of Judicial Officers (UEHJ) + European Bailiffs’ Foundation (EUBF)
Title of the project:	Recovery of Uncontested Claims (RUC)
Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	Civil law (Contract and Commercial law, Company law), Dispute Resolution
AI technology type:	Expert systems and rule-based systems
Project description	
<p><u>Context and judicial (business) problem:</u></p> <p>For the first time, a law has set up an administrative process to recover uncontested money debts between companies. In Belgium, under certain conditions such as uncontested claims, judicial officers have the authority to provide a valid title with the help of AI (central register).</p> <p>The tool seeks to automate legal workflows related to debt collection, involving a judicial officer, a creditor, and a debtor, with the aim of improving the efficiency of justice, enhancing stakeholders’ satisfaction, acquiring insights from available data, reporting, visualising, and increasing productivity (with AI automating low-value, routine activities).</p> <p>The tool would attempt to set up a solution for recovering debts in business-to-business (B2B) cases for uncontested claims; avoiding enforcement; and finding solutions between the debtor and creditor by using AI to facilitate and accelerate the work while still having a judicial officer at the place of the debtor.</p> <p>The number of open cases between 2 July 2016 and 30 November 2019 was 90,964. The tool has helped enhance the number of cases processed and has helped achieve faster time-to-trial. So far, some cultural constraints have been present. As this was the first time a digitalised procedure was set up, it required a lot of time and investment to change the mentality of an entire profession.</p> <p><u>Type of IT solution:</u></p> <p>Open source solution, custom development</p> <p><u>Solution description:</u></p> <p>The IT system is in production and has approximately 500 users. It is based on expert systems and rule-based systems, defined by internal specialists. The coverage rate of the expert/rule-based system is 81-100%. It took between one and three years to constitute the knowledge base.</p>	

Study on the use of innovative technologies in the justice field – Annex III: Explored projects and use cases of Legal professional organisations

Way Forward:

No information provided

3.3.UEHJ and EUBF, Project Name: Online Dispute Resolution (ODR) for Medicys-consommation.fr

Status: 2016-Ongoing	
Brief Profile	
Country, Organisation:	Union européenne des huissiers de justice (UEHJ) + Fondation européenne des huissiers de justice (EUBF)/European Union of Judicial Officers (UEHJ) + European Bailiffs' Foundation (EUBF)
Title of the project:	ODR for Medicys-consommation.fr ³⁴⁹
Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	Civil law (Contract and Commercial law, Company law), Dispute Resolution
AI technology type:	Machine Learning/Deep Learning (NLP)
Project description	
<u>Context and judicial (business) problem:</u>	
<p>In accordance with Directive 2013/11/EU on alternative dispute resolution for consumer disputes, the ODR is a platform that helps to amicably solve litigations between consumers and professionals with the use of automatic responses to users' frequently asked questions.</p> <p>The tool seeks to automate administrative processes with the aim of improving efficiency of justice, enhancing stakeholders' satisfaction, acquiring insights from available data, reporting and visualisation, and increasing productivity (with AI automating low-value, routine activities). Its main strength is providing a fast dematerialised title procedure. It provides an opportunity to take the lead in digitalisation in the field of dispute resolution.</p> <p>However, some cultural constraints have been present so far. It required a lot of time and investment to change the mentality of an entire profession.</p>	
<u>Type of IT solution:</u>	
Open source solution and custom development. The solution makes use of Case Law Analytics SAS ³⁵⁰	
<u>Solution description:</u>	
The IT system is in the production phase with more than 1000 ODR cases/year	
<u>Way Forward:</u>	
No information provided	

³⁴⁹ <https://medicys-consommation.fr/>

³⁵⁰ <https://www.caselawanalytics.com/>

3.4. UEHJ and EUBF, Project Name: Alertcys.io

Status: 2018 – Ongoing	
Brief Profile	
Country, Organisation:	Union européenne des huissiers de justice (UEHJ) + Fondation européenne des huissiers de justice (EUBF)/European Union of Judicial Officers (UEHJ) + European Bailiffs' Foundation (EUBF)
Title of the project:	Alertcys.io
Field (Blockchain or AI):	DLT
Project specifications	
Area of justice:	Civil law (Company law)
DLT technology type:	Public, permission-less
Project description	
<u>Context and judicial (business) problem:</u>	
<p>The Business problem that the project aims to solve is disintermediation (i.e. removing or reducing the need to entrust the common platform to a "central" entity), with the aim of ensuring data integrity and traceability. The project aims to provide a safe environment to whistle-blowers as well as an accessible medium for companies obliged to obtain such a system and open it to whistle-blowers. It will allow the national competent authorities to offer confidence and safety to bailiffs. This system aims to remove the need to entrust the common platform to a "central" entity.</p>	
<u>Type of IT solution:</u>	
<p>A market survey and comparative assessment of solutions have been performed. A COTS solution provided by Woleet³⁵¹ has been selected.</p>	
<u>Solution description:</u>	
<p>It is a public, permissionless blockchain/DLT applicable in the domains of data anchoring in classical systems to ensure their integrity and proof of existence of information or documents. The technology uses more than 3000 nodes operated by citizens and networked through the public internet. It uses Proof of Work and Bitcoin consensus protocols.</p>	
<u>Way Forward:</u>	
<p>No information provided</p>	

³⁵¹ <https://www.woleet.io/>



3.5.IT, National Council of Notaries, Project Name: Notaio Smart

Status: Ongoing Proof of Concept (POC)	
Brief Profile	
Country, Organisation:	IT, Consiglio Nazionale del Notariato (*National Council of Notaries)
Title of the project:	Notaio Smart
Field (Blockchain or AI):	DLT
Project specifications	
Area of justice:	Administrative Law, Administrative Proceedings
DLT technology type:	Private / consortium, permissioned
Project description	
<p><u>Context and judicial (business) problem:</u></p> <p>The technology aims to solve data integrity and traceability issues. At this stage, based on the project work products/outputs, it solves the business problem at a rate of 5-10% and partially meets expectations.</p> <p>The expected gain of the project is process optimisation. The project falls in the following domains of application of blockchain/DLT:</p> <ul style="list-style-type: none"> • Trusted data sharing; • Provenance and ownership of (digital or physical) assets; and • Proof of existence of information or documents. <p><u>Type of IT solution:</u></p> <p>The IT is planned to be custom developed using Hyperledger, which was selected by the IT team based on experience.</p> <p><u>Solution description:</u></p> <p>The IT system is at POC stage. It uses a private/consortium, permissioned blockchain/DLT type with between 3 and 60 nodes in operation, or to be in operation, in the blockchain/DLT network, hosted on premises and networked via a private network. The project implements a Proof of Authority consensus protocol. The blockchain/DLT-based system complements an existing system rather than completely replacing it.</p> <p>The system is used by individual users using external identity and certificate management systems for identification and authentication. Users and beneficiaries of the system are notaries. The yearly volume of records expected to be accumulated on the system is less than 10,000 records.</p> <p><u>Way forward:</u></p>	

Study on the use of innovative technologies in the justice field – Annex III: Explored projects and use cases of Legal professional organisations

No information provided

3.6. IT, National Council of Notaries, Project Name: Notaio Smart

Status: Ongoing	
Brief Profile	
Country, Organisation:	IT, Consiglio Nazionale del Notariato (*National Council of Notaries)
Title of the project:	Notaio Smart
Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	Administrative proceedings
AI technology type:	Expert systems and rule-based systems
Project description	
<u>Context and judicial (business) problem:</u>	
<p>The project falls within the category of Document Automation application of AI, in particular contract reviews. It is aimed at enhancing 'client' satisfaction. However, based on the project work products/outputs, the use of AI technology currently solves the administrative problem at 5-10% and thus only partially meets expectations.</p>	
<u>Type of IT solution:</u>	
<p>The IT system is at POC stage. It is custom developed, based on expert systems and rule-based systems defined by internal experts and external consultants.</p>	
<u>Solution description:</u>	
<p>It uses Information Extraction and Reinforcement Learning algorithms of ML. It is trained with semi-structured datasets. Overall the solution is evaluated as not accurate.</p>	
<u>Way forward:</u>	
No information provided	

3.7. IT, Sant'Anna School of Advanced Studies – Pisa (LIDER-Lab of DIrpolis Institute), Project Name: Predictive Jurisprudence

Status: Ongoing, September 2019 – September 2022	
Brief Profile	
Country, Organisation:	IT, Scuola Superiore Sant'Anna (*Sant'Anna School of Advanced Studies – Pisa) (LIDER-Lab of DIrpolis Institute) in collaboration with Economy and Management in the era of Data Science (EMbeDS), Knowledge Discovery and Data Mining (KDD) Laboratory, Economy Institute (IoE) and Tribunal of Genoa

Study on the use of innovative technologies in the justice field – Annex III: Explored projects and use cases of Legal professional organisations

Title of the project:	Predictive Jurisprudence
Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	Civil law, Competition law
AI technology type:	Supervised ML/Deep learning
Project description	
<u>Context and judicial (business) problem:</u>	
<p>Predictive Jurisprudence is a multilayer piloting project unfolding into five interconnected but autonomous levels.</p> <p>The key objectives of the project are :</p> <ul style="list-style-type: none"> · developing automated pseudonymisation/anonymisation tools and protocols for judicial decisions, · developing automated annotation tools and protocols, · developing AI algorithms to extract judicial trends from case law, · developing explanation tools and protocol for the algorithms developed, · developing a predictive algorithm to anticipate decisions and foster out-of-court settlements, · automating classification of documents based on domain knowledge ontologies, · automating pseudo-anonymisation/anonymisation tasks, and · automating labelling and information extraction to populate databases. <p>In the start-up phase, the project aims to analyse decisions with the corresponding files of trial courts according to the criteria and methodologies developed in the Observatory on personal Injury (ODP).It is applicable to areas of litigation other than non-pecuniary damages (level 1) and with the contribution of researchers from Economics and specialised software (TaITac) used to text-mine judgements for illegal economic events.</p> <p>The same materials are also used through the techniques of Machine Learning to develop both tools for annotation and automatic extraction of information from legal texts (level 2) and algorithms for analysis and prediction (so-called Artificial Intelligence level 3).</p> <p>In particular, the architecture of the database, which will host the data acquired by the courts, will be designed and trained with developing algorithms to automatically identify trends with reference to the criteria known to the interpreter, as well as to highlight new trends on the basis of possible bias/tendencies found by the algorithm.</p> <p>Furthermore, the results of text-mining could be used to create new variables (both qualitative and quantitative) that can enrich the databases of judgements in order to improve both the legibility of the models' output and of the machine learning processes. The new variables, obtained automatically, could also be used to perform cluster analysis of judgements, and to validate and test the results on subsets of judgements (clusters). In other words, we shall be able to asses for which kind of judicial decisions (e.g. topics) each algorithmic tool is best suited, both in terms of predictive accuracy and in terms of replicability.</p> <p>The algorithm aims to recreate and mimic the legal reasoning behind the solution(s) adopted in the judgements by making predictable subsequent decisions on the same subject. These tools should also help explain the reasoning underlying each decision, while the development of suitable tools to explain the criteria defined by the developed AI (level 4) will be tested. Lastly, efforts and results in the different levels of research</p>	

and development will be traced back to the attempt to structure the analysis of the legal argument at such a level of abstraction and systematics as to contribute to the simplification of all tasks (level 5).

The multilayer framework is currently running using three selected case-studies with the following targets:

- divorce maintenance (pilot 1),
- personal injury damages compensation (pilot 2), and
- burnout damage (pilot 3).

The first one refers to **alimony in cases of divorce**: queries are pre-determined by law, but their judicial interpretations continuously evolve. In this regard, current reform bills propose to introduce new criteria, the efficacy of which could be discussed in light of our analysis.

The second and third pilots are being developed within the Observatory on Personal Injury Damage studies³⁵².

The algorithm may contribute to identifying criteria for awarding non-pecuniary loss compensation beyond the current interpretations and attempts to standardise these highly subjective types of damages. Within this core-analysis, the algorithm could be better trained to explain non-pecuniary losses in cases of burnout, the boundaries of which are still being discussed, from both clinical and legal perspectives.

The involvement of interdisciplinary experts (statisticians, experts on text mining and social data-mining, medico-legal professionals, psychiatrists etc.) will impact, first, the understanding of judicial reasoning and, more generally, the given legal systems. It will also open avenues to undiscovered developments in terms of policymaking. It is worth stressing that this research is running in close cooperation with the courts themselves.

The general project and its internal subprojects are being developed and tested in three case studies. Each layer of the main project (Predictive Jurisprudence) is a project in itself. In addition, within the broader project of Predictive Jurisprudence, three subprojects are incorporated, hereafter briefly described:

- **Automated classification of documents** based on domain knowledge ontologies. In this (subproject), large corpus of documents are clustered by category using standard text classification algorithms (based on both term frequency and word embedding) combined with domain knowledge for weighting specific common sentences and document structure.
- **Automatic pseudo-anonymisation/anonymisation tools**. In this (subproject), in a corpus of documents personal information is automatically identified and removed (i.e. fiscal code, names beginning with capital letters) to protect individual privacy, preserving only information (for example, country of birth or age category,) to be used in descriptive analyses or to select a sub-corpus in order to allow the corpus to be more widely accessible and useful for both researchers and individuals, while remaining fully GDPR compliant.
- **Automatic labelling and information extraction** to populate databases. In this (subproject), important features from legal documents are automatically extracted to guide statistical analysis on judicial trends and the development of practical Predictive Jurisprudence tools. Here the aim is to automate the transfer of the labels produced into the corresponding database in order to populate it.

³⁵² <https://www.lider-lab.sssup.it/lider/odp/>

Study on the use of innovative technologies in the justice field – Annex III: Explored projects and use cases of Legal professional organisations

3.8.IT, National Council of Agricultural Experts, and Graduated Agricultural Experts,
Project Name: Desktop Assistance for End Users

Status: Ongoing 2020 - 2022	
Brief Profile	
Country, Organisation:	IT, Collegio Nazionale dei Periti Agrari e dei Periti Agrari Laureati (CNPAPAL) (*National College of Agricultural Experts and Graduated Agricultural Experts)
Title of the project:	Desktop Assistance for End Users
Field (Blockchain or AI):	AI
Project specifications	
Area of justice:	Administrative law
AI technology type:	Supervised ML/Deep learning
Project description	
<u>Context and judicial (business) problem:</u>	
<p>The main objective of the project is to assist different business users with tasks of contracts preparation, documents categorisation and also to swiftly provide answers to frequently asked questions. It aims to automate administrative processes, improve efficiency of justice, and enhance 'client' satisfaction. Based on the project work products/outputs, the technology solves the administrative problem by 11-30% and thus meets expectations.</p>	
<u>Type of IT solution:</u>	
No information provided	
<u>Solution description:</u>	
<p>The project falls in the following AI domains of application:</p> <ul style="list-style-type: none"> · Judge Automation/Robo-lawyer; · Document Automation, in particular contract pre-filling, contract reviews, automated document classification/categorisation, and creation of structured data; and · Advanced Search, in particular question-answer systems, semantic search engines and IP, and patent and trademark search. 	
<p>The system is in its development phase, with an average of 501 to 1000 users. The training dataset size is fewer than 1000 records constituted by internal experts. The overall project results currently show that the project meets expectations.</p>	
<u>Way forward</u>	
No information provided	

STUDY ON THE USE OF INNOVATIVE TECHNOLOGIES IN THE JUSTICE FIELD

ANNEX IV: ICT COMPANIES PROJECTS/SERVICES

September 2020

Study on the use of innovative technologies in the justice field – Annex IV: ICT companies projects/services

This Report has been prepared by TRASYS International, part of the NRB Group, under the ABC IV – Lot 3 Framework Contract, for the DG for Justice and Consumers.

Project manager: Dijana SPASOJEVIC, Head of Business Consulting

Email: dijana.spasojevic@nrb.be

Tel.: +32 478 490 240

Report prepared by: Miglena VUCHEVA, Margarida ROCHA, Robrecht RENARD, Dimitrios STASINOPOULOS

Disclaimer: The information and views set out in this report are those of the author(s) and do not necessarily reflect the official opinion of the European Commission. Any person acting on the Commission behalf may be held responsible for the use which may be made of the information contained therein.

Contents

1. INTRODUCTION	3
2. ICT ORGANISATIONS PRODUCTS/SERVICES AND SELECTED PROJECTS.....	3
2.1. M2N CONSULTING AND DEVELOPMENT, FORENSIC ANALYSIS SUITE	3
2.2. CONSONO, DYNIZER	4
2.3. DELOITTE, REGEXPLORER.....	5
2.4. IBM, BELGIUM.....	7
2.4.1. IBM, WATSON.....	7
2.4.2. IBM, WATSON STUDIO; MACHINE LEARNING; OPEN SCALE; WATSON ASSISTANT; WATSON DISCOVERY.....	8
2.4.3. IBM, WATSON KNOWLEDGE STUDIO; WATSON NATURAL LANGUAGE UNDERSTANDING	9
2.4.4. IBM, WATSON ASSISTANT FOR CLOUD PAK FOR DATA	10
2.4.5. IBM WATSON CARE MANAGER	11
2.4.6. IBM, I2 THREAT INTELLIGENCE ANALYSIS SOFTWARE.....	12
2.4.7. IBM, BLOCKCHAIN PLATFORM.....	13
2.4.8. IBM, GARAGE	15
2.5. UNIVERSITY OF GHENT, DATABASE FOR STORING AND LINKING DATA FROM COURT JUDGMENTS	15
2.6. NEWTON TECHNOLOGIES ADRIA (NTA), DICTATE.....	16
2.7. PENTIA A/S, DIGITAL LEGAL DIARY	17
2.8. GUARDTIME, ASSURED-AI	18
2.9. KNOWIT, FINLAND.....	20
2.10. DOCTRINE, FRANCE	21
2.11. PREDICTICE, FRANCE	22
2.12. LEFEBVRE SARRUT, FRANCE- PROJECT FOR FRENCH SUPREME COURT	23
2.12.1. LEFEBVRE SARRUT, FRANCE- PROJECT FOR MINISTRY OF JUSTICE LUXEMBOURG	24
2.13. PARADATEC, POSAR-AIDA.....	25
2.14. LEXIQ, LEXALYSE	26
2.15. NL, MICROSOFT, AZURE AI PLATFORM.....	27
2.16. NL, UNIVERSITY OF MAASTRICHT, USE CASE- NETWORK ANALYSIS.....	28
2.16.1. NL, UNIVERSITY OF MAASTRICHT, USE CASE – TOPIC MODELLING.....	29
2.16.2. NL, UNIVERSITY OF MAASTRICHT, USE CASE – CROSS-BORDER MOBILITY	29
2.16.3. NL, UNIVERSITY OF MAASTRICHT, USE CASE – IMPACT OF SOCIAL MEDIA ON CHILDREN	30
2.16.4. NL, UNIVERSITY OF MAASTRICHT, USE CASE – IDENTIFYING HATE SPEECH.....	31
2.16.5. NL, UNIVERSITY OF MAASTRICHT, USE CASE – DARK WEB DATA BREACHES ONLINE	31

Study on the use of innovative technologies in the justice field – Annex IV: ICT companies projects/services

2.17.	KAIROS FUTURE, PROXIES SOLUTION	32
2.17.1.	KAIROS FUTURE, INVOICES SOLUTION.....	33
2.18.	VOICESCRIPT TECHNOLOGIES LTD., VOICE TRANSCRIPTION AND TRANSLATION	34
2.19.	PREDPOL, UK.....	35

1. Introduction

This document describes completed and ongoing projects of the ICT organisations, who participated in this study.

The solutions that are available on the market are marked in **green**³⁵³, while projects still under development are marked in **blue**³⁵⁴. Projects that are related more to services offered by an organisation or that are part of a research and innovation at the university level, are marked in **yellow**³⁵⁵.

Disclaimer: The list of companies included is not exhaustive. An indicative list of ICT organisations was prepared by the contractor and it was further completed based on the stakeholders' replies to the questionnaire.

2. ICT organisations products/services and selected projects



AUSTRIA

2.1. m2n Consulting and Development, Forensic Analysis Suite

Status: Available	
Brief profile	
Country, Organisation and Contact Person	Austria, m2n – consulting and development GmbH ³⁵⁶
Title of the project	m2n, Forensic Analysis Suite
Field: Blockchain or AI	AI
Project specifications	
Area of justice	Civil justice; Administrative justice; Criminal justice; Competition law
AI technology type	Machine learning/Deep learning ^{357 358} ; Expert systems and rule-based systems ³⁵⁹ ; Data mining; Image recognition
Project description	
<i>Context and judicial (business) problem:</i>	

³⁵³ Red-Green-Blue=146-208-80

³⁵⁴ Red-Green-Blue= 91-155-213

³⁵⁵ Red-Green-Blue=255-242-204

³⁵⁶ <http://www.m2n.at>

³⁵⁷ See *Deep Learning: a practitioner's approach*, J. Patterson and A. Gibson, O'Reilly Media, Inc. 1005 Gravenstein, Highway North, Sebastopol, CA 95472, 'Deep learning is defined as neural networks with a large number of parameters and layers in one of four fundamental network architectures unsupervised pre-trained networks, convolutional neural networks, recurrent neural networks, recursive neural networks'.

³⁵⁸ Machine learning/Deep learning (empirical, e.g. automatic learning of rules from past data).

³⁵⁹ Expert systems and rule-based systems (symbolic, e.g. manually defined rules in a knowledge base).

The tool acts as a support for investigators in (criminal) prosecution in analysing big amounts of data, especially seized in house searches or gathered in the course of other investigative actions.

Type of IT solution:

The solution is a standalone product, with a subscription based sales model.

It makes use of algorithms for classification³⁶⁰, and unsupervised learning. For the text analysis it uses natural language processing (NLP), where a part of the speech tagging is based on text.

Solution description:

The m2n tool 'm2n Forensic Analysis Suite' is an AI based flexible solution that is able to extract semantically rich Information out of heterogeneous, unstructured and semi structured datasets and documents. The system identifies hidden relationships, draws conclusions and visualises results. It supports semantic search and visual analytics and it is flexible regarding changing case-specific domain models and new data formats. The m2n tool is scalable regarding increasing amount of data by utilising container platforms and (private) cloud infrastructure.

Way forward:

N/A



BELGIUM

2.2. Consono, Dynizer

Status: Available	
Brief profile	
Country, Organisation and Contact Person	Belgium, Consono ³⁶¹
Title of the project	Dynizer
Field: Blockchain or AI	AI
Project specifications	
Area of justice	Civil justice; Administrative justice; Criminal justice; Competition law
AI technology type	Machine learning/Deep learning; Data mining
Project description	
<u>Context and judicial (business) problem:</u>	

³⁶⁰ Classification involves predicting a class/category. For example, classifying/predicting offender's recidivism risk as 'high' or 'low'.

³⁶¹ www.consono.ai

The Dynizer tool enables organisations to connect structured or unstructured data, from different data sources, linking it together, and to keep track of it. The solution will then facilitate the access to the data for the users of the tool, in order to easily query the data. It can connect information about people, organisations, events, and other, from an unstructured data lake.

Type of IT solution:

The tool is available as a Software as a Service (SaaS), with a subscription based sales model. It makes use of algorithms for classification and reinforcement learning.

Solution description

The Dynizer tool stores data from different data sources and texts and for each data source it will assign a 'who', 'when', 'what', and 'where' category (semantic branching). It can then make links between the pieces of information, and possibly discover connections between initially unrelated data.

For the basics of the Dynizer tool, neural networks are used for the 'who', 'what', 'where' and 'when' and trained in a specific way, in combination with an integration formula for the results. This is the generic analysis. The second series of algorithms is in place for the analysis of specific content, specific juridical grammar. A number of elements are derived from the document structure and context that the first generic analysis cannot cover. So there is a combination of Natural Language Processing (NLP) and rules.

For the analytical capabilities of the tool, a complete text is divided in small usable parts related to persons, action, places and the judgment. This will facilitate the process of finding who are the judges involved, who are the lawyer and the defendants, what were the argumentations, etc. All these parts are bundled in a completely analysable database.

From the user's perspective, it uses a specific DQL query language for Dynizer, complemented with SQL.

Other features of the tool include: anonymisation of data and documents; identification of specific document parts such as conclusions, notary deeds, introductions; the automatic creation of summaries; and providing metadata of documents.

Way forward:

The tool can be used in the judicial sector but also in other sectors such as: healthcare, railways and infrastructure maintenance, banking and insurances.

2.3. Deloitte, RegExplorer

Status: Available	
Brief profile	
Country, Organisation and Contact Person	Belgium, Deloitte ³⁶²
Title of the project	RegExplorer ³⁶³

³⁶² www.deloitte.com

³⁶³ www.regexplorer.ai

Study on the use of innovative technologies in the justice field – Annex IV: ICT companies projects/services

Field: Blockchain or AI	AI
Project specifications	
Area of justice	N/A
AI technology type	Machine Learning/Deep; Data mining
Project description	
<p><u>Context and judicial (business) problem:</u></p> <p>The RegExplorer tool can be of help where combinations on subject matter are needed to analyse regulatory text and digesting, analysing, and understanding links within a regulatory corpus and across institutions, where the data sources are of big volume and have a complexity of the regulatory frameworks and regimes. The tool also fills the gaps where there is a loss of institutional knowledge.</p> <p><u>Type of IT solution:</u></p> <p>RegExplorer is a web-based AI solution, available both as a standalone solutions and as a SaaS, which makes use of Unsupervised Learning³⁶⁴.</p> <p><u>Solution description:</u></p> <p>The RegExplorer tool is purpose-built for analysing regulations. It is built on a natural language processing (NLP) solutions platform and works alongside SMEs who assist with data and insight. In addition to classic text analytics techniques, RegExplorer uses neural networks (AI) to boost the quality of the analysis.</p> <p>The AI allows for computers to understand how concepts in a given piece of text relate to each other. It combines 'on-tool' and custom-made functionalities, tailored to the specific needs. The delivery process comprises the following five steps:</p> <ol style="list-style-type: none"> 1) Exploring the regulatory landscape by conducting research on the tool 2) Discovering similar regulations leveraging advanced NLP and machine learning (ML) methods 3) Comparing datasets against external state, local, federal, or transnational regulations, using ML 4) Designing custom RegExplorer views for client consumption and analysis. 5) Generating reports <p>The key RegExplorer capabilities are:</p> <ul style="list-style-type: none"> • Providing summary statistics (providing regulatory profiles on datasets such as number and age of regulations) • Identifying similar regulations (find and cluster regulatory text by the topic and meaning of the sections) • Creating a citation structure (identifies and visualises citations across regulations to understand relationship ecosystem between targeted sections) • Making a comparison of datasets (with use of machine learning to align regulations within or across datasets (e.g., country to country) to better understand regulation consistencies) <p><u>Way forward:</u></p>	

³⁶⁴ Note: In this context, unsupervised learning is considered to be a broad category, comprising of all other techniques that are based neither on supervised learning nor on reinforcement learning.

As of 1 July 2020, the tool will apply a hybrid supervised model for tagging cross-jurisdiction regulations based on a uniform taxonomy from the EuroVoc thesaurus.

2.4. IBM, Belgium

2.4.1. IBM, Watson

Status: Available	
Brief profile	
Country, Organisation and Contact Person	Belgium, IBM ³⁶⁵
Title of the project	Watson
Field: Blockchain or AI	AI
Project specifications	
Area of justice	Any
AI Technology type	N/A
Project description	
<p><u>Context and judicial (business) problem:</u></p> <p>The solution can be of help with reading a high volume of documents and coming up with recommendations based on these documents.</p> <p><u>Type of IT solution:</u></p> <p>Watson can be deployed on both cloud and premises. The knowledge is/can be transportable. Watson can be trained within the premises. In the case of a cloud service, when Watson learns, the knowledge stays with the customer.</p> <p><u>Solution description:</u></p> <p>Watson can be used for solving judicial problems, in preparing court cases by reading and learning legal documents and giving advice to lawyers and judges. It also has the ability to act as a chatbot to guide citizens in giving answers according to the European laws. In the taxation sector, it can analyse tax treatments and suggest the best tax regime for a correct tax return.</p> <p>For each business case, Watson needs to be trained again. In every field, Watson starts as a child, and learns its way up to be an expert. For every piece of advice Watson gives, it always explains how it came to that conclusion.</p> <p><u>Way forward:</u></p> <p>A next step is Watson Debater which has the ability to debate instead of just recommending things. Watson has to listen to arguments and to react on the arguments of the others. Some of these capabilities will become available this year (2020). Everything starts off in English, but it will also become available in other languages.</p>	

³⁶⁵ <https://www.ibm.com/be-en>

Study on the use of innovative technologies in the justice field – Annex IV: ICT companies projects/services

2.4.2. IBM, Watson Studio; Machine Learning; Open Scale; Watson Assistant; Watson Discovery

Status : Available	
Brief profile	
Country, Organisation and Contact Person	Belgium, IBM
Title of the project	IBM Watson Studio IBM Watson Machine Learning IBM Watson Open Scale IBM Watson Assistant IBM Watson Discovery ³⁶⁶
Field: Blockchain or AI	AI
Project specifications	
Area of justice	Civil justice; Administrative justice; Criminal justice; Competition law
AI technology type	Machine learning/Deep learning (empirical, e.g. automatic learning of rules from past data); Expert systems and rule-based systems (symbolic, e.g. manually defined rules in a knowledge-base); Multi-agent systems (e.g. for reinforcement learning etc.); Data mining; Image recognition; Text-to-speech/Speech-to-text; Other, please specify
Project description	
<p><u>Context and judicial (business) problem:</u></p> <p>Automating business processes, in particular legal workflow automation; Improving efficiency; Earlier and more accurate risk assessment, e.g. detecting potentially contentious clauses in documents/contracts; Enhancing 'client' satisfaction, where client refers to all involved stakeholders in a case; Accuracy; Acquiring insights from available data, reporting and visualisation; Ability to focus on more value-added activities (with AI automating low-value, routine activities).</p> <p><u>Type of IT solution:</u></p> <p>It is a proprietary subscription based Software as a Service (SaaS). It uses techniques such as algorithms for classification (e.g. classifying/predicting offender's recidivism risk as 'high' or 'low'); Algorithms for regression (e.g. predicting recidivism risk score, instead of class/category); Reinforcement learning; Unsupervised Learning (Note: consider this as a broad category, comprising of all other techniques that are based neither on</p>	

³⁶⁶ <https://www.ibm.com/cloud/watson-studio>
<https://www.ibm.com/cloud/machine-learning>
<https://www.ibm.com/cloud/watson-openscale>
<https://www.ibm.com/cloud/watson-assistant>
<https://www.ibm.com/cloud/watson-discovery>

supervised learning nor on reinforcement learning); Optimisation; Speech recognition algorithms.

Solution description:

IBM Watson Studio

Data Scientist environment is used to prepare data and build model, using open source codes or visual modelling. Enriched by IBM innovations like auto-AI and decision optimisation.

<https://www.ibm.com/cloud/watson-studio>

IBM Watson Machine Learning

This is an AI model deployment management tool. It helps you to run and maintain machine-learning models anywhere, across any cloud. Bring your open-source AI projects into production, can keep them up-to-date.

<https://www.ibm.com/cloud/machine-learning>

IBM Watson OpenScale

It is a monitoring environment that tracks and measures outcomes from AI across its lifecycle, and adapts and governs AI to changing business situations — for models built and running anywhere.

<https://www.ibm.com/cloud/watson-openscale>

Watson Assistant

It is a conversation AI platform that helps you provide citizens fast, straightforward and accurate answers to their questions, across any application, device or channel. By addressing common inquiries, Watson Assistant reduces the cost of interactions, helping agents focus on complex use cases – not repetitive responses.

<https://www.ibm.com/cloud/watson-assistant>

Watson Discovery

An enterprise AI search technology that retrieves specific answers to your questions while analysing trends and relationships buried in your structured and unstructured data. It can easily be trained on the language of your legal domain.

<https://www.ibm.com/cloud/watson-discovery>

Way forward:

N/A

2.4.3. IBM, Watson Knowledge Studio; Watson Natural Language Understanding

Status : Available	
Brief profile	
Country, Organisation and Contact Person	Belgium, IBM

Study on the use of innovative technologies in the justice field – Annex IV: ICT companies projects/services

Title of the project	IBM Watson Knowledge Studio IBM Watson Natural Language Understanding ³⁶⁷
Field: Blockchain or AI	AI
Project specifications	
Area of justice	Civil justice; Administrative justice; Criminal justice; Competition law
AI technology type	Machine learning/Deep learning (empirical, e.g. automatic learning of rules from past data)
Project description	
<p><u>Context and judicial (business) problem:</u></p> <p>When customers have many documents to analyse with specific business language and nuances.</p> <p>The solutions aim at: Improving efficiency; Earlier and more accurate risk assessment, e.g. detecting potentially contentious clauses in documents/contracts; Acquiring insights from available data, reporting and visualisation.</p> <p><u>Type of IT solution:</u></p> <p>It is a proprietary subscription based Software as a Service (SaaS). It uses techniques such as algorithms for classification (e.g. classifying/predicting offender's recidivism risk as 'high' or 'low'); algorithms for regression (e.g. predicting recidivism risk score, instead of class/category); reinforcement learning; unsupervised learning (Note: consider this as a broad category, comprising of all other techniques that are based neither on supervised learning nor on reinforcement learning); optimisation; speech recognition algorithms.</p> <p><u>Solution description:</u></p> <p>It is a solution based on an AI technology that understands the specifics of the industry language. Judge automation/Robo-lawyer; Dispute resolution; Legal analytics (e.g. extract patterns, trends from past judgements); Advanced search.</p> <p><u>Way forward:</u></p> <p>N/A</p>	

2.4.4. IBM, Watson Assistant for Cloud Pak for Data

Status : Available	
Brief profile	
Country, Organisation and Contact Person	Belgium, IBM
Title of the project	Watson Assistant for Cloud Pak for Data

³⁶⁷ <https://www.ibm.com/watson/services/knowledge-studio/>
<https://www.ibm.com/cloud/watson-natural-language-understanding>

Study on the use of innovative technologies in the justice field – Annex IV: ICT companies projects/services

Field: Blockchain or AI	AI
Project specifications	
Area of justice	Civil justice; Administrative justice; Criminal justice; Competition law
AI technology type	Machine learning/Deep learning (empirical, e.g. automatic learning of rules from past data)
Project description	
<p><u>Context and judicial (business) problem:</u></p> <p>Automation of conversations in any language, even slang of kids. Simplify communication internal or with customers. Together with Watson Discovery, Watson assistant can guide you through difficult piles of documents, like law, court history, etc.</p> <p>The solution is aiming at: Improving efficiency; Enhancing 'client' satisfaction, where client refers to all involved stakeholders in a case; Accuracy; Acquiring insights from available data, reporting and visualisation; Ability to focus on more value-added activities (with AI automating low-value, routine activities).</p> <p><u>Type of IT solution:</u></p> <p>It is a proprietary standalone product and is offered as a one-time purchase. It is a chatbot that could be applied as Judge automation/Robo-lawyer.</p> <p><u>Solution description:</u></p> <p>The solution aims to save time and personnel by automating the answering of standard questions by the service centre. As key features, the following are mentioned: Customer experience made easy; Powered by national language understanding; Deploy anywhere (any cloud, on premise).</p> <p><u>Way forward:</u></p> <p>N/A</p>	

2.4.5. IBM Watson Care Manager

Status : Available	
Brief profile	
Country, Organisation and Contact Person:	Belgium, IBM
Title of the project	IBM Watson Care Manager ³⁶⁸
Field: Blockchain or AI	AI
Project specifications	
Area of justice	Civil justice; Administrative justice
AI technology type	

³⁶⁸ <https://www.ibm.com/products/watson-care-manager>

Project description
<p><u>Context and judicial (business) problem:</u></p> <p>The need for integrated smart care system was the key requirement to be fulfilled. The solution helps court case preparation – identifying and understanding the situation. More specifically it helps in: Automating business processes, in particular, legal workflow automation; Improving efficiency; Earlier and more accurate risk assessment, e.g. detecting potentially contentious clauses in documents/contracts; Enhancing 'client' satisfaction, where client refers to all involved stakeholders in a case; Accuracy; Acquiring insights from available data, reporting and visualisation.</p> <p><u>Type of IT solution:</u></p> <p>It is a subscription based, proprietary software as a service (SaaS).</p> <p><u>Solution description:</u></p> <p>IBM Watson® Care Manager helps organisations to unlock and integrate the full breadth of information from multiple systems and care providers, automate care management workflows, and scale to meet the demands of growing populations under management. Watson Care Manager is built on an innovative Health Insurance Portability and Accountability Act (HIPAA)-enabled, cloud-based platform that can aggregate data and connect stakeholders, helping to support coordination and delivery of services.</p> <p>Key features:</p> <ul style="list-style-type: none"> • Care management workflows • Health summary • Note summarisation • Structured and configurable programs • Connecting to community service providers • Interoperability with IBM Watson Health solutions • Intuitive user interface • Watson Health Cloud

2.4.6. IBM, i2 threat intelligence analysis software

Status : Available	
Brief profile	
Country, Organisation and Contact Person	Belgium, IBM
Title of the project	IBM i2 threat intelligence analysis software ³⁶⁹
Field: Blockchain or AI	AI
Project specifications	
Area of justice	Civil justice; Administrative justice; Criminal justice
AI technology type	Machine learning/Deep learning (empirical, e.g. automatic learning of rules from past data); Expert systems and rule-based

³⁶⁹ <https://www.ibm.com/security/intelligence-analysis/i2>

	systems (symbolic, e.g. manually defined rules in a knowledge-base); Data mining
Project description	
<u>Context and judicial (business) problem:</u>	
<p>The most trusted threat intelligence analysis platform for tackling critical missions across national security and defence, law enforcement, fraud, financial crime and cyber threat hunting. The key requirements as they are expressed for this product are:</p> <ul style="list-style-type: none"> • Need to analyse structured and unstructured data • Need for visual analysis • Need for social network analysis • Analyse complex sets of disparate data • Analyse relations between disparate elements 	
<u>Type of IT solution:</u>	
<p>It is a standalone proprietary software offered as one-time purchase, available for big, small and medium-sized companies.</p>	
<u>Solution description:</u>	
<p>The IBM i2 tool is capable of analysing investigation data (like telephone records, cyber security records, financial records and lots of other types of data) and provides advanced analytics, giving capabilities to visualise the data of investigations. This is done by providing charts, and maps that show links for the purpose of the investigation. It puts, for example, persons on the map to see in what they are most involved and where a phone call goes to and is received from.</p> <p>It is capable of making links via partners with open sources, dark web parts, or scanning documents in all languages.</p> <p>The system is used in sectors of: defence organisations, intelligence organisation, law enforcements, the fight against fraud and financial crimes, as well as cyber protection.</p>	
<u>Way forward:</u>	
N/A	

2.4.7. IBM, Blockchain Platform

Status : Available	
Brief profile	
Country, Organisation and Contact Person	Belgium, IBM
Title of the project	IBM Blockchain Platform ³⁷⁰
Field: Blockchain or AI	Blockchain /DLT
Project specifications	

³⁷⁰ <https://www.ibm.com/blockchain/platform>

Study on the use of innovative technologies in the justice field – Annex IV: ICT companies projects/services

Area of justice	Civil justice; Administrative justice; Criminal justice
AI technology type	Machine learning/Deep learning (empirical, e.g. automatic learning of rules from past data); Expert systems and rule-based systems (symbolic, e.g. manually defined rules in a knowledge-base); Data mining
Project description	
<p><u>Context and judicial (business) problem:</u></p> <p>Business objectives differ a lot from use case to use case, especially in the public sector, i.e. from e-Voting, tax returns, bond issuance, etc.</p> <p><u>Type of IT solution:</u></p> <p>It is a standalone, open source licensed, software offered as one-time purchase. The key features are the following: proven, flexible and built to run on any public cloud or on premise. Deploy the leading Hyperledger Fabric platform in the environment that's right for your enterprise.</p> <p>BUILD</p> <ul style="list-style-type: none"> • Leverage our advanced Visual Studio (VS) code extension for smooth integration between smart contract development and network management • Transition seamlessly from development to test to production in a single environment with simplified DevOps • Write smart contracts in JavaScript, Java, and Go languages <p>OPERATE & GOVERN</p> <ul style="list-style-type: none"> • Manage all network components in one place, no matter where they are deployed • No vendor lock-in: maintain complete control of your identities, ledger and smart contracts • Deploy only the blockchain components you need (Peer, Ordering Service, Certificate Authority) <p>GROW</p> <ul style="list-style-type: none"> • Start small, then pay as you grow for what you use – no upfront investment and upgrade easily through Kubernetes • Connect a single peer to multiple industry networks with ease • Connect to nodes running in any environment (on-premises, public, hybrid clouds) <p><u>Solution description:</u></p> <p>IBM provides a 'Return on investment' (ROI) tool: https://www.ibm.com/blockchain/news-and-events/webinars/blockchain-roi</p> <p><u>Way forward:</u></p> <p>N/A</p>	

2.4.8. IBM, Garage

Status : Available (with minimum scope)	
Brief profile	
Country, Organisation and Contact Person:	Belgium, IBM
Title of the project	Garage ³⁷¹
Field: Blockchain or AI	DLT
Project specifications	
Area of justice	N/A
AI technology type	Hyperledger
Project description	
<u>Context and judicial (business) problem:</u>	
The main reason of demand for a blockchain solution is its immutability.	
<u>Type of IT solution:</u>	
It is a first release with bare minimum scope that provides proof of usability and value.	
<u>Solution description:</u>	
Envisaged use of this solution is: to track and trace for rolling materials (around the globe). Set up a certification chain; to track and trace in logistics when goods are handed over to other transport companies; to establish trusted transaction between banks; to create a requirements approval chain in a heavily regulated environment.	
<u>Way forward:</u>	
N/A	

2.5. University of Ghent, Database for storing and linking data from court judgments

Status: project under development	
Brief profile	
Country, Organisation and Contact Person	Belgium, University of Ghent
Title of the project	Database for storing and linking data from court judgments
Field: Blockchain or AI	AI
Project specifications	
Area of justice	N/A

³⁷¹ <https://www.ibm.com/nl-en/garage>

Study on the use of innovative technologies in the justice field – Annex IV: ICT companies projects/services

AI technology type	Machine learning
Project description	
<u>Context and judicial (business) problem:</u>	
The solution can be of help to analyse big amounts of data, court judgments, and find links between them.	
<u>Type of IT solution:</u>	
This solution is not available yet. The technology is based on the Consono 'Dynizer' technology.	
<u>Solution description:</u>	
The solution tool is a combination between research from the university of Ghent, and the 'Dynizer' tool developed by Consono ³⁷² .	
In terms of approach, the judgments are firstly pre-processed in 2 stages: (1) the full PDF text is taken and the PDF format is transformed into html format and then (2) from html individual parts of the judgment are identified. Secondly, the Dynizer software is used to process and analyse the full text of each judgment, herewith explicitly considering its individual part, identifying with AI the 'who', 'what', 'where' and 'when' units of the documents. The software stores the analysed full texts in a database, without information loss. This permits to semantically interpret the judgements and link them based on common content. Additionally several levels of anonymisation are possible for the documents.	
<u>Way forward:</u>	
Improvements regarding anonymisation and pseudonymisation are still ongoing, as well as further development to be fully compliant with the GDPR.	



CROATIA

2.6. Newton Technologies Adria (NTA), Dictate

Status: Available	
Brief profile	
Country, Organisation and Contact Person	Croatia, Newton Technologies Adria ³⁷³ ,
Title of the project	NEWTON Dictate ³⁷⁴
Field: Blockchain or AI	AI
Project specifications	
Area of justice	Any justice area

³⁷² Consono, Belgian ICT provider, also mentioned in this document.

³⁷³ www.diktiranje.hr

³⁷⁴ <https://www.diktiranje.hr/newton-dictate/>

Study on the use of innovative technologies in the justice field – Annex IV: ICT companies projects/services

AI technology type	Machine learning/Deep learning; Data mining; Text-to-speech/Speech-to-text
Project description	
<u>Context and judicial (business) problem:</u>	
<p>The NEWTON Dictate tool provides digital transformation through workflow optimisation and strengthening of the efficiency and quality of the judicial system regarding text and document generation, where big amounts of documents need to be created.</p>	
<u>Type of IT solution:</u>	
<p>The solution is available as a standalone product, the purchase of the NEWTON Dictate program is permanent, with additional contracts for maintenance. The tool is based on Speech Recognition algorithms.</p>	
<u>Solution description:</u>	
<p>NEWTON Dictate is a speech-to-text solution tailored specifically according to each end user. With the language model designed for a specific customer and range of customisable features, it provides users with smoother transition from typing to creating documents by voice.</p>	
<p>The provided features include both: speech-to-text transcription from dictating the text, and speech-to-text transcription from audio files. Additionally the system gives the users the ability to add their own words into the system and to search through the transcripts as the words are 'time-stamped' into the audio file.</p>	
<p>Usage of the system results in a faster document creation process, higher reporting accuracy, reduction of wrist and back pain from typing big amounts of documents, and a standardisation of the legal terminology.</p>	
<u>Way forward:</u>	
N/A	



2.7. Pentia A/S, Digital legal diary

Status: Under development	
Brief profile	
Country, Organisation and Contact Person	Denmark, Pentia A/S ³⁷⁵ ,
Title of the project	Digital legal diary
Field: Blockchain or AI	AI
Project specifications	

³⁷⁵ <https://pentia.dk/>

Study on the use of innovative technologies in the justice field – Annex IV: ICT companies projects/services

Area of justice	Administrative justice
AI technology type	Machine learning/Deep learning; Data mining
Project description	
<u>Context and judicial (business) problem:</u>	
<p>The Digital Legal Diary system aims at improving efficiency in relation with the judicial administration and facility management and planning.</p>	
<u>Type of IT solution:</u>	
<p>The tool is a proprietary licence, hosted solution, available as a one-time purchase. It makes use of algorithms for classification, algorithms for regression, and optimisation techniques.</p>	
<u>Solution description:</u>	
<p>The tool helps the persons in charge in matching prosecutors with court meetings. It does so based on experience, availability and predefined business rules. It imports court lists, transforms them to outlook meetings, and provides a planning. The person in charge will still need to approve the system suggestions.</p>	
<u>Way forward:</u>	
N/A	



ESTONIA

2.8. Guardtime, Assured-AI

Status: Under development	
Brief profile	
Country, Organisation and Contact Person	Estonia, Guardtime ³⁷⁶
Title of the project	Assured-AI
Field: Blockchain or AI	AI (the application also makes use of a DLT base)
Project specifications	
Area of justice	Any justice field is possible
AI technology type	Assured-AI is a supporting tool built upon KSI Blockchain by Guardtime
Project description	
<u>Context and judicial (business) problem:</u>	

³⁷⁶ <https://guardtime.com/>

The Assured-AI tool can be used where the regulator is demanding auditability and independent verification from AI-service providers. Additionally a risk-mitigation and enhancing control/oversight is needed when deploying (third-party provided) AI-based solutions in judicial field.

Type of IT solution:

The Assured-AI tool is a proprietary licenced, hosted solution, which will be available as a one-time investment, and standalone/hosted solution. It is a supporting tool that is built upon Keyless Signature Infrastructure (KSI)³⁷⁷ Blockchain by Guardtime. This is a tool that enables to control and verify any type of AI-development processes.

Solution description:

The objectives of the Assured-AI tool are:

- Ensure that AI-models are not biased
- Enable control and auditability over AI training sets. Verify the input information and other configurations
- Resilience to attacks
- Accuracy of the models
- Quality and integrity of the data
- Access control
- Transparency
- Accountability
- Compliance
- Process audit
- Data/model sharing

As underlying technology, Guardtime's KSI Blockchain is a scalable and efficient blockchain/DLT tool that enables signing up to trillion data points every second. This enables you to sign, control and verify endless amounts of information in real-time, with negligible computational resources.

The Assured-AI tool ensures that all of the above-mentioned AI-services/tools are in fact secure, not biased and that they can be controlled/analysed in retrospect. This might be highly relevant in the case of possible disputes and audits.

The project is still on track in R&D and just closed pilots.

Way forward:

N/A

³⁷⁷ <https://www.guardtime-federal.com/ksi/>



FINLAND

2.9. KnowIT, Finland

Status: Available	
Brief profile	
Country, Organisation and Contact Person	Finland, KnowIT Solutions Oy ³⁷⁸
Title of the project	Intelligent process automation services
Field: Blockchain or AI	AI
Project specifications	
Area of justice	Civil justice; Administrative justice; Criminal justice; Competition law
AI technology type	Machine learning/Deep learning; Image recognition
Project description	
<p><u>Context and judicial (business) problem:</u></p> <p>The main business problem that is being addressed is the need to reduce manual tasks. These tasks could be automating business processes, in particular, legal workflow automation, and improving efficiency and accuracy.</p> <p><u>Type of IT solution:</u></p> <p>The tool is open source, under agreement of non-disclosure agreement (NDA) where applicable, and it provides solutions for document automation and advanced search.</p> <p><u>Solution description:</u></p> <p>More specifically, the solution provides contract pre-filling, automated document classification/categorisation. As far as the search options go, the solution provides question-answering systems, semantic search engines, IP, patent and trademark search.</p> <p><u>Way forward:</u></p> <p>N/A</p>	

³⁷⁸ www.knowit.fi



2.10. Doctrine, France

Status: Available	
Brief profile	
Country, Organisation and Contact Person	France, Doctrine (Forseti SAS) ³⁷⁹
Title of the project	Doctrine
Field: Blockchain or AI	AI
Project specifications	
Area of justice	Civil justice; Administrative justice; Criminal justice; Competition law
AI technology type	Machine learning/Deep learning; Expert systems and rule-based systems; Data mining; Natural language processing (NLP): We use a wide range of AI methods (from rule-based systems to deep learning) to realise different NLP tasks (text classification, entity recognition, linkage, etc.).
Project description	
<p><u>Context and judicial (business) problem:</u></p> <p>Doctrine aims at: Improving efficiency; Earlier and more accurate risk assessment e.g. detecting potentially contentious clauses in documents/contracts; Accuracy; Acquiring insights from available data, reporting and visualisation; Ability to focus on more value-added activities (with AI automating low-value, routine activities); Achieving faster time-to-trial; Enhancing the 'turnover', e.g. number of cases processed. Ensuring consistency in decisions (e.g. judgements); Elimination of human biases and prejudices.</p> <p><u>Type of IT solution:</u></p> <p>Doctrine is a proprietary software as a service (SaaS) type of solution and it organises legal information to make it more relevant and easily accessible for legal professionals (lawyers, in-house counsels, judges...). Doctrine claims to have developed the best pseudonymisation technologies with less than 1% of errors. They have appointed a Data Protection Officer (DPO) and created a 'Centre for Data protection' to provide a clear and tailored information on personal data.</p> <p><u>Solution description:</u></p> <p>Doctrine aims to answer the need for better and quicker access to data, the need for help in tracking the legislation changes and the new case law, and the need for tools to search more rapidly into vast amount of legal data to find the most relevant answer.</p> <p>In order to publish court decisions online without harming the privacy of the natural persons involved in the decisions, Doctrine team has developed a pseudonymisation algorithm based on machine learning and named entity recognition. The training</p>	

³⁷⁹ www.doctrine.fr

datasets need to be diverse enough in order to prevent biases (e.g. sex, race) in the pseudonymisation. To avoid such biases, they thrive to obtain and work on the largest datasets possible. They also ensure that the datasets are as varied as possible: Doctrine uses datasets comprising several dozens of court decisions from each type of jurisdiction, from every city, in all matters and eventually they label and annotate the error cases in order to continuously retrain our algorithms on such.

For subscribers – Doctrine offers functionalities such as search, links with previous and later decisions, references and suggestions to other judgements in the field.

Way forward:

Doctrine plans to evolve and include more judicial domains from other countries. The Doctrine team wants to be able to build a legal platform for lawyers to handle all internal content.

2.11. Predictice, France

Status: Available	
Brief profile	
Country, Organisation and Contact Person	France, Predictice ³⁸⁰
Title of the project	Predictice
Field: Blockchain or AI	AI
Project specifications	
Area of justice	N/A
AI technology type	Machine learning/Deep learning; Expert systems and rule-based systems; Data mining
Project description	
<u>Context and judicial (business) problem:</u>	
<p>Predictice aims at: Improving efficiency in the judicial business, which means achieving faster time-to-trial; Enhancing the 'turnover', e.g. number of cases processed; Earlier and more accurate risk assessment, e.g. detecting potentially contentious clauses in documents/contracts; Enhancing 'client' satisfaction, where client refers to all involved stakeholders in a case; Acquiring insights from available data, reporting and visualization; Ability to focus on more value-added activities (with AI automating low-value, routine activities).</p>	
<u>Type of IT solution:</u>	
<p>The solution is a proprietary software as a service (SaaS) type of solution. Its key features are: Advanced search engine; Litigation visualisation; Calculation of the outcome of procedures. Some of the algorithms that are being used are: Algorithms for classification (e.g. classifying/predicting offender's recidivism risk as 'high' or 'low'); Unsupervised learning (Note: consider this as a broad category, comprising of all other techniques that are based neither on supervised learning nor on reinforcement learning).</p>	

³⁸⁰ www.predictice.com

Solution description:

Predictice is a legal research and analysis platform that uses the best of natural language processing for the performance of legal professionals.

Way forward:

N/A

2.12. Lefebvre Sarrut, France- project for French Supreme Court

Status: Services provider	
Brief profile	
Country, Organisation and Contact Person	France, Lefebvre Sarrut ³⁸¹
Title of the project	Anonymisation of court decisions for the French Supreme Court
Field: Blockchain or AI	AI
Project specifications	
Area of justice	Civil justice
AI technology type	N/A
Project description	
<u>Context and judicial (business) problem:</u>	
<p>The personal data protection rules in France require reinforced quality anonymisation of case law. In the beginning of 2019, Lefebvre Sarrut started collaborating with the French Supreme Court and the French administration in charge of IT and digitalisation – DINUM³⁸² in France to do a proof of concept (PoC) for anonymisation of the court decisions. The court chose to go with Flair³⁸³ from Zalando Research³⁸⁴. The project was completed and the conclusion is to go in production. This has not happened yet as the Court is awaiting a decision by the Ministry of Justice.</p>	
<u>Type of IT solution:</u>	
<p>Lefebvre Sarrut analysed two open source libraries – Spacy and Flair from Zalando Research to anonymise the Courts of Cassation’s decisions. Flair was chosen because of the higher quality, it implements state-of-the-art technology for Named Entity Recognition (NER) with dedicated pre-trained ‘language models’ for many languages including French³⁸⁵. They contributed to the open source code to mitigate the slowness of the computation for very large dataset like cases of the French Courts of Cassation (from a processing of 2 million cases of 1 month to 3 days on 1 machine with a GPU).</p>	

³⁸¹ <https://www.lefebvre-sarrut.eu/en/homepage/>

³⁸² In French, *La direction interministérielle du numérique* (DINUM).

³⁸³ <https://github.com/flairNLP/flair>

³⁸⁴ <https://research.zalando.com/>

³⁸⁵ See articles written by MB for more information on their work: https://towardsdatascience.com/why-we-switched-from-spacy-to-flair-to-anonymize-french-legal-cases-e7588566825f?source=friends_link&sk=de15a2550de1141865329fd37ef793b3 and https://towardsdatascience.com/benchmark-ner-algorithm-d4ab01b2d4c3?source=friends_link&sk=5bffa2cb19997d1658479f18ce8cf6bb

Study on the use of innovative technologies in the justice field – Annex IV: ICT companies projects/services

The whole project, including the processing of French cases, has been made open source (excluding the data).

Solution description:

- Lefebvre Sarrut³⁸⁶ is a publishing company/legal editor, with offices throughout Europe;
- It combines editor expertise with training offerings;
- Lefebvre collaborates with European administrations, such as the Court of Cassation in France and the Ministry of Justice in Luxembourg to anonymise their legal decisions to push open data in justice.

Way forward:

N/A

2.12.1. Lefebvre Sarrut, France- project for Ministry of Justice Luxembourg

Status: Services provider	
Brief profile	
Country, Organisation and Contact Person	France, Lefebvre Sarrut,
Title of the project	Anonymisation of court decisions for the Luxembourgish Ministry of Justice
Field: Blockchain or AI	AI
Project specifications	
Area of justice	Civil justice
AI technology type	N/A
Project description	
<u><i>Context and judicial (business) problem:</i></u>	
<p>Compared to the project with the French Supreme Court where Lefebvre Sarrut had more programming work, with Luxembourg they assisted the authorities to build the dataset with a PoC, so their role is more of an advising one. The first model has leveraged existing manually anonymised decisions (the training dataset has been automatically generated by comparing decisions before and after manual anonymisation) and the team had an idea of the quality of anonymisation without making important time investment. By basing their work on Flair, Lefebvre Sarrut is reusing the knowledge they acquired from the state-of-the-art algorithm. To measure the quality of the anonymisation, they compare the manually anonymised decisions with the automated anonymisation.</p>	
<u><i>Type of IT solution:</i></u>	
<p>Lefebvre Sarrut analysed two open source libraries – Spacy and Flair from Zalando Research to anonymise the French Courts of Cassation’s decisions. They chose Flair because the quality is higher, it implements state-of-the art technology for Named Entity Recognition (NER) with dedicated pre-trained ‘language models’ for many languages</p>	

³⁸⁶ <https://www.lefebvre-sarrut.eu/en/homepage/>

including French³⁸⁷. They contributed to the open source code to mitigate the slowness of the computation for very large dataset like cases of the French Courts of Cassation (from a processing of 2 million cases of 1 month to 3 days on 1 machine with a GPU). The whole project, including the processing of French cases, has been made open source (excluding the data).

Solution description:

The source code used for the French Supreme Court has been adapted to match the needs of Luxembourgish decisions with a special interest in understanding errors made by the algorithm to help manual annotators improve the training dataset.

Way forward:

N/A



GERMANY

2.13. Paradatec, Posar-Aida

Status: Available	
Brief profile	
Country, Organisation and Contact Person	Germany, Paradatec GmbH ³⁸⁸ ,
Title of the project	PROSAR-AIDA
Field: Blockchain or AI	AI
Project specifications	
Area of justice	Civil justice; Administrative justice; Criminal justice; Competition law
AI technology type	Machine learning/Deep learning, and Expert systems and rule-based systems
Project description	
<u>Context and judicial (business) problem:</u>	
<p>The PROSAR-AIDA tool can be of help where classification and data extraction is needed from unstructured and semi-structured documents, especially when the inherent logic of the documents is extremely complex.</p>	
<u>Type of IT solution:</u>	
<p>The PROSAR-AIDA tool is a proprietary-licenced, standalone product. It makes use of algorithms for classification, and optimisation technologies.</p>	

³⁸⁷ See articles written by MB for more information on their work: https://towardsdatascience.com/why-we-switched-from-spacy-to-flair-to-anonymize-french-legal-cases-e7588566825f?source=friends_link&sk=de15a2550de1141865329fd37ef793b3 and https://towardsdatascience.com/benchmark-ner-algorithm-d4ab01b2d4c3?source=friends_link&sk=5bffa2cb19997d1658479f18ce8cf6bb

³⁸⁸ <https://www.paradatec.de>

Solution description:

The PROSAR-AIDA tool is an AI for document analysis. It makes use of classification and data extraction, in a hybrid approach combining AI and rule based algorithms. It also provides an optical character recognition (OCR) based on neural networks.

Applications of the tool include assign patent and brand application to an International Patent Classification (IPC) code, or digitising the public land registry, where the PROSAR-AIDA tool creates structured data from unstructured PDF documents, extracting thousands of different data points.

Way forward:

N/A



NETHERLANDS

2.14. LexIQ, Lexalyse

Status: Available

Brief profile

Country, Organisation and Contact Person	Netherlands, LexIQ ³⁸⁹
Title of the project	Lexalyse
Field: Blockchain or AI	AI

Project specifications

Area of justice	Civil justice; Administrative justice; Criminal justice; Competition law
AI technology type	Machine learning/Deep learning

Project description

Context and judicial (business) problem:

The solution is aiming at: Automating business processes, in particular, legal workflow automation, Improving efficiency, Applying accuracy, Acquiring insights from available data, reporting and visualisation and Ability to focus on more value-added activities (with AI automating low-value, routine activities).

Type of IT solution:

Lexalyse is a proprietary software as a service (SaaS) type of solution. It uses algorithms for Classification (e.g. classifying/predicting offender's recidivism risk as 'high' or 'low'). The solution is performing optimisation by using linear programming (e.g. simplex algorithm), and quadratic programming (e.g. gradient-based/descent algorithm).

Solution description:

³⁸⁹ www.lexiq.nl

Study on the use of innovative technologies in the justice field – Annex IV: ICT companies projects/services

The solution is aiming to provide full transparency in justice such as labour and social security law claims; bankruptcy and insolvency law, company law, administrative law, administrative and competition law enforcement.

Way forward:

N/A

2.15. NL, Microsoft, Azure AI platform

Status: Available	
Brief profile	
Country, Organisation and Contact Person	Netherlands, Microsoft ³⁹⁰
Title of the project	Azure AI platform
Field: Blockchain or AI	AI
Project specifications	
Area of justice	Civil justice; Administrative justice; Criminal justice; Competition law; Other, please specify
AI technology type	Machine learning
Project description	
<u>Context and judicial (business) problem:</u>	
<p>The solution is aiming to automate business processes, in particular, legal workflow automation. Furthermore, it helps in improving efficiency such as: Achieving faster time-to-trial; Enhancing the 'turnover', e.g. number of cases processed. Additionally, it provides earlier and more accurate risk assessment, e.g. detecting potentially contentious clauses in documents/contracts; Enhancing 'client' satisfaction, where client refers to all involved stakeholders in a case. It improves accuracy in the sense of ensuring consistency in decisions (e.g. judgements). It ensures repeatability/reproducibility (e.g. judgements) for verification purposes. It helps in the elimination of human biases and prejudices when applied; Acquiring insights from available data, reporting and visualisation; Ability to focus on more value-added activities (with AI automating low-value, routine activities).</p>	
<u>Type of IT solution:</u>	
<p>The Azure AI platform is a proprietary software as a service (SaaS) solution. It uses algorithms for regression (e.g. predicting recidivism risk score, instead of class/category). It uses reinforcement and unsupervised learning³⁹¹. It uses optimisation techniques and speech recognition algorithms.</p>	
<u>Solution description:</u>	

³⁹⁰ <https://www.microsoft.com/en-us/industry/government/public-safety-and-justice>

³⁹¹ Note: In this context, unsupervised learning is considered to be a broad category, comprising of all other techniques that are based neither on supervised learning nor on reinforcement learning.

Study on the use of innovative technologies in the justice field – Annex IV: ICT companies projects/services

AI is the ability of a computer to mimic intelligent human behaviour. Through AI, you can analyse images, understand speech, communicate naturally and make predictions based on data.

The Azure AI platform offers advanced machine learning capabilities, with specialities from different perspectives, such as: Azure Machine Learning, Azure Databricks, and ONNX to build, train, and deploy machine learning models. It applies knowledge mining, by means of acquiring insights from all available content (documents, images, and media) with Azure Cognitive Search. It allows to discover patterns and relationships in related content, understand moods, and pick up key terms.

Way forward:

N/A

2.16. NL, University of Maastricht, Use case- Network analysis

Status: Research and innovation lab	
Brief profile	
Country, Organisation and Contact Person	The Netherlands, University of Maastricht
Title of the project	Network analysis
Field: Blockchain or AI	AI
Project specifications	
Area of justice	Civil justice
AI technology type	AI
Project description	
<u>Context and judicial (business) problem:</u>	
<p>This tool will allow the conducting of network analysis on legal decisions for students and legal researchers. Due to the ever-increasing volume of documents on various topics, it is impossible for humans to process them all. In this context, they use network analysis that helps the team identify the relevance of decisions. For the time being, the focus is on Dutch law but it is foreseen to include EU cases and then to connect all of those, in order to enable the information flow in the legal system of Member States.</p>	
<u>Type of IT solution:</u>	
N/A	
<u>Solution description:</u>	
N/A	
<u>Way forward:</u>	
N/A	

Study on the use of innovative technologies in the justice field – Annex IV: ICT companies projects/services

2.16.1. NL, University of Maastricht, Use case – Topic Modelling

Status: Research and innovation lab	
Brief profile	
Country, Organisation and Contact Person	The Netherlands, University of Maastricht
Title of the project	Topic Modelling
Field: Blockchain or AI	AI
Project specifications	
Area of justice	Civil justice
AI technology type	AI
Project description	
<u>Context and judicial (business) problem:</u>	
<p>Following the same principle of overly increased information, especially in the field of law and AI, the need to retrieve relevant information in order to avoid duplications is becoming an increasingly time-consuming task. This project is about identifying the topic of papers in order to optimise research time and to discover patterns and trends in the development of, in this case, legal research.</p>	
<u>Type of IT solution:</u>	
<p>Natural language processing (NLP) techniques are applied in the system along with topic modelling in the field of AI and law. The idea is to feed the machines with the text to identify the topic such as military, self-driving cars, etc. These techniques could be used for other legal databases and the intention is to do so. It is envisaged to use the network analysis with topic modelling. The development of methods to make it scalable is ongoing.</p>	
<u>Solution description:</u>	
N/A	
<u>Way forward:</u>	
N/A	

2.16.2. NL, University of Maastricht, Use case – Cross-border mobility

Status: Research and innovation lab	
Brief profile	
Country, Organisation and Contact Person	The Netherlands, University of Maastricht
Title of the project	Cross-border mobility
Field: Blockchain or AI	AI
Project specifications	
Area of justice	Civil justice

Study on the use of innovative technologies in the justice field – Annex IV: ICT companies projects/services

AI technology type	AI
Project description	
<u>Context and judicial (business) problem:</u>	
<p>The project is in the context of companies moving headquarters from one country to another and how this affects the national enterprise registries. The project helps in extracting information from national countries' registers on where the companies are registered, what is their business and number of employees, etc.</p>	
<u>Type of IT solution:</u>	
N/A	
<u>Solution description:</u>	
N/A	
<u>Way forward:</u>	
N/A	

2.16.3. NL, University of Maastricht, Use case – Impact of social media on children

Status: Research and innovation lab	
Brief profile	
Country, Organisation and Contact Person	The Netherlands, University of Maastricht
Title of the project	Impact of social media on children
Field: Blockchain or AI	AI
Project specifications	
Area of justice	Civil justice
AI technology type	AI
Project description	
<u>Context and judicial (business) problem:</u>	
<p>The university lab is working on a project to identify how to protect minors on social media. It is more on the evaluation than of the harm that it could inflict.</p>	
<u>Type of IT solution:</u>	
N/A	
<u>Solution description:</u>	
N/A	
<u>Way forward:</u>	
N/A	

Study on the use of innovative technologies in the justice field – Annex IV: ICT companies projects/services

2.16.4. NL, University of Maastricht, Use case – Identifying hate speech

Status: Research and innovation lab	
Brief profile	
Country, Organisation and Contact Person	The Netherlands, University of Maastricht
Title of the project	Identifying hate speech.
Field: Blockchain or AI	AI
Project specifications	
Area of justice	Civil justice
AI technology type	AI
Project description	
<u>Context and judicial (business) problem:</u>	
<p>From a legal perspective point of view, the research is focusing on political, gender and fundamental rights, etc. in order to identify hate speech. The main goal is to see what is going on and where technology can assist in enforcing regulation. For this, computer science methods are applied.</p>	
<u>Type of IT solution:</u>	
N/A	
<u>Solution description:</u>	
N/A	
<u>Way forward:</u>	
N/A	

2.16.5. NL, University of Maastricht, Use case – Dark web data breaches online

Status: Research and innovation lab	
Brief profile	
Country, Organisation and Contact Person	The Netherlands, University of Maastricht
Title of the project	Dark web – data breaches online
Field: Blockchain or AI	AI
Project specifications	
Area of justice	Civil justice
AI technology type	AI
Project description	
<u>Context and judicial (business) problem:</u>	

There is an effort to develop methods to track data breaches on the dark web.

Type of IT solution:

N/A

Solution description:

N/A

Way forward:

N/A



SWEDEN

2.17. Kairos Future, Proxies solution

Status: Under development

Brief profile

Country, Organisation and Contact Person	Sweden, Kairos Future ³⁹² , Mr Magnus KEMPE
--	--

Title of the project	Proxies solution
----------------------	------------------

Field: Blockchain or AI	DLT
-------------------------	-----

Project specifications

Area of justice	Administrative justice
-----------------	------------------------

AI technology type	N/A
--------------------	-----

Project description

Context and judicial (business) problem:

In relation to accounting, auditing, and taxation, challenges were identified, such as data integrity; traceability; operational efficiency; and decrease of the technical dependence of national systems from the common platform. For example, a registry with proxies would be a severe threat to privacy and a cybersecurity risk. A secured and accessible place was missing where personal authorisations can be stored and consulted.

Type of IT solution:

The solution is still under development. The technology behind the solution is based on open source and is developed in collaboration with the ICT company ChromaWay³⁹³.

Solution description:

The aim of the Proxies solution is to provide the possibility to know if a proxy (an indication of the rights and authorities of a person in companies and organisations) is

³⁹² <https://www.kairosfuture.com/>

³⁹³ ChromaWay, IT company – Blockchain, <https://chromaway.com/>

Study on the use of innovative technologies in the justice field – Annex IV: ICT companies projects/services

the latest version and is valid. Digital signing of proxies is already possible, but it is hard to recall a proxy, since there may be copies. With this solution, recalls and version control is possible.

The solution uses a blockchain for encrypted and anonymised references to the proxies. The focus of the tool lays in recording the proxies for people working on behalf of another company, such as

bookkeeping on behalf of other companies, and making registrations and payments at banks and public agencies.

Way forward:

Manifest the legal value of a blockchain solution as an official proof.

2.17.1. Kairos Future, Invoices solution

Status: Under development	
Brief profile	
Country, Organisation and Contact Person	Sweden, Kairos Future
Title of the project	Invoices solution
Field: Blockchain or AI	DLT
Project specifications	
Area of justice	Administrative justice
AI technology type	N/A
Project description	
<u>Context and judicial (business) problem:</u>	
<p>In relation to accounting, auditing, and taxation, challenges were identified, such as data integrity; traceability; operational efficiency; and data security, and privacy. For example, a registry with invoices would be a severe threat to privacy and a cyber-security risk. A secured and accessible place was missing where company invoices can be stored and consulted.</p>	
<u>Type of IT solution:</u>	
<p>The solution is still under development. The technology behind the solution is based on open source and is developed in collaboration with the ICT company ChromaWay.</p>	
<u>Solution description:</u>	
<p>The Invoices solution is a tracking tool for taxes for goods being sold in companies and stores. It will help the tax agency to detect fraud against taxes, and secure the VAT revenue. All taxes will pass directly through a single server, and only one VAT bill will exist.</p>	
<p>It will give a control of document versions, and originals, as there will only be one unique source for the truth, without giving all the power to this source.</p>	
<u>Way forward:</u>	

This type of blockchain solution is starting to be used to validate documents, but it is expected to be expanded to more areas and used at scale.



2.18. VoiceScript Technologies Ltd., Voice Transcription and translation

Status: Available	
Brief profile	
Country, Organisation and Contact Person	United Kingdom, VoiceScript Technologies Ltd. ³⁹⁴
Title of the project	Automated, per user/speaker voice transcription and translation
Field: Blockchain or AI	AI
Project specifications	
Area of justice	Civil justice; Administrative justice
AI technology type	Machine learning/Deep learning; Data mining; Text-to-speech/Speech-to-text
Project description	
<p><u>Context and judicial (business) problem:</u></p> <p>The key requirements are that turnaround speeds are too slow, costs to prepare documents are too high, costs to organise and have 'the right thing ready at the right time' involve too much labour.</p> <p>The solution aims to improve efficiency such as time-to-trial enhancing the 'turnover', e.g. number of cases processed. In addition, the solution aims at 'client' satisfaction, where client refers to all involved stakeholders in a case. It improves accuracy by eliminating human biases and prejudices. Finally, the solution provides the ability to focus on more value-added activities (with AI automating low-value, routine activities).</p> <p><u>Type of IT solution:</u></p> <p>The solution is proprietary and is offered as software as a service (SaaS). VoiceScript automates a highly manual process (manual transcription) without the errors and in a multi-person, multi-language setting. The average cost save is 70% and the output of the system allows organisations to recombine the artefacts so more valuable data models and insights can be generated over time.</p> <p><u>Solution description:</u></p> <p>Automated, per user/speaker voice transcription and translation, coupled with AI capabilities in sentiment analysis, content meaning, co-reference data, correlation and proximity placement. Equally, a services is used that combinatorically extract summary data (take a 200 line document and provide a 5 line fact summary of what was said) plus the ability to do a deviation comparison of text to find anomalies.</p>	

³⁹⁴ www.voicescripttech.com

It also provides a deep and broad data set that can be used again to find interconnected data. For example: how many times during a police interview does a person make a mistake in retelling their timeline of events? How large of the errors and are the errors related to a person/item/place?

Way forward:

N/A

2.19. PredPol, UK

Status: Available	
Brief profile	
Country, Organisation and Contact Person	United Kingdom, PredPol Inc. ³⁹⁵
Title of the project	PredPol
Field: Blockchain or AI	AI
Project specifications	
Area of justice	Civil justice; Administrative justice; Criminal justice; Competition law
AI technology type	Machine learning/Deep learning
Project description	
<p><u>Context and judicial (business) problem:</u></p> <p>The key requirements, needs and problems are usually the following: Improve officer patrol; Efficiency; Increase officer accountability; Remove potential for officer bias in patrolling; Increase departmental transparency; and Reduce crime.</p> <p>The PredPol platform does three things:</p> <ol style="list-style-type: none"> 1. Predict where and when specified crimes are most likely to occur 2. Track and manage officer locations in real time to ensure target areas are being patrolled 3. Provide crime and patrol operations analytics <p>This leads to: Improving efficiency by achieving faster time-to-trial; Enhancing the 'turnover', e.g. number of cases processed; Earlier and more accurate risk assessment, e.g. detecting potentially contentious clauses in documents/contracts; Enhancing 'client' satisfaction, where client refers to all involved stakeholders in a case; Acquiring insights from available data, reporting and visualisation; Ability to focus on more value-added activities (with AI automating low-value, routine activities).</p> <p><u>Type of IT solution:</u></p>	

³⁹⁵ <http://www.predpol.com/law-enforcement/>

The solution is proprietary and is provided as a Software as a Service (SaaS). It uses algorithms for classification (e.g. classifying/predicting offender's recidivism risk as 'high' or 'low') and unsupervised Learning³⁹⁶.

Solution description:

This predictive policing tool (PredPol) uses a machine learning algorithm to calculate its predictions. For this it makes use of historical event datasets, ideally from 2 to 5 years of data, to train the algorithm for each new city. PredPol then updates the algorithm each day with new events for which it uses the information coming from the agency's records management system (RMS). PredPol does not collect, store, or use personally identifiable information of any kind.

The part "Patrol Operations" of the tool is in charge of mission planning and location management. For this task, PredPol lets agencies set specific missions for each shift, beat and day of the week. These missions are collections of selected crimes or events. PredPol then displays the highest-probability locations for the events associated with each mission. Using GPS or automatic vehicle location (AVL), PredPol can also track "dosage" of PredPol boxes. (Dosage refers to the amount of time officers spend in PredPol boxes, and a PredPol box refers to a specific area in the city with a higher risk) This allows command staff to ensure that recommended areas are being patrolled. PredPol also creates patrol heat maps that allow command staff to see if any areas of their jurisdiction are being over-patrolled or under-patrolled.

The analytical part of the tool is PredPol's COMPSTAT. This analytics and reporting module provides a quick summary of a rich and complex dataset. It can create custom reports instantly, by any combination of crime types, missions, districts and shifts over any date range. The goal is to present the underlying data in an actionable format. This is used for activities such as mission planning and setting resource levels, following the philosophy "you can't manage what you don't measure." This information can also be shared with local government or the community to see the relative patrol coverage across the city.

Way forward:

N/A

³⁹⁶ Note: In this context, unsupervised learning is considered to be a broad category, comprising of all other techniques that are based neither on supervised learning nor on reinforcement learning.

HOW TO OBTAIN EU PUBLICATIONS

Free publications:

- one copy:
via EU Bookshop (<http://bookshop.europa.eu>);
- more than one copy or posters/maps:
from the European Union's representations (http://ec.europa.eu/represent_en.htm);
from the delegations in non-EU countries
(http://eeas.europa.eu/delegations/index_en.htm);
by contacting the Europe Direct service (http://europa.eu/europedirect/index_en.htm)
or calling 00 800 6 7 8 9 10 11 (freephone number from anywhere in the EU) (*).

(*) The information given is free, as are most calls (though some operators, phone boxes or hotels may charge you).

Priced publications:

- via EU Bookshop (<http://bookshop.europa.eu>).

