EJLT European Journal of Law and Technology

Addressing the Needs of Victims: the Design of a Multi-Role AI-Driven Application for Victims of Crime Access to Justice

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Abstract

In this article, we explore the possibilities offered by new information and communications technology (ICT) and artificial intelligence (AI) in providing efficient digital solutions to support crime victims' rights and their access to justice. Based on the results of the LINK Project (Linking Information for Adaptive and Accessible Child-Friendly Courts, involving Italy, Portugal, Czech Republic, Bulgaria, Lithuania and Slovenia), this paper describes the blueprint for an information system named DIANA, which is designed to provide the following functionalities: victim data collection; procedural accommodation definition; risk assessment; data management; expert system information through an AI chatbot; secure chat for operators. The application of the DIANA blueprint in a real-world scenario, a prospective for future research, will allow for a clearer determination of essential elements such as the material and organisational costs of development, the actual user acceptance of the technology, and above all its capacity to support effectively the victims' access to justice.

Keywords: victims' rights, artificial intelligence (AI), e-justice, access to justice, digital victim support systems (DIANA).

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1. Introduction

The role of the victim in criminal proceedings and the need to provide them with solid institutional support in accessing justice and protection services is receiving increasing attention from interest groups, policymakers[1] and the academic world.[2] This is also evidenced by various research projects in the EU that focus on analysing and evaluating the ability of judicial and extrajudicial systems to meet the needs of victims and ensure their participation in criminal and compensation proceedings.[3] Furthermore, in Europe, the legislative frameworks of Member States have been influenced by the need to implement the provisions of the EU Victims' Rights Directive (2012/29/EU), which establishes minimum standards for the rights, support and protection of crime victims across the EU, and is based on these pillars: right to information; right to support; right to protection; and more inclusive participation in criminal proceedings.

The need to guarantee these rights to victims, which requires increased coordination among the actors involved in support and protection procedures, could be better met through the development of ICT- and AI- based systems that, by digitising procedures

[1] International and European regulations are constantly evolving on the subject. Key instruments include: Council of Europe, Recommendation No (85) 11 on the Position of Victims in Criminal Law and Procedure (28 June 1985) and Recommendation No (87) 21 on Assistance to Victims and Prevention of Victimisation (17 September 1987); European Convention on the Compensation of Victims of Violent Crimes (Strasbourg, 24 November 1983, in force 1 February 1998); Council of Europe Convention on the Protection of Children against Sexual Exploitation and Sexual Abuse (Lanzarote, 25 October 2007, in force 1 July 2010); Directive 2012/29/EU of the European Parliament and of the Council of 25 October 2012 establishing minimum standards on the rights, support and protection of victims of crime [2012] OJ L315/57 (EU Victims' Rights Directive).

[2] Academic attention on the subject is also extremely high. See, e.g., Jo-Anne Wemmers, 'Victims' experiences in the criminal justice system and their recovery from crime' (2013) 19 Int Rev Victimol 221; Edna Erez, 'Integrating a Victim Perspective in Criminal Justice through Victim Impact Statements' in Adam Crawford and Jo Goodey (eds), *Integrating a Victim Perspective within Criminal Justice. International Debates* (Routledge 2019) 165; Sarah Charman and Emma Williams, 'Accessing Justice: The Impact of Discretion, "Deservedness" and Distributive Justice on the Equitable Allocation of Policing Resources' (2022) 22 *Criminology & Criminal Justice* 404.

[3] See the LINK project (Linking Information for Adaptive and Accessible Child-Friendly Courts), launched in Bulgaria, Czech Republic, Lithuania, Portugal, Slovenia and Italy, aimed to strengthen professionals' capacity to ensure non-discrimination of child victims with disabilities and to integrate child protection systems into criminal proceedings. The preliminary results of the research were illustrated in the National Briefing Papers (NBP), available at: https://validity.ngo/.../national-briefing-papers/ . See also the project 'Re-Agire' (IGSG-CNR and the Italian Ministry of Justice) aimed to develop a prototype of a website, i.e., the 'Institutional Information Portal on the Protection of Crime Victims — Re-Acting', to enhance victims' awareness of their rights and their access to justice. For further details, see: https://www.igsg.cnr.it/avvio-messa-a-punto-e-popolamento-del-portale-di-informazione-istituzionale-in-materia-di-protezione-delle-vittime-di-reato-re-agire/. See also Victim Support Europe, the main EU network advocating for crime victims, with ongoing projects listed at: https://victim-support.eu/what-we-do/our-projects/ongoing/ (accessed October 2024).

and ensuring interoperability between the technologies used by stakeholders, could lead to improved efficiency and faster response times.

As several studies have demonstrated,[4] the use of ICT and AI-based technology in aiming to improve the efficiency of the judicial system in various areas is already widespread in several national contexts. The significant expansion of digital technologies in the justice sector opened the door to new opportunities by replacing the traditional working approach – built on paper and the exchange of physical documents – with the 'digital method', based on the use of ICT and, more recently, AI.[5] Additionally, many national systems innovated and adapted their regulations in order to allow the collection, use and exchange of electronic data and documents within judicial systems. In most cases, this 'change of course' has improved traditional legal processes, increasing their efficiency, timeliness and transparency, and helping the judiciaries to provide adequate services.[6]

However, aside from a few rare experiments,[7] the application of ICT and AI technology specifically to victim support services is not very widespread, even though it likely represents an effective solution for improving the conditions of crime victims in various national contexts.

On this basis, this study aims to address the following research question: what technical and organisational features should an ICT- and AI-based system have in order to simultaneously ensure victims' access to justice and legal information, as well as coordination through the exchange of data, communications and information, among all the actors involved in victim support services?

This research question will be addressed through the design of a blueprint for a general-purpose and general-application system that covers various aspects related to the victim's access to justice, from the legal information provision to the

[4] Marco Velicogna, 'e-Justice in Europe: From national experiences to EU cross-border service provision', in Laura Alcaide Muñoz and Manuel Pedro Rodríguez Bolívar (eds), *International E-Government Development* (Springer 2018); Marco Velicogna, 'Justice Systems and ICT: what can be Learned from Europe?' (2007) 3 *Utrecht Law Review* 129; Giampiero Lupo, 'Law, Technology and System Architectures: Critical Design Factors for Money Claim and Possession Claim Online in England and Wales' in Francesco Contini and Giovan Francesco Lanzara (eds), *The Circulation of Agency in E-Justice: Interoperability and Infrastructures for European Transborder Judicial Proceedings* (Springer 2014) 83−107.

[5] Rachid Ejjami, 'AI-Driven Justice: Evaluating the Impact of Artificial Intelligence on Legal Systems' (2024) 6 *International Journal For Multidisciplinary Research*; Floris Bex and others, 'Introduction to the Special Issue on Artificial Intelligence for Justice (AI4J)' (2017) 25 *Artificial Intelligence and Law* 1.

[6] This point of view was expressed by Velicogna Marco and Bogdani Mirela, 'Use of Information and Communication Technologies (ICT) in European Judicial Systems' (2009), https://rm.coe.int/sep- 2017-use-of-information-and-communication-tecnoligies-ict-in-judic/16809ebf0a (accessed October 20204).

[7] We are referring to the Viogen app, implemented in Spain starting from 2007 and detailed in Section 4. For more information, Ángel González-Prieto and others, 'Machine Learning For Risk Assessment in Gender-Based Crime' (2021) arXiv preprint arXiv:210611847.

coordination of the actors involved in the victim's support procedures. The blueprint of the system denominated DIANA will be described in Section 6. The design and description of the blueprint is based, on the one hand, on a preliminary analysis assessing the needs of the actors involved in victims' access to justice and support procedures (i.e., victims, justice professionals and support services; Section 3) and, on the other hand, on a study of the state of the art of the technological developments related to justice digital technologies in EU countries (Section 4). In particular, the latter, which confirmed the uneven development of ICT technologies in the judiciary across different EU countries, prompted us to take into account the principle of maximum adaptability[8] to different contexts during the blueprint design phase, as it has been clarified in the section describing the system.

The preliminary studies and the introduced blueprint design are part of the results of the LINK Project ('Linking Information for Adaptive and Accessible Child-Friendly Courts'), in which the authors of this paper are involved as researchers of ISASI-CNR (Institute of Applied Sciences and Intelligent Systems - National Research Council of Italy) partner and beneficiary of the project. The project, which was launched in six EU Member States (Bulgaria, Czech Republic, Lithuania, Portugal, Slovenia and Italy), aims to guarantee more efficient and timely access to the judicial system for victims of crime who are minors and affected by intellectual and/or psychosocial disabilities, by promoting a decision-making process appropriate to age, gender and disability.[9]

Before we address these analyses and descriptions, the following section introduces the methodological framework utilised for the preliminary study and for the design of the blueprint described in this paper.

2. Methodology

The methodological framework of this study combines various analytical techniques, including qualitative and quantitative analysis, as well as the application of ICT design principles for the ideation of the technological proposal described here. As mentioned above, before developing the system for crime victims' support presented in this article, we worked on two fronts: first, assessing the needs of victims and the professionals working for their support and protection; and second, identifying the state-of-the-art technological development in criminal justice in several European countries.

[8] We will cover the ICT and e-justice design principles, on which we based the ideation of DIANA, later in Section 6. For now, the quoted principle of maximum adaptability is described in the following contributions: Kalle Lyytinen, Carsten Sørensen and David Tilson, 'Generativity in Digital Infrastructures: A Research Note', in R. Galliers and Mari-Klara Stein (eds), *The Routledge Companion to Management Information Systems* (Routledge 2017) 253−275; Giampiero Lupo and Jane Bailey, 'Designing and Implementing e-Justice Systems: Some Lessons Learned from EU and Canadian Examples' (2014) 3 *Laws* 353.

[9] *LINK project* (n 3).

For both analyses, we employed qualitative methods, such as the analysis of official documentation, bibliographies, legislation and semi-structured interviews with stakeholders conducted as part of the LINK project,[10] as well as quantitative methods to analyse the available data related to the studied phenomena.

In designing the DIANA system blueprint, and in addition to the needs analysis and the state-of-the-art review mentioned above, we relied on a series of well-established ICT and e-justice development principles, such as the principle of reuse of the existing installed base[11] or the principles of adaptability, flexibility and modularity.[12] The principles applied to DIANA's design will be described in more detail in Section 5.

3. Needs Assessment: Theoretical and Juridical Argumentations for the Implementation of a Multi-Function/Multi-Role Application for Victims

In the EU legal framework, the assessment of victims' individual needs and protection requirements is a fundamental precondition for their access to justice and participation, in a conscious and informed manner, in the criminal proceedings. These needs may be of various kinds and concern respect and recognition, support and information, protection, compensation and restoration.[13] In this perspective, article 22 of the EU Victims' Rights Directive (which establishes minimum standards regarding the rights, assistance and protection of crime victims)[14] provides that Member States shall ensure that victims receive a timely and individual assessment, in accordance with national procedures, to identify specific protection needs and to determine whether and to what extent they would benefit from special measures in the course of criminal proceedings due to their particular vulnerability to secondary[15] and repeat victimisation,[16] to intimidation and to retaliation.

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[10] Ibid.

[11] 'Installed base' refers to the technological solutions, institutional arrangements, organisational practices and legal frameworks already in place when a new e-justice system is developed. See Lupo and Bailey (n 8).

[12] Lyytinen, Sørensen and Tilson (n 8).

[13] Arianna Visconti, 'Directive 2012/29/EU establishing minimum standards on the rights, support and protection of victims of crime' in *Guidelines for Corporations Preventing Victimisation and Dealing with Victims of Corporate Violence* (Università Cattolica del Sacro Cuore 2017) 7–9.

[14] Directive 2012/29/EU of the European Parliament and of the Council of 25 October 2012 establishing minimum standards on the rights, support and protection of victims of crime [2012] OJ L315/57 (EU Victims' Rights Directive).

[15] 'Secondary victimisation' means the victimisation that occurs not as a direct result of the criminal act but through the response of institutions and individuals to the victim. This definition is provided by *Rec(2006)8* of the Committee of Ministers to Member States on assistance to crime victims, available at: https://rm.coe.int/16805afa5c (accessed October 2024).

[16] 'Repeat victimisation' or 'revictimisation' means a situation when the same person suffers from more than one criminal incident over a specific period of time. Also this definition is provided by *Rec(2006)8* (n 15).

This evaluation has two stages: first, the specific protection needs of the victim are determined; second, the procedural accommodations that should be applied in the course of criminal proceedings are identified so as to meet the needs detected and avoid the risks to which the most vulnerable victims are frequently exposed.

With regards to the assessments criteria, article 22 sets out three categories of factors affecting potential vulnerabilities: 1. the personal circumstances of the victim; 2. the type and nature of the crime; and 3. the circumstances of the crime. The first category includes circumstances relating to age, gender and possible disability, but also related to the victim's family, economic and social conditions, his or her relationship with the offender, etc. With regard to the type and nature of the crime (second category), the level of the trauma suffered by the victim increases with the severity of the violence involved in the crime: consequently, in the case of a particularly aggressive offence, the victim will be exposed to greater risks of secondary or repeated victimisation and will have a greater need for protection. The circumstances of the crime (third category) relate to heterogeneous elements which may concern the place where the offence was committed (for example, the family, the home or work environment of the victim) or the purposes for which it was perpetrated (gender or racial hatred, discriminatory motivation, etc.).

This evaluation should be carried out as soon as possible (and therefore, as a rule, at the time of filing the complaint) by the authority which first comes into contact with the person who has suffered the crime. The evaluation should be constantly updated throughout the overall proceeding, based on the changes of personal circumstances of the victim (this is the case, for instance, of a child who, during the proceeding, reaches the age of majority) and of any other relevant change to external factors (such as the risk of threats and retaliation by the offender).

It is clear, therefore, that to ensure that this assessment is carried out correctly and in a timely manner, the involvement of several subjects is necessary, especially in cases of intersectionality between multiple and overlapping vulnerability factors.[17] In particular, vulnerability can depend on various categories – such as gender, disability, ethnicity, race, social class, generation, nationality, mother tongue, etc. – which, in their reciprocal interactions, may be at the basis of social inequalities, unjust social relations, and even multiple forms of violence (physical, sexual, psychological, economic, etc.). Consider, for example, a teenage girl with intellectual and psychosocial disabilities who reports sexual abuse by a family member: her particular

[17] The concept of intersectionality has been defined by Kimberlé Crenshaw, 'Mapping the Margins: Intersectionality, Identity Politics, and Violence against Women of Color' (1991) 43 *Stanford Law Review* 1241. On this topic, see also Jennifer C. Nash, 'Re-Thinking Intersectionality' (2008) 89 *Feminist Review* 1; Christian Kuran, Henrik Alexander et al., 'Vulnerability and Vulnerable Groups from an Intersectionality Perspective' (2020) 50 *International Journal of Disaster Risk Reduction*; Saatcioglu Bige and Canan Corus, 'An Inclusive Approach to Consumer Vulnerability: Exploring the Contributions of Intersectionality', in Kathy Hamilton, Susan Dunnett and Maria Piacentini (eds), *Consumer Vulnerability* (Routledge 2015), 31–42.

need for protection will depend on gender, age, type of disability, existing relationship with the perpetrator of the crime, nature and circumstances of the offence (linked to the phenomenon of domestic and gender violence). Intersectional violence can only be effectively addressed through an interinstitutional approach: to understand the specific needs of the victim and to correctly identify the procedural accommodations to be applied, it is appropriate to create an 'assessment team' and establish a link – safe and continuous – between different professionals, including representatives of the law enforcement and/or judicial institutions, but also experts such as psychologist, speech and other types of therapists, medical professionals, legal experts, social workers and, more generally, support and protection services that assist victims in the process of overcoming violence.[18] Therefore, good cooperation between all relevant stakeholders at national level is essential to ensure adequate access to information, protection and support to the victims that are considered high-risk targets due to their exposure to several forms of violence. Additionally, these types of victims require special attention from state and non-state institutions (such as the police, the prosecution office, the courts, social welfare centres, health institutions and victim support organisations).

At the EU national level, the European standard, mainly set by the Directive 2012/29/EU, has been implemented in an uneven way.[19] In some systems, the generic concept of 'particularly vulnerable victim' has been introduced: this is the case, for example, of Italy, Czech Republic, Portugal and Slovenia.

In Italy, Directive 2012/29/EU was executed with the Legislative Decree of 15 December 2015, n. 212, which introduced the new article 90-quater of the Italian Criminal Procedure Code. The Legislative Decree defines the 'condition of particular vulnerability' on the basis of subjective and objective criteria: the former concerns the personal characteristics of the victim (such as age, infirmity, psychosocial disability or economic, emotional or psychological dependence on the perpetrator of

[18] This aspect was examined in detail by Andrada Antofie, Aleksandra Ivankovic and Antonio De Martin, 'Model Multidisciplinary cooperation System – Part. 1: Individual Assessment and Procedural Accommodations for Child Victims with Intellectual and Psychosocial Disabilities'. To be published.

[19] This lack of homogeneity was also noted by the European Parliament in the Report A8-0168/2018 on the implementation of Directive 2012/29/EU. While the report recognised significant progress on individual assessment (Art 22), it also underscored inconsistencies in how such assessments are carried out across Member States - and sometimes even within individual Member States. These differences concern both methods employed in the assessment and the availability and coordination of victim support structures. Moreover, the report emphasised that ensuring proper coordination at Member States level remains challenging. The report is available at: https://www.europarl.europa.eu/doceo/document/A-8-2018-0168_IT.html (accessed November 2024). On the implementation of the directive in the various national contexts see, e.g., Elżbieta Hryniewicz-Lach, 'Victim's interests in Criminal Law and their Implementation in the European Union Directives' (2018) 1 *Pro Justitia: Ηλεκτρονική Επετηρίδα Νομικής Σχολής ΑΠΘ* 60; Raquel Borges Blázquez, 'European Judicial Cooperation and Protection of Gender-Based Violence Victims, Fact or Fiction?' (2020) 8 *Journal of Penal Law and Criminology* 95.

the crime); the latter relates to the nature of the crime (crime committed with violence, racial hatred, in the context of organised crime, terrorism or human trafficking, or for purposes of discrimination). When the condition of vulnerability is ascertained, multiple institutions cooperate for the implementation of procedural accommodations aimed at preventing the victim in a particularly vulnerable condition from being exposed to the risks of secondary victimisation. For example, the examination of the vulnerable victim could take place through the 'probative evidence hearing' (in Italian: *incidente probatorio*) during the investigation phase or the pre-trial hearing, without the necessity of waiting for the traditional hearing that may take place even years after the crime occurred.[20]

In the Czech Republic legal system, the EU Victims' Rights Directive was transposed into law by Act No. 56/2017 Coll.[21] There is not a conceptually or normatively differentiated approach to victims depending on gender, age or disability within this legal system, but the generic legal category of 'especially vulnerable victim' is utilised:[22] this concept includes, among other things, children, people with disability, victims of particularly violent crimes (such as rape or terrorist attack) or victims of crimes committed in specific circumstances (for example, offences committed because of membership of a nation, race, ethnic group, religion, class or other groups of persons). Also, in this case, this specific condition entails the application of a series of procedural accommodations: for example, this type of victim has the right to a representative (usually a lawyer), who may be appointed by the court or the public prosecutor at the initiative of the police.[23]

Directive 2012/29/EU was transposed to Portuguese law through the National Law 130/2015, which, on the one hand, introduced the definition of 'victim especially

[20] The Italian criminal trial is composed of three phases: preliminary investigations, the pre-trial hearing (serving as a filter), and the trial, during which evidence is gathered through cross-examination. According to the general rule, testimony must be given during the third phase, which often takes place years after the crime. This could expose the vulnerable victim to a risk of retraumatization. To avoid the risk of secondary victimization, the italian 'incidente probatorio' allows for the statements of the vulnerable victim to be taken, in cross-examination, already during the preliminary investigations or the pre-trial hearing. In this way, the victim is not forced to relive the trauma years later, potentially after having already overcome it. See Maria Grazia Coppetta, 'Il contributo dichiarativo del minorenne nell'incidente probatorio' in Claudia Cesari (ed), *Il minorenne fonte di prova nel processo penale* (Giuffrè 2015), 155–204. More information about the individual assessment and the procedural accommodations in the Italian legal system can be found in Giampiero Lupo and Giada Pacifico, 'Italy Nation Briefing Paper' (2024), https://validity.ngo/wp-content/uploads/2024/06/CNR_NBP_EN_FINAL.pdf (accessed October 2024).

[21] Amendment to Act No. 45/2013 Coll., on victims of crime, with effect from 1 April 2017.

[22] See Sec. 2, par. 4 of the Act on Victims of Crime (Act. No. 45/2013 Coll., as amended).

[23] See Sec. 51a of Act No. 45/2013 Coll. For an overview of the procedural accommodations provided for vulnerable victims by the Czech procedural system, see Katerina Smolíkpvá, Petra Klímovà and Camille Latimier, 'Czech Republic National Briefing Paper' (2024), https://validity.ngo/wp-content/uploads/2024/06/SPMP_NBP_EN.pdf (accessed October 2024).

vulnerable'[24] and, on the other, outlined a 'Victim Statute'. On the basis of this statute, all especially vulnerable victims can be awarded protective measures. These include, for example, accommodations aimed to prevent visual contact between victims and defendants, particularly during testimony, through the use of appropriate technological resources; the recording of statements; criminal proceedings; and in particular hearings that take place without the presence of the public.[25]

A similar approach has been adopted by the Slovenian legal system. In particular, article 143 of the Slovenian Criminal Procedure Act requires the competent authorities to carry out an individual assessment of the injured person every time a complaint is filed in order to establish whether the victim has special protection needs.[26] The assessment results in the application of specific safeguards: for instance, the hearing of the victim may be carried out with the assistance of an expert in psychology or in specially adapted premises.[27]

In contrast, in other countries the Directive was implemented by introducing provisions that take into account specific categories of subjects. Bulgaria is a case in point. The Bulgarian Law on Assistance and Financial Compensation for Victims of Crime,[28] adopted to transpose the Directive in question and recently amended,[29] provides that victims of crime are entitled to an individual assessment and that special

[24] Article 67.A of the Portuguese Criminal Procedure Code defines victims who are especially vulnerable as the those whose particular fragility results, inter alia, from their age, health or disability, and the fact that the degree and duration of victimisation has resulted in injuries with serious consequences for their psychological balance or the conditions of their social integration.

[25] These protective measures are governed by articles 21–24 of the Victim Statute. See also APAV, Portuguese Association for Victim Support and FENACERCI, National Federation of Social Solidarity Cooperatives, 'Portugal National Briefing Paper' (2024), https://validity.ngo/wp-content/uploads/2024/06/APAV-and-FENACERCI_NBP_EN.pdf (accessed October 2024); Mariana Vilas Boas, 'Crime Victims'right to Information: Plain Language and its Implementation' (2024) 1(24) *Polissema–Revista de Letras do ISCAP* 316; Alline Pedra Jorge, *What Works for Crime Victims: Criminal Justice, Victim Support Centers, and the Emotional Well-Being of Crime Victims* (Editora Dialética 2021).

[26] Article 144 defines the 'injured person with special needs for protection' as 'the injured person whose personal or property right has been significantly violated by the criminal offence, but who, owing to his or her personal characteristics or vulnerability, is in need of special protection due to the nature, gravity or circumstances of the crime or the conduct of the accused person or the injured party in pre-trial or criminal proceedings and outside them, in order to protect his or her personal integrity during individual acts in pre-criminal and criminal proceedings.'

[27] These measures are provided for by article 240 of the Slovenian criminal procedure code. See Ana Bajt and Katarina Bervar Sternad, 'Slovenia National Briefing Paper' (2024), https://validity.ngo/wp-content/uploads/2024/06/PIC_NBP_EN.pdf (accessed October 2024); Vid Jakulin, 'Protection of Victims of Crimes in the Republic of Slovenia' (2022) Journal of Eastern European Criminal Law L 21.

[28] In force since 22 December 2006, last amended: 6 October 2023, available at: https://lex.bg/laws/ldoc/2135540550 (accessed October 2024).

[29] See Article 7a of the Law on Assistance and Financial Compensation for Victims of Crime, effective as of 1 September 2023.

protection needs are presumed to exist for children or people with disabilities. Some procedural adaptations are specifically tailored in favour of children; for example, the minor's hearing must always be conducted with the assistance of an educator or psychologist.[30] The situation is similar in the Lithuanian juridical system;[31] while there is no generic reference to vulnerable victims, specific legal provisions are devoted to the protective measures to be applied in their favour. In addition, it is worth mentioning that while the Lithuanian Criminal Procedure Code specifically regulates – in article 189 – the procedure for the individual evaluation of the minor suspected to be an offender, there is not a homologous rule that regulates in detail the evaluation of the child victim.[32]

The analysis carried out confirms, conclusively, a different implementation of the Directive 2012/29/EU in various national contexts. In addition, in some EU Member States[33] the law applying the Directive does not specify the modalities and procedures by which to conduct the assessment of the victim's vulnerability, and only provides

[30] See Article 139a of the Bulgarian Criminal Procedure Code. Further details on procedural accommodations and victims' rights in the Bulgarian legal system are provided in Tsvetelina Marinova and Aneta Genova, 'Bulgaria National Briefing Paper' (2024) https://validity.ngo/wp-content/uploads/2024/06/KERA_NBP_EN.pdf (accessed October 2024); Dobrinka Chankova, 'Crime Victims' Rights in Bulgaria. Are we Continuing to Stay beyond Time?' (2024) 65 *Studia Prawnoustrojowe* 39; Mila Ivanova, 'Assistance and Financial Compensation of Victims of Criminal Offences in Accordance with the Legislation of the Republic of Bulgaria' (2018) 9 *World Science* 27.

[31] In Lithuania, Directive 2012/29/EU has been transposed through the Law on Assistance for Victims of Criminal Offences No XIV-169, which governs the provision of support to victims. For further analysis of the Directive's implementation, see Erika Leonaitė, Anna Markina and Katre Pall, 'Implementation of the Victims' Rights Directive in Lithuania and Estonia: Challenges and Achievements' in *Legal Protection of Vulnerable Groups in Lithuania, Latvia, Estonia and Poland: Trends and Perspectives* (Springer 2022) 287; Alisa Grebinskytė, 'Protection of Victims of Domestic Violence in Lithuania According to International and European Union Law' dissertation (Mykolo Romerio Universitetas, 2016).

[32] On this issue, see: https://vaikoteises.lrv.lt/en/protection-of-children/ensuring-the-childs-rights/assistance/assistance-for-victims-of-criminal-offences (accessed October 2024).

[33] For example, the Italian and Czech legal frameworks only set out the criteria by which authorities must assess victims' vulnerability, without specifying the methods for conducting such assessments. In Lithuania, no legislation is expressly dedicated to individual assessment. The situation in Italy is set out in Lupo and Pacifico (n 20). See also Mauro Bardi and Giovanni Galvani, 'Vociare National Report Italy' (2019) https://victim-support.eu/wp-content/files_mf/1564677194VOCIARE_National_Report_Italy_interactive.pdf; Marta Lamanuzzi, 'La valutazione individuale delle specifiche esigenze di protezione nelle vittime della violenza di genere' (2018) 3 *Jus: Rivista di Scienze Giuridiche* 399. For the Czech Republic, see Smolíkpvá, Klímovà and Latimier (n 23); Michal Malacka, 'Victims of Crime and Harmonization of the Legal Regulation of their Rights in the EU and the Czech Republic' (2013) 20 *International and Comparative Law Review* 129. For Lithuania, see Ugnė Grigaitė and Marija Baltrušytė, 'Lithuania National Briefing Paper' (2024) https://validity.ngo/wp-content/uploads/2024/06/PsP_NBP_EN.pdf; Ilona Michailovič and others, 'Challenges to an Individualized Approach toward Batterers Intervention Programs in the Context of Coordinated Community Response to the Intimate Partner Violence in Lithuania' (2024) 39 *Journal of Family Violence* 271.

for non-mandatory criteria. This leaves the application of the procedure of vulnerability assessment to the discretion of the competent authorities. This regulatory gap could increase conflicts between parties to proceedings with opposing interests. For example, although the public prosecutor will certainly endeavour to highlight the victim's vulnerability in order to ensure that he or she receives adequate protection by applying the appropriate measures provided for by law, the defence of the accused will aim to devalue the victim's fragility, as the procedural position of the offender could be aggravated if committing of the crime took advantage of the vulnerability of the offended. Furthermore, this regulatory gap could prevent vulnerable victims from accessing a range of measures to which they are necessarily entitled (as stated by the EU Victims' Rights Directive) as additional rights, guarantees, options and possibilities that are not provided for generic victims. It is, therefore, desirable to introduce uniform protocols for the assessment of the needs of victims – especially the most vulnerable ones – and for the application of protective measures in their favour.

As we have seen, the evaluation procedures, the selection of different forms of accommodation and protection, and their application require the collaboration of various professionals from both the judicial context and support services (social services, associations, anti-violence centres, etc.), and the exchange of data and documents between them. It is therefore essential to ensure continuous, secure and correct communication between all subjects – both procedural (judges, prosecutors, lawyers) and extra-judicial (law enforcement, psychologists, care workers, health workers, etc.) – who have a role in the process of victim support and protection. New technologies (such as that described below), can play a key role in this respect. For instance, an electronic system may ensure the secure collection and sharing of data relevant to the various victim protection procedures, while providing functionalities useful both for the procedural accommodation and risk assessment, and for victims' access to legal information related to their rights.

4. State of the Art of e-Justice Technology in Support of Crime Victims

Studies on the subject[34] have highlighted the spread of ICT systems for the digitalisation of criminal procedures both inside and outside the EU, resulting in the implementation of web services, online legislation and case law databases, electronic filing and case management systems (CMSs). AI-based technologies are also increasingly considered applicable in the judiciary, including the criminal sector, and there is a growing number of projects aimed at automating procedures. Currently, experiments are being conducted on the use of AI to digitalise various functions of

[34] Athanasios P. Deligiannis and Dimosthenis Anagnostopoulos, 'Towards Open Justice: ICT Acceptance in the Greek Justice System the Case of the Integrated Court Management System for Penal and Civil Procedures' in *Conference for E-Democracy and Open Government* (IEEE 2017) 82–91; Laura J Moriarty, *Criminal Justice Technology in the 21st Century* (Charles C. Thomas Publisher 2017).

criminal justice, thus involving predictive policing,[35] facial recognition,[36] risk assessment tools,[37] automated case management and chatbot. These developments, in turn, are fostering a debate on the technological and ethical risks related to the impact that AI technology may have on the rule of law and fundamental rights, such as non-discrimination, respect for privacy and the independence of judges.[38] Despite the increasing digitalisation of criminal procedures, it is evident that there are still a few examples of technologies specifically dedicated to victims of crime and to the professionals working to support and protect them. Most existing systems are primarily focused on managing specific aspects of the criminal procedure and the offenders' data within the criminal justice proceedings (for example, CMSs used by prosecutors and courts), with limited interoperability with systems used by actors outside the judicial system (such as social services in the context of victim support services) and limited sharing of information with the public (improving this aspect, for instance, could enhance victims' access to legal information).[39]

Moreover, the development of ICT technology in criminal justice is not uniform across European countries. From our study on the ambit of the LINK project,[40] it is evident that while in some countries there is a widespread and consistent use of technologies in the judiciary, in others, these tools are still in an embryonic or developing stage. Our study, for example, highlighted an advanced stage of development in the Italian,

[35] Richard A. Berk, 'Artificial Intelligence, Predictive Policing, and Risk Assessment for Law Enforcement' (2021) 4 *Annual Review of Criminology* 209; John L.M. McDaniel and Ken Pease, *Predictive Policing and Artificial Intelligence* (Routledge, Taylor & Francis Group 2021); Fei Yang, 'Predictive Policing' in *Oxford Research Encyclopedia of Criminology and Criminal Justice* (Oxford University Press 2019).

[36] Paramjit Kaur and others, 'Facial-Recognition Algorithms: A Literature Review' (2020) 60(2) *Medicine, Science and the Law* 131; Kristine Hamann and Rachel Smith, 'Facial Recognition Technology: Where will it Take us' (2019) 34 *Criminal Justice* 9; Kay L Ritchie and others, 'Public Attitudes towards the Use of Automatic Facial Recognition Technology in Criminal Justice Systems around the World' (2021) 16 PloS one e0258241.

[37] Lee T Ostrom and Cheryl A Wilhelmsen, *Risk assessment: Tools, Techniques, and their Applications* (John Wiley & Sons 2019).

[38] Giampiero Lupo, 'The Ethics of Artificial Intelligence: An Analysis of Ethical Frameworks Disciplining AI in Justice and other Contexts of Application' (2022) 12 *Oñati Socio-Legal Series* 614.

[39] This issue was also addressed in the National Briefing Papers developed within the framework of the LINK project: https://validity.ngo/projects-2/linking-information-for-adaptive-and-accessible-child-friendly-courts/national-briefing-papers (accessed October 2024). On victims' access to legal information, see Marion EI Brienen and Ernestine H Hoegen, 'Information Systems for Victims of Crime: Results of Comparative Research' (1998) 5 *International Review of Victimology* 163; Erin J Williamson and others, 'Keeping Victims Informed: Service Providers' and Victims' Experiences Using Automated Notification Systems' (2015) 30 *Violence and Victims* 533.

[40] *LINK project* (n 3).

Lithuanian, Bulgarian and Portuguese contexts, as well as a less progressive development in the Czech Republic and Slovenia.[41]

In Italy, the Criminal Trial Online (*Processo Penale Telematico* – PPT) is quite developed, allowing the digitalisation of all phases of the proceedings; nevertheless, the system also presents critical points due above all to the difficulty of needing to quickly adapt to constant legislative changes and to the structural specificities of the criminal process, which often still requires the physical transmission of paper documents.[42] For external users such as lawyers, the Ministry of Justice's Telematic Services Portal[43] is available; it also offers limited telematic services to all citizens, which can only be used after authentication. Video-conferencing technologies are equally implemented, especially in criminal cases involving vulnerable or intimidated witnesses, experts and defendants.[44]

In Lithuanian criminal justice, the system Liteko is used for data management, exchange and integration.[45] Recent years have seen consistent growth in the number of users of the portal, demonstrating the effectiveness and importance of this tool, which facilitates access to justice for the parties to each case, their representatives and other participants in the process.[46] Lithuania has also developed the Teismai portal for the sharing with external users procedural information relating, for example, to the date of a hearing, the name of the competent judge or the final decision of a specific procedure.[47]

In Bulgaria, the Unified Court Information System (UCIS) was gradually introduced in all courts by appellate districts, with the exception of the administrative courts and the Supreme Administrative Court. The UCIS is a centralised web-based application

[41] Giampiero Lupo, Giada Pacifico, David Banes and Sabine Lobnig, 'Model Multidisciplinary Cooperation System – Part. 2: Digital Information System for the Model Multidisciplinary Cooperation System'. To be published.
[42] Benedetta Galgani, 'Il processo penale telematico' (2023) 29 *Diritto Penale e Processo* 114; Silvia Signorato, 'Gestione dell'atto processuale nel dedalo del processo penale telematico' (2023) 4 *Rivista di Diritto Processuale* 1388.
[43] Available at: https://pst.giustizia.it/PST (accessed October 2024).
[44] These technologies range from commercial services like Skype or Microsoft Teams to more complex set-ups that involve separate facilities or portable equipment. These aspects are discussed in detail in Lupo and Pacifico (n 20); Antonella Falcone, 'La videoconferenza nel procedimento penale italiano: riflessioni a margine della recente riforma Cartabia in materia di partecipazione a distanza' (2023) 10 *La Legislazione Penale* 1.
[45] The LITEKO system can be accessed via the electronic services portal of the Lithuanian courts: www.teismai.lt (accessed October 2024). See also Olena Antoniuk, 'Electronic Criminal Proceedings: International Experience of Using Information Systems for Algorithmization of Criminal Justice' (2022) 2 *Philosophy, Economics and Law Review* 148; Vigita Vėbraitė, Goda Strikaitė-Latušinskaja, 'Digitalization of justice in Lithuania' in K. Gajda-Roszczynialska (ed), *Impact of the COVID-19 Pandemic on Justice Systems: Reconstruction or Erosion of Justice Systems – Case Study and Suggested Solution* (V&R unipress 2023) 223–233.
[46] By the end of 2022, 2,192 attorneys and 1,118 assistant attorneys had used the Portal. These data are available in APAV and FENACERCI (n 25).
[47] Available at: www.teismai.lt (accessed October 2024).

for managing case management processes electronically, from the initiation of a case, through the management of court sittings, court statistics, automatic calculation of judges' case loads and financial management of the cases, etc. UCIS has been integrated with numerous external systems and registers, among which are the Unified Information System to Counter Crime, the Integrated e-Justice Portal, the Central Web-based Interface for Publishing Judicial Acts, the National Legal Aid Bureau, the Information System for Insolvency Proceedings, the National Population Database, the Commercial Register and the Register of Non-Profit Legal Entities, the BULSTAT Register, the Information System of the National Revenue Agency, the Information System of the National Social Security Institute and the Automated Information System for the Bulgarian Identity Documents.[48]

In Portugal, the Citius platform offers a comprehensive digital solution that allows all information and documents related to a case to be easily accessed by judges, court staff and lawyers.[49] The Portuguese judicial system also boasts a legal documentary database developed by the Institute of Management and Equipment of Justice, which provides access to court decisions issued by the country's Courts of Appeal, the Supreme Court of Justice and the Constitutional Court.[50]

As an example of the discontinuity in technological development across EU Member States – and unlike in the previously mentioned countries – in the Czech Republic, the technological development in criminal justice is still in its early stages: there is no electronic file system (CMS) or a general portal offering information services in the judicial field for citizens, and most of the procedures are managed on paper.[51]

The situation in Slovenia is also less advanced. The Slovenian Information System for Monitoring Criminal Proceedings (i-K system) is used to share case-related information only by court staff who are authorised to use it, such as registrars, typists, assistants and judges. Other criminal justice professionals cannot access the system, as it is only used internally and is incompatible with the systems used by other judicial authorities.[52]

The results described, while highlighting an uneven spread of information systems in criminal justice across the EU, confirm the ability of judicial digitalisation projects to

[48] For more information, see Tsvetelina Marinova and Aneta Genova, 'Bulgaria National Briefing Paper' (2024) https://validity.ngo/wp-content/uploads/2024/06/KERA_NBP_EN.pdf (accessed October 2024).
[49] Available at: https://www.citius.mj.pt/portal/default.aspx (accessed October 2024). See Rui Pedro Lourenço, Paula Fernando and Conceição Gomes, 'From eJustice to Open Judiciary: An Analysis of the Portuguese Experience' in *Open Government: Concepts, Methodologies, Tools, and Applications* (IGI Global 2020); Paula Fernando, Conceição Gomes and Diana Fernandes, 'The Piecemeal Development of an e-Justice Platform: The CITIUS Case in Portugal' (2014) in Contini and Lanzara (n 4) 137–159; Paula Casaleiro and others, 'Judicial Perceptions and Use of Technology: Portuguese Survey Report' (Centro de Estudos Sociais, Coimbra, 2023).
[50] The topic was discussed in detail in APAV and FENACERCI (n 25).
[51] This is clear from Smolíkpvá, Klímovà and Latimier (n 23).
[52] More detailed information is contained in Bajt and Bervar Sternad (n 27).

modernise, speed up and enhance the efficiency of procedures. They suggest, therefore, that new technologies could support a more effective participation of crime victims in criminal proceedings and in support and protection services.

Additionally, it is worth mentioning that the importance of technological solutions for crime victims' support increased significantly during the COVID-19 pandemic and the resulting national lockdowns: the stay-at-home measures, adopted to contain the epidemiological emergency, the lack of distinction between home and work, the consequential sharing of daily life's time and spaces, the isolation from the social fabric and the increased intra-family stress have been all risk factors for domestic violence.[53] In response, several countries expanded online web-based services for victims of violence, with 24/7 digital responses, such as web services (including tele-counselling) and pragmatic support services delivered via low-data messaging platforms (for example, WhatsApp).[54] The pandemic also prompted a more diffused adoption of technologies in the judicial field: this is the case, for example, of videoconferencing, which, from an exception imposed by isolation measures, became in many jurisdictions (such as Italy)[55] a regular and legally regulated way of carrying out hearings.

These recent developments have further reinforced the belief that the application of ICT- and AI-based technology can be an optimal path to improving the situation of victims seeking access to criminal justice. However, the use of ICT technology to digitalise and make interoperable the services offered by the judicial system and support services is still rare.

An example of the virtuous use of ICT- and AI-based technologies to monitor and prevent the risk of gender-based violence is provided by the VioGén system (Integral Monitoring System in Cases of Gender Violence), which was implemented in Spain in 2007. The AI program collects data by asking the victim to fill out two questionnaires: the first (police risk assessment) is administered at the time the victim files a

[53] To learn more about the topic, see Anastasia Kourti and others, 'Domestic Violence During the COVID-19 Pandemic: A Systematic Review ' (2023) 24 *Trauma Violence Abuse* 719; Jinan Usta, Hana Murr and Rana El-Jarrah, 'COVID-19 Lockdown and the Increased Violence Against Women: Understanding Domestic Violence During a Pandemic' (2021) 8 *Violence and Gender* 133; Tatiana Stoianova, Liudmyla Ostrovska and Grygorii Tripulskyir, 'COVID-19: Pandemic of Domestic Violence' (2020) 9 *Ius Humani Revista de Derecho* 111.

[54] For further discussion, see Chuka Emezue, 'Digital or Digitally Delivered Responses to Domestic and Intimate Partner Violence During COVID-19' (2020) 6 *JMIR Public Health Surveillance* e19831; Sónia Maria Martins Caridade and others, 'Remote support to victims of violence against women and domestic violence during the COVID-19 pandemic' (2021) 23 *The Journal of Adult Protection* 302.

[55] Antonelle Falcone, 'La Videoconferenza nel Procedimento Penale Italiano: Riflessioni a margine della Recente Riforma Cartabia in Materia di Partecipazione a Distanza' La Legislazione Penale (6 September 2023); Enrico Maria Mancuso, 'La dematerializzazione del processo al tempo del COVID-19' (2020) 5 *Giurisprudenza Penale* 1; Elena Valentini, 'Riforma Cartabia: modifiche strutturali al processo penale-I rimedi a favore dell'imputato e del condannato giudicato in assenza' (2023) 2023 *Giurisprudenza Italiana* 1202.

complaint; and the second (police risk evolution assessment) one year after, when the proceeding is concluded. The algorithm processes the data to quantify the level of risk of aggression, distinguishing between five levels: unappreciated; low; medium; high; and extreme. Each level corresponds to an action plan for victim support and protection involving the victim and all relevant authorities, including the court.[56]

The VioGén results confirm that, despite some criticisms,[57] the use of ICT and AI in the fight against gender violence can have significant results. Our proposal, as described below, is inserted in this direction, with the aim of filling the gaps highlighted through the design of a complete digitalised support system for the victims who need to participate in criminal proceedings and to receive support and protection.

5. DIANA: a Multi-Role AI-Driven Application for Victim Support

The blueprint of the digital information system for victim support here described is designed on the basis of the previous analysis assessing the needs of actors involved in victims' access to justice and support procedures (e.g. victims, justice professionals, support services). We also took into consideration the state of the art of digital technology development for justice in the EU countries and the most diffused design principles for the development of e-justice technologies.[58] Based on these two analyses, we ideated a general purpose and general application system that covers several aspects related to victims' access to justice, from the provision of legal information to the coordination of the actors involved in victim support procedures.

The designed system, therefore, has been envisioned as a multi-function, multi-role application for victim data collection, procedural accommodation definition, risk assessment, data management, expert system information through an AI chatbot, and the provision of a secure chat for operators. The proposed design is notable for

[56] To explore the system, see Jordi Gimeno Beviá, 'Predictive Policing and Predictive Justice in the Spanish Legal System: Current Situation and Lege Ferenda Ideas before Future Applications' (2023) *e-Revue International de Droit Penal*; Ana Montesinos García, 'Los algoritmos que valoran el riesgo de reincidencia: En especial, el sistema Viogen' (2021) 64 *Revista de Derecho y Proceso Penal* 19; José Luis González and María José Garrido, 'Satisfacción de las víctimas de violencia de género con la actuación policial en España. Validación del Sistema VioGen' (2015) 25 *Anuario de Psicología Jurídica* 29; Juan José López-Ossorio and others, 'Validation and Calibration of the Spanish Police Intimate Partner Violence Risk Assessment System (VioGén)' (2019) 34 *Journal of Police and Criminal Psychology* 439.

[57] These mainly concern the stability and accuracy of the forecasts and the transparency of the system. See, e.g., Raquel Borges Blázquez, 'Algoritmización de la concesión de medidas cautelares en el proceso penal para la protección de víctimas de violencia de género.¿Es capaz VIOGEN de interpretar el "periculum in mora"?' (2024) 21 *Actualidad jurídica iberoamericana* 384. These doubts have been denied by José Luis González Álvarez and others, 'Comprehensive Monitoring System in Cases of Gender Violence VioGén System' (2018) 4 *Behavior & Law Journal*. The authors argue that the system has high statistical reliability, almost equivalent to that of cancer screening tests. This reliability has been improved over the years by refining the variables used within the system to estimate risk and allow for more accurate monitoring.

[58] Lupo and Bailey (n 8).

its high level of adaptability to different national contexts. This high level of adaptability means that the application to a hypothetical national context does not necessitate radical changes in the national procedural system of victim protection, in the legislative framework and potentially in the digital infrastructure: such changes would entail a high level of complexity due to the necessary involvement of actors with legislative power at various levels and, above all, longer development times than those for technological implementation. As we will see later, the implementation of DIANA can be more or less complex, depending on the degree of interoperability with the systems already in use by justice professionals and support services that developers intend to ensure. However, at any level of interoperability and related complexity, the core functionalities and objectives of the project will still be guaranteed. This high adaptability to various contexts and levels of technological development is in line with three fundamental design principles described by the sector's literature. First, it represents a correct interpretation of the principle of 'reuse of existing installed base' – which refers to technological solutions, institutional arrangements, organisational practices and legal frameworks already in place when a new e-justice system is developed – with the aim of reducing adoption barriers and safeguarding capabilities already in place.[59] Second, the project complies with the principles of adaptability and flexibility,[60] to meet users' needs and demands, and to establish critical mass. Third, as we will see later in our more technical description of the system, DIANA is characterised by marked modularity: Information Systems and e-Justice scholars have indicated that modularisation and a system development based on an infrastructure composed of different loosely coupled layers connected by gateways can be essential to positive outcomes.[61]

The analysis of needs assessments (section 3) also allowed us to identify the potential users of DIANA. The users belong to two main categories: the victims, especially including vulnerable victims (e.g., victims with disabilities); and all the actors who participate in the procedures of victim support and protection. This category includes justice authorities (e.g., the police, the prosecutor's office, lawyers authorised by the victim, judges) and support services (e.g., support service professionals, anti-violence centres, healthcare system operators, psychologists). The participation of all these actors is essential because the system will be based on the collection and

[59] Ole Hanseth and Kalle Lyytinen, 'Design Theory for Dynamic Complexity in Information Infrastructures: The Case of Building Internet' (2010) 25 *Journal of Information Technology*. Giampiero Lupo, 'Law, Technology and System Architectures: Critical Design Factors for Money Claim and Possession Claim Online in England and Wales' in FContini and Francesco Lanzara (eds), (n 4) 83−107.

[60] Jannis Kallinikos, 'Institutional Complexity and Functional Simplification: the Case of Money Claim Online Service in England and Wales' in Contini and Lanzara (n 4) 174−210; Marco Velicogna and Francesco Contini, 'Assemblage-in-the-Making: Developing the e-Services for the Justice of the Peace Office in Italy', in Francesco Contini and Giovan Francesco Lanzara (eds), *ICT and Innovation in the Public Sector: European Studies in the Making of e-Government* (Springer 2009) 211−243.

[61] Giovan Francesco Lanzara, 'Building Digital Institutions: ICT and the Rise of Assemblages in Government' in Contini and Lanzara (n 60) 9−48.

management of data related to victimisation which, on the one hand, will allow the exchange of information between the main actors supporting the victim, and on the other, will serve as the main fuel for DIANA's functionalities.

In order to achieve the widest dissemination and portability, the application should be designed for various platforms including in particular a dedicated website and an application on PC, Mac, Android and IOS. Additionally, in order to make the procedure accessible to all types of victims, including vulnerable victims such as those with disabilities, it is necessary to reflect on how to make DIANA as inclusive as possible. A key point concerns the accessibility of the system for victims with disabilities: in this regard, the application must be supported by the most utilised accessibility solutions for persons with disabilities and by the relevant regulations.[62] For instance, DIANA should support the integration of assistive technologies that support the access of users that may experience difficulties due to a wide spectrum of vision impairments, such as speech-to-text technology that automatically converts into speech all the text appearing in the application. Other assistive technologies integrated to DIANA may support users with a limited ability to write due to physical or cognitive impairments; for example, word prediction software can assist individuals by reducing the number of keystrokes required when typing.

Another consideration necessarily concerns cyber security. This refers, first, to the identification and authentication functions that should guarantee access only to authorised users. In DIANA, these functions are based on a strong multi-factor authentication system[63] based on a multi-layered approach with the aim of ensuring maximum protection and security for the sensitive data managed by the system. Second, cyber security concerns the protection of data from external attacks that can modify them illicitly and that should involve both data stored in the database, as well as the information exchanged and document flow. For the data stored in the database, DIANA's project foresees the application of blockchain technology

[62] This issue has been regulated at European level by the Directive (EU) 2016/2102 of the European Parliament and of the Council of 26 October 2016 on the accessibility of the websites and mobile applications of public sector bodies [2016] OJ L327/1. On this issue, see Nataša Rajh and Matjaž Debevc, 'Analysis of Web Accessibility Evaluation Tools and Guidelines for Monitoring According to the Directive (EU) 2016/2102' (2022) in *Proceedings of the 10th International Conference on Software Development and Technologies for Enhancing Accessibility and Fighting Info-exclusion* (DSAI 2022); Delia Ferri and Silvia Favalli, 'Web Accessibility for People with Disabilities in the European Union: Paving the Road to Social Inclusion' (2018) 8 *Societies* 40. Some Member States had already adopted specific laws: for example, in Italy the reference law for digital accessibility is Law n. 4 of 9 January 2004 (so called 'Stanca Law'). In 2018, Italy transposed Directive (EU) 2016/2102 through Legislative Decree No 106, which amended and updated Law No 4/2004. For further details on the Italian regulation, see Davide Galliani, 'L'accessibilità dei siti internet delle pubbliche amministrazioni e la cd "legge Stanca"' federalismi it (11 June 2008).

[63] Multi-factor authentication (MFA) requires users to present two or more verification factors to access the application. This usually includes something the user knows (password), something the user has (a mobile device or security token) and something the user is (biometrics).

characterised by a decentralised, transparent and tamper-resistant framework.[64] As far as document flow, including chat and data exchange, is concerned, in order to ensure a secure and reliable exchange of data, DIANA will involve a combination of technologies designed to protect integrity, confidentiality, authenticity and availability of exchanges as data encryption,[65] secure file transfer protocols,[66] content filtering,[67] endpoint protection[68] and virtual private networks.[69] Finally, all systems related to data protection and management, along with the associated procedures, will comply with the current legislation, particularly the GDPR.[70]

To support all the operations related to victims' access to justice and the procedure for victim support and protection, DIANA's design includes five principal functionalities: 1. data gathering; 2. case management system; 3. risk and procedural

[64] DIANA's blockchain will be based on a decentralised/distributed ledger that involves the distribution of data across multiple nodes (computers) in a network where each node has a copy of the entire blockchain, reducing the risk of a single point of failure. The framework will ensure transparency and traceability through an open ledger that allows anyone to view the recorded transactions, thus deterring fraud and enhancing trust in the system. Additionally, DIANA's blockchain is tamper-resistant: once data is recorded on the blockchain, it becomes extremely difficult to alter. Each block of data is linked to the previous one through cryptographic hashes, creating a chain of blocks. If someone tries to change any data in a block, it will invalidate the hashes of subsequent blocks, alerting the network to the tampering.

[65] DIANA includes an end-to-end encryption technology that ensures that data is encrypted from the moment it leaves the user's device until it is received and decrypted by the server. This protects sensitive data during transmission. The system utilises transport layer security to encrypt data in transit and 'encryption at Rest', thus storing sensitive data in an encrypted format on the server using strong encryption algorithms like AES-256.

[66] Secure file transfer protocols establish an encrypted link between a web server and a browser, ensuring that all data passed between them remains private. Mazin Sameer Al-Hakeem, Suhiar M Zeki and Sarah Y Yousif, 'Development of Fast Reliable Secure File Transfer Protocol (FRS-FTP)' (2013) 19 *Al-Mansour Journal* 1.

[67] Content filtering allows the monitoring and control of the transfer of sensitive documents based on pre-defined policies, ensuring that sensitive data is not accidentally or maliciously shared. Kamran Morovati, Sanjay Kadam and Ali Ghorbani, 'A Network Based Document Management Model to Prevent Data Extrusion' (2016) 59 *Computers & Security* 71.

[68] DIANA's Endpoint Protection will be deployed on endpoints (e.g., computers, mobile devices) to monitor and control document exchange activities, preventing data breaches. Kimberlee Ann Brannock, 'Cybersecurity Risk Associated with Endpoint and IoT Devices: An Examination of Endpoint Print Device Security' (Marymount University 2022).

[69] Virtual private networks (VPNs) create a secure tunnel between the user's device and the internet, ensuring that all data, including documents, is encrypted during transmission, even over unsecured networks. Michael Oladipo Akinsanya, Cynthia Chizoba Ekechi and Chukwuekem David Okeke, 'Virtual Private Networks (VPN): A Conceptual Review of Security Protocols and their Application In Modern Networks' (2024) 5 *Engineering Science & Technology Journal* 1452.

[70] Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC [2016] OJ L119/1 (General Data Protection Regulation).

accommodation assessment; 4. expert system and chatbot; and 5. internal encrypted secure chat.

For data gathering, DIANA allows the acquisition of data on the victims of crime who access the system or come into contact with justice and social service professionals through different access points. This data will be the fuel for activating other important functions of the system, from risk assessment to management of individual cases during the various stages of the procedure. The data that the system will need to acquire includes contact information, type of crime suffered, health data and phase of the criminal proceeding as well as risk factors useful for the risk and procedural accommodation assessment as the manner of the offence, motives for crime, criminal record of the offender, disability and age of the victim (see Figure 1).

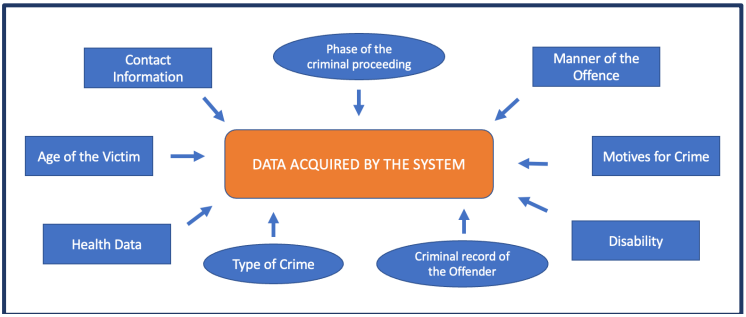

Figure 1. Data acquired by DIANA

The access points (see Figure 2) allow different types of users to participate in the system: first, the victims that access the system and deposit their data directly on the platform; and second, the professionals (justice professionals or support services) involved in all the activities related to victim support and protection that can gather the victim's data and store them in the database.

On this basis, the access points will be the following. First, a dedicated application function that a victim can access through registration on the website or directly on the mobile app. Following registration, a questionnaire will guide the victim in providing the essential data, including contact information and all the relevant information for the risk procedural accommodations assessment. Second, the actors of the support and protection system for victims of crime (internal or external to the judicial system) will use a dedicated access point on a web platform or on an operating system's specific application. When victims of crime come into contact with one of the actors in the system, they will be asked to provide their contact details and the details of the crime they have suffered, which will then be filed and stored in the application. The idea is that such data can be available to all support operators in order to reduce double filing and the resulting risk of secondary victimisation. As we will see later, the data entered may also be modified, depending on the access levels

(and therefore the roles of the operator), during the various stages of the procedure. This will allow constant updating of the data and the supply of constantly updated data in real time.

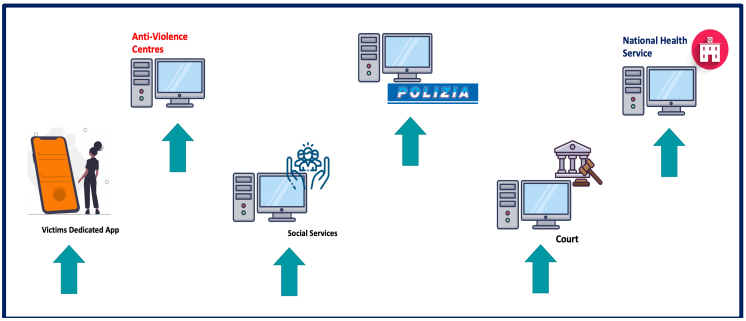

Figure 2. Access points for DIANA data gathering

With the aim of supporting the highest adaptability of the system, DIANA can be implemented with different levels of interoperability with the IT systems utilised by justice and social professionals. At the highest level of interoperability, DIANA can be interconnected with existing systems via a specific API:[71] in this way, professionals will directly use their own data management system which will automatically populate the data in our application. This level of interoperability brings considerable complexity, as it involves the development of dedicated APIs for the interconnection between systems, the analysis of exchanged data and metadata, and where necessary (certainly in the case of changes to systems managed by the Ministry of Justice), some legislative amendments. On the other hand, at the minimum level of complexity, the system can be implemented as a standalone application. The operators will use their own system and the DIANA application in parallel. Although this may represent a redundant activity, it is necessary to keep in mind the advantages of using DIANA for the acquisition of data at the first access point as these will then be usable in real time by all other operators involved in the protection process and in criminal proceedings.

DIANA's case management system (CMS) allows the management of the data acquired, making it accessible in different ways and at different levels by users of the system, including victims, following their authentication and identification. This widespread access allows the exchange of data useful for victim support and

[71] An application programming interface (API) is a collection of rules and protocols that enable different software applications to interact and exchange information. It outlines how applications can request data and perform actions, detailing the required data, allowed methods and expected responses. APIs allow developers to integrate and enhance functionalities across various systems – such as a website retrieving weather information – without needing to understand or alter the other system's internal code. Joshua Ofoeda, Richard Boateng and John Effah, 'Application Programming Interface (API) Research: A Review of the Past to Inform the Future' (2019) 15 *International Journal of Enterprise Information Systems* 76.

protection procedures. The filed data may also include documents in pdf format or other formats (especially for documents that form evidence of the crime, which can be added during the different phases of the proceedings). The data stored and managed by CMS will be kept on a central server (the entity or operator that maintains and updates this server may be of a different nature and will be selected by the country in which DIANA is implemented and applied).

The access to different types of data will depend on the type and role of the user: this is to avoid sensitive data being disseminated beyond the purpose of victim support and protection. This strategy also aims to limit the risks of re-identification, secondary victimisation and repeated victimisation. For instance, while the police may have access to various types of data, including, for example, health data, factors related to risk and procedural accommodation assessment, and phase of the proceedings, healthcare providers will instead have access only to data types relevant to the activities they need to perform (thus excluding, for instance, criminal proceedings-related data). With the same logic, different users with different roles will have different possibilities for editing data, and changes to the database will need to be approved by the other actors, so as to avoid erroneous or unlawful amendments.

As already mentioned, the stored data will be used by the system for two fundamental functions: the evaluation of *procedural accommodations* and the victim's *risk assessment*. The risk and procedural accommodation assessments comply with the requirements of article 22 of Directive 29/2012/EU that provides that Member States should ensure that victims receive a prompt and individualised assessment to identify specific protection needs and to determine if they may benefit from special measures during criminal proceedings due to their particular vulnerability to secondary and repeated victimisation. As described in Section 3, the assessments should be conducted as promptly as possible − ideally when the complaint is filed, by the authority that first engaged with the victim − and should be updated throughout the proceedings to reflect any changes in the victim's personal circumstances or relevant external factors (such as risks of threats or retaliation from the offender). The design of the DIANA system, particularly in terms of its assessment functionalities, addresses the need for rapid activation of evaluation and protection procedures, as well as the continuous monitoring of victimisation conditions.

The procedural accommodation evaluation is based on a set of fundamental factors, such as gender, age, disability (including an assessment of the eventual type of disability and related assistive technologies or augmentative and alternative communication (AAC) required for victim participation in the proceedings), social, family and emotional background of the victim, etc. Based on these factors, the system will suggest the type of procedural accommodation to be applied in the various stages of the procedure.

The risk assessment aims to determine the risk of recurrence of victimisation events. It will be based on an analysis of the statistical data stored in the system, using AI (data stored in the server are utilised for the analysis following automatic

anonymisation). The assessment will be based on a number of key factors including the type of crime, manner of the offence (e.g., time, place, object, nature and means used to commit the crime), motives for crime (e.g., crime committed with violence against the person, in a domestic environment, with racial hatred and for the purpose of discrimination), criminal record of the offender, etc. The system will bring to light specific patterns and significant relationships between risk factors and events of victimisation, as well as repeated or secondary victimisation. Based on such analyses applied to individual cases, after assessing the level of risk to which the victim is exposed, justice and social service professionals can decide for the activation of specific protective measures.

With the aim of promoting access to justice for crime victims, a fundamental part of the system will concern inclusive access to legal information. DIANA's *expert system* will provide access to simplified legal information on its various platforms. The expert system will be based on official and verified sources of information as laws (substantive and procedural) and available case law. The information will generally cover the existing rules on victim protection and support and related procedures, the procedures for filing a complaint or participating in a proceeding, the procedural accommodations and protection services available, etc. All the information will be provided in a conversational manner through an AI- and large language models (LLMs)[72]-based chatbot. Through a geolocation function, the application will provide to victims information on the closest support service, and again after the completion of the data filing procedure.

To facilitate coordination between actors using DIANA, the application will include the implementation of the DIANA internal secure chat. This will allow the exchange of communications in 'two-on-one' or group chat.

This feature may support an effective and traceable professional collaboration among practitioners. Additionally, the chat will allow coordination and information between operators, thus also providing the possibility for supervisors to screen communications and assess whether all procedures have been correctly followed and whether victims have received appropriate protections, especially from secondary and repeated victimisation. Communications will be secured through an encryption method based on an end-to-end encryption technology.[73]

As we have seen, the designed system, through its various functions – ranging from assessment and provision of legal information to the coordination of actors and

[72] Large language models (LLMs) are sophisticated AI systems trained on vast amounts of text to understand and generate language similar to human communication. Using deep learning techniques, particularly neural networks with billions of parameters, they can predict and create coherent text based on given prompts. Notable examples include OpenAI's GPT, Google's BERT, and Meta's LLaMA. Enkelejda Kasneci and others, 'ChatGPT for good? On opportunities and challenges of large language models for education' (2023) 103 *Learning and Individual Differences* 102274.

[73] Lanzara (n 61).

exchange of communications and data − can make a difference in providing a useful tool for the good cooperation between all relevant stakeholders at national level. This is crucial to guarantee that victims needing special attention from both state and non-state institutions − such as police, prosecution offices, courts, social welfare centres, healthcare providers and victim support organisations − have adequate access to information, assistance and protection.

6. Conclusive Remarks

This study has described how the application of ICT technologies, including those based on AI and LLMs,[74] can help improve the conditions of crime victims and their access to justice and legal information. The proposed blueprint project, if implemented in real-world scenarios, would enable the digitalisation of various operations related to victim support and protection, from access to legal information to coordination among stakeholders in social services and judicial contexts, up to the assessment of victimisation risks and necessary procedural accommodations. These functions address the needs identified in Section 3 of this article, whose satisfaction is the main objective of the EU Victims' Rights Directive,[75] which is applied with varying results across EU countries. In addition to enhancing support functions and access to justice for victims, the strength of the proposed project lies in its applicability across different national contexts, adapting to various levels of technological development in the justice field based on the principle of ensuring the same essential functionalities and services, even in those environments where interoperability with existing systems is not an option. This design also meets a fundamental requirement of the LINK project,[76] from which this work originates, namely the creation of a system to digitalise victim support services through a model applicable to a selection of case studies (e.g., Portugal, Bulgaria, Italy, Czech Republic, Lithuania and Hungary), which, following an in-depth analysis,[77] revealed an uneven development of the technology applied within criminal justice.

Although the project described here appears on paper to offer significant results in terms of modernising and speeding up victim support procedures, to demonstrate its true effectiveness, it must undergo an implementation and application phase in a real-world context. This phase will allow for a clearer determination of essential elements such as the material and organisational costs of development, user acceptance of the technology, issues encountered during implementation and

[74] Akinsanya, Ekechi and Okeke (n 69).
[75] EU Victims' Rights Directive (n 14).
[76] More information on the LINK Project is available at: https://validity.ngo/projects-2/linking-information-for-adaptive-and-accessible-child-friendly-courts (accessed October 2024).
[77] The results of this in-depth study are illustrated, state by state, in the Nation Briefing Papers available at: https://validity.ngo/projects/linking-information-for-adaptive-and-accessible-child-friendly-courts-bulgaria-czechia-lithuania-portugal-slovenia-italy-hungary-june-2023-may-2025 (accessed October 2024).

application, and more. This phase will be the focus of future research and dissemination efforts.