

Introduction

Criminal law in the EU represents today a good example of how the interaction between law and legal informatics can bring important synergy that enhance the efficiency of the overall system and the protection of citizens' fundamental rights.

Enhancing smooth cooperation mechanisms is one of the main aims of the EU policy in the area of criminal justice. However, their effective implementation is heavily impacted by the highly varying legal frameworks which characterize Member States' regulation on procedural rights and investigative measures in criminal proceedings.

While we face such challenges in Europe, on a global level the domain of law is also on the brink of a period of fundamental and irreversible change and transformation. Information technologies and computer systems are the main drivers of this change. Increasingly capable machines, operating in support of experts are transforming the way that legal activities and procedures are undertaken. New legal applications and platforms appear, changing the practice of law, specifically by enriching legal texts with computational models of legal reasoning, providing users with automated assessments and explanations of their outcomes with reasons and arguments. New AI-enhanced tools, such as large language models (like GPT), are being introduced to analyse and reason also upon case law and legislation, although several significant challenges are still to be addressed here to make these tools really of support for the legal professions.

Against this background, we introduce the results of the FACILEX research project, that tried to address these problems from a multi-disciplinary perspective.¹

Started in December 2022, the FACILEX project ("Facilitating mutual recognition: Analytics and Capacity building Information LEqual eXplainable tool to strengthen cooperation in the criminal matter") aimed to strengthen the implementation and application of the *acquis* on judicial cooperation in criminal matters through the help of digital tools, and not being limited to fact-finding research.

In light of the new Strategic Agenda 2019–2024, the project focused on three cooperation tools, that is: the European Arrest Warrant (FD 2002/584/JHA), the European Investigation Order (Directive 2014/41/EU) and Regulation 1805/2018

1 Grant Agreement no. 101089634; the project was funded by the European Union's Justice Programme (2022).

on freezing and confiscation orders, as implemented or anyway operational in nine Member States: Bulgaria, Croatia, France, Germany, Italy, Poland, Portugal, Spain, and the Netherlands.

The research study counted seven international partners including eminent scholars and researchers in the field of European law and Criminal Procedure, Legal Informatics and Computer Science, as well as private-sector experts working in the field of IT platform development.

FACILEX not only investigated the theoretical aspects, but also delivered concrete tools to support the legal professionals and citizens in retrieving the necessary knowledge to face criminal proceedings at the EU level.

1 From the CrossJustice Project ...

The FACILEX research stands on the results gathered by a previous research programme, also coordinated by the University of Bologna, called CrossJustice (“Knowledge, Advisory and Capacity Building Information Tool for Criminal Procedural Rights in Judicial Cooperation”).²

The CrossJustice study tackled the domain of criminal procedure law, by critically examining the procedural safeguards of the suspect and the accused as recognised by the six EU Procedural Rights Directives: Directive 2010/64/EU of 20 October 2010 on the right to interpretation and translation; Directive 2012/13/EU of 22 May 2012 on the right to information; Directive 2013/48/EU of 22 October 2013 on the right of access to a lawyer and to have a third party informed; Directive (EU) 2016/343 of 9 March 2016 on the presumption of innocence and the right to be present at trial; Directive (EU) 2016/800 of 11 May 2016 on procedural safeguards for juvenile defendants; Directive (EU) 2016/1919 of 26 October 2016 on legal aid.

All these Directives were analysed both with regard to the statutory legal framework and in their practical implementation in the case law of eleven EU jurisdictions (Bulgaria, Croatia, France, Germany, Italy, Portugal, Poland, Romania, Spain, Sweden, the Netherlands).

The research proposed an innovative perspective. First, the analysis of the shortcomings and obstacles that procedural rights of the Directives meet in

2 Crossjustice (University of Bologna) <<https://site.unibo.it/cross-justice/en>>. Grant Agreement no. 847346; the project was funded by the European Union's Justice Programme (2014–2020). The results of the project have been published in the volume Giuseppe Contissa, Giulia Lasagni, Michele Caianiello, Giovanni Sartor (eds.) *Effective Protection of the Rights of the Accused in the EU Directives. A Computable Approach to Criminal Procedure Law* (Brill, Leiden, 2022).

their national implementation was carried out through the lenses of legal reasoning. Second, the research integrated a legal informatics approach, consisting in the translation of the EU Procedural Directives, as well as samples of national legislation, into a computable language, that became the core of the *CrossJustice online platform*.

In particular, the project resulted in the development of a Legal Database and an Advisory Module, both freely accessible online.

The Legal Database aims at providing access to legislative, judicial and expert documents falling within the material scope of criminal procedure law, including international treaties and standards, relevant EU legislation and case law, as well as national legislation and case law, all provided in an English translation.

The Advisory Module, in turn, is an interactive expert module that helps legal professionals in identifying and applying relevant rules of EU and national legislations concerning procedural rights of persons suspected or accused of crimes, both at domestic and cross-border level. Within this Module, three computer tools were developed.

The first tool, called “Mass Testing”, produces a comparative report showing the legal framework (legislation and case law) of the relevant national systems on a hypothetical legal case concerning a particular procedural right. This use modality is aimed at supporting policy makers in evaluating the level of harmonisation of national legal frameworks with the EU *acquis*.

The second tool, named “Single Assessment”, requires the user to provide a series of concrete information concerning a specific legal situation, and, on that basis, produces a legal assessment concerning the significant potential critical legal issues. This use modality aims at supporting legal professional in a first legal assessment of practical cases.

The third and last tool, the “Automated Reasoner Assessment”, aims at assisting users in developing and analysing the legal reasoning process of a given case. This tool represents a technological innovation in the application of computational models of legal reasoning to the domain of criminal law. The system is structured as a knowledge base containing the legal norms and a reasoning module that applies the rules to specific cases. The outcome provided by the tool includes all steps of the legal reasoning, leading to a specific conclusion, as well as an automated assessment of the level of harmonisation of the national legislation with the relevant Directive. Taking the lead from this research, the University of Bologna took the initiative to expand the investigation, adopting a similar approach also the matter of transnational cooperation among Member States in the criminal matter.

2 ... To the FACILEX Project

The FACILEX project goes well beyond CrossJustice, in a twofold way.

On the one hand, it changed the subject matter of the analysis, bringing the focus of the research to the much more complex dimension of horizontal cooperation and taking into account mutual recognition instruments not previously examined.

On the other, the project also greatly improved the scientific methodology and approach, focusing on the innovative design and modelling of complex, multilayer legal norms in the field of criminal law cooperation and adopting novel legal informatics approaches for the development of online tools functionalities provided by the platform. Unlike other currently available legal information tools that only enable access to case law and legislation, the online platform developed within the FACILEX research thus includes an enhanced, AI-enabled advisory function providing accurate comparative analysis on the state-of-play of criminal cooperation across Member States.

FACILEX expanded the CrossJustice platform first by integrating the Legal Database Module, including the legal framework concerning the three chosen mutual recognition instruments, both at the EU and at the national level. Similarly to CrossJustice, all data are available in English and encompass also the relevant EU and national case law.

Secondly, the project developed a dedicated “Customized Single Test Advisory Module” focused on judicial cooperation, based on an explicit and computable representation of legal knowledge and reasoning, based on symbolic logic rules.

The tool has been designed to be user-friendly and accessible to legal experts. It is structured in a way to provide a deeper level of explainability, thanks to the adoption of novel technological approaches in logic programming, such as the use of Logical English, a logic programming language based on natural language. The explanations, as well as the rules themselves, are detailed and expressive, and enable a high degree of isomorphism in relation to the source legal material.

The module provides legal advice in a straightforward way, i.e. by answering to step-by-step questionnaire designed to take into even account users’ inertia and general lack of tech abilities.

The system thus a) assesses the level of compliance of national legal systems with the relevant EU *acquis*; b) offers customized support to legal professional in the first legal assessment of practical cross-border cases; c) enables the generation of mock cases, for academic purposes, showing all possible different solutions for research purposes.

Finally, the FACILEX integrated platform includes a dedicated Harmonization Mass Test Advisory Module, that provides a harmonization index for each Member State, based on Natural Language Processing, that is an AI technique of textual and semantic analysis. The harmonization index is a measure of proximity between the terminologies of European and national legislation. This may enable legal professionals to assess the national law level of compliance with the EU *acquis* in matters of judicial cooperation, as well as to access an automated evaluation of the harmonization level of terminology.

The system also contains relevant case law from the Member States, used to assess the conformity between each State and the European Union. Case-based reasoning techniques are employed to evaluate the interpretation given by each State of relevant legal principles, in compliance with EU law. Such explanation is enhanced with the application of Large Language Models, which is applied for translating the explanations produced by the rule-based system, from high-level programming language to natural language, allowing all stakeholders a fast, clear, and accessible interaction with the technology.

Accessing the FACILEX platform, legal professionals receive a tailored legal assessment of potential cooperation flaws and available remedies, drawing all possible solutions relative to the given parameters. The FACILEX project thus represents a valuable tool to streamline EU judicial cooperation in criminal matters. By leveraging all the potential of digital technologies, the project fostered mutual knowledge, communication and ultimately trust among the relevant actors in the Area of Freedom, Security and Justice.

3 Exploring This Volume

The volume describes the results of the FACILEX twenty-four months international research project. However, the book goes also beyond such specific results, providing a generally applicable and integrated analysis, that results understandable also for readers who were not directly involved in the study.

The multi-disciplinary perspective of the research is mirrored in the approach adopted in this volume, that integrates criminal law and legal informatics analysis.

First, the analysis of the shortcomings and obstacles of the cooperation mechanisms at stake is carried out through the lenses of both legal reasoning and legal informatics. Secondly, the book proposes a multi-level perspective, since the legal analysis, carried out by highly specialised scholars, tackles both EU law and national legislation, as well as case law. Therefore, the practical implementation of the cooperation systems is also dealt with in the volume.

The book is composed of four parts.

Part 1, comprising three Chapters, serves as a general introduction to the increasing connection between cooperation in criminal matters and technological development. Chapter 1 opens the volume with an analysis of the impact of digital and AI technology on cooperation mechanism, with a specific focus on the role played, in this context, by the principle of mutual recognition. Chapter 2 looks at the global perspective, by focusing on investigations conducted by the International Criminal Court in cooperation with some EU institutions (as well as several EU Member States) in connection with international crimes committed during the war between Russia and Ukraine. It investigates the idea that mutual recognition cooperation instruments can serve as an inspiring model for cooperation also beyond the EU, between ICC States Parties and the ICC itself. Finally, Chapter 3 expounds on the application of Large Language Models in the justice domain in the context of the studies of legal text analytics, by exploring the developments from Natural Language Processing to generative pre-training models.

Part 2 presents nine, concise-yet-comprehensive Chapters on the state of implementation and application of the EAW Framework Decision, the EIO Directive and Regulation 1805/2018 at the national level. It includes legal analyses from Bulgaria, Croatia, France, Germany, Italy, Poland, Portugal, Spain and the Netherlands. The country selection ranges from North to South, from Western to Eastern European States and puts together inquisitorial and accusatorial traditions, allowing a broad representation of EU legal traditions and models.

The examination is innovative and integrated, as it illustrates the state of play of the most significantly critical or successful aspects in the cooperation among EU Member States, while taking into account both legislation and national case law. Each analysis, prepared by national experts, highlights the most problematic or significant issues emerging from the specific country context and provides a critical analysis that encompasses both the legislative transposition and case law implementation of the three cooperation mechanisms. The national analysis, however, does not cover an article-by-article analysis of the legal texts. Such analysis was nonetheless carried out in the course of the FACILEX research, and brought to the drafting of detailed national reports, that are currently available from the webpage of the Project.³

3 Facilex (University of Bologna) <<https://site.unibo.it/facilex/en>>.

Part 3, comprising three Chapters, provides a comparative and transnational analysis. The comparison of Chapter 13 builds upon the national law chapters of the previous section, as well as findings emerged by the semantic Natural Language Processing analysis, developed thanks to the computational approach previously illustrated. This perspective provides an innovative overview on the functioning of cooperation mechanisms grounded on mutual recognition in criminal matters and over the different (and sometimes contradictory) causes that reduce a smooth collaboration among Member States. Chapter 14 investigates the role played by fundamental rights' protection in the architecture of three judicial cooperation mechanisms. Chapter 15, lastly, entangles the double criminality test, facing the main inconsistencies of judicial application at both national and supranational levels.

Finally, Part 4 of our book covers the computable representation of EU law, showcasing a hybrid approach that combines Large Language Models and logic rules to offer users an overview of the applicable grounds for refusal. It also utilizes natural language processing to analyse the main legal concepts and their national implementation, achieved across the EU, and assists users in identifying relevant case law.

Last but not least, acknowledgements are in order.

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