# A. Introduction

Over the past three decades, migration governance and public perceptions thereof have undergone profound shifts within the European Union (EU), shaped by political realignments and rapid technological innovation. While statistical data from Frontex and Eurostat indicate that hundreds of millions of third-country nationals enter the EU annually – often as tourists, students, or workers – and only a fraction are irregular migrants, EU policy continues to be dominated by a securitised narrative.[1] This framing tends to depict migrants as a threat to the stability of host states, rather than as contributors to the European way of life.[2]

This securitarian lens is mirrored in the way migration policy has evolved, with growing associations between migration and threats to public order and internal security. These developments are reflected in the technology currently used in connection with migration by the EU – including the new and soon-to-be interoperable Eurodac system, which is the focus of this study. Originally established in 2003[3] to support the Dublin mechanism by enabling the comparison of asylum seekers' fingerprints, Eurodac was at first a narrowly circumscribed tool. Its primary objective was administrative: to facilitate the allocation of responsibility for asylum claims among Member States.[4] However, in the two decades since its inception, Eurodac has been fundamentally transformed into a central component of the EU's broader digital migration infrastructure. With its latest revision, the adoption of Regulation (EU) 2024/1358, the legal framework governing Eurodac has been significantly revised. The new provisions permit the collection of more extensive (biometric) data, expand the categories of

1 Elspeth Guild, 'Promoting the European way of life: Migration and asylum in the EU', (2020) 26 European Law Journal 357.

2 ibid.

3 See 'Eurodac' (*eu-LISA*) at <https://www.eulisa.europa.eu/Activities/Large-Scale-It-Systems/Eurodac>; Council Regulation (EC) No 2725/2000 of 11 December 2000 Concerning the Establishment of 'Eurodac' for the Comparison of Fingerprints for the Effective Application of the Dublin Convention [2000] OJ L316/1 (Eurodac Regulation 2000).

4 See Niovi Vavoula, *Immigration and Privacy in the Law of the European Union: The Case of Information Systems*, (Brill Nijhoff 2022) 307ff.

individuals whose data may be stored, and enable interoperability with other EU large-scale information systems.

These changes reflect a broader shift in the EU's migration governance towards integrated data infrastructures that rely on biometric identifiers and automated processes. It shows an EU vision of fully automated border controls and the surveillance of every movement of third-country nationals through biometric profiling and cross-system data sharing. An important milestone in this development was the adoption of the Interoperability Regulations in 2019, which provide the legal basis for interconnecting several large-scale EU information systems, among them Eurodac. Through the interoperability framework, biometric and biographical data of third-country nationals are stored and cross-referenced across six information systems, processing entries and exits, visa and travel information, security-related alerts, and criminal records. The objective is to create a comprehensive and centralised information architecture that enables tracking, identification, and control of migrants. As Eurodac becomes increasingly embedded within this network of interoperable databases, it exemplifies the changing role of EU information systems – not merely as tools for administrative coordination, but as mechanisms that structure how individuals are identified, categorised, and governed.

Around the same time as the interoperability framework and the expansion of EU information systems took shape, the General Data Protection Regulation (GDPR)[5] was adopted, setting out the EU's core principles for data handling, among them a strong emphasis on individual data autonomy, transparency, and data minimisation. Yet these core protections are weakened or functionally sidelined in the context of migration management. The expansion of Eurodac into an interoperable node within a larger infrastructure thus raises fundamental questions regarding the extent to which the rights of migrants can be meaningfully realised within a system designed for control.

In this context, Eurodac serves as a pertinent case study for analysing the legal framing of interoperable information systems and their capacity – or lack thereof – to protect the rights and autonomy of individuals. This study focuses on access to justice, understood as both the formal rights granted to data subjects and the practical question of whether these rights can be effectively exercised. It analyses the rights to information, access and

5 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 [2016] OJ L119/1 (GDPR).

rectification of personal data, as well as the right to an effective remedy as provided by the Eurodac and Interoperability Regulations. These rights are of growing significance in light of the expanding data infrastructures, as they form a cornerstone for safeguarding the autonomy – and, by extension, the dignity – of data subjects. The developments outlined above call for careful legal and normative reflection on how these fundamental rights are protected and rendered accessible to individuals subject to such systems. This analysis thus aims to contribute to a deeper understanding of access to justice and the broader fundamental rights challenges posed by the digitalisation of migration governance within the EU and beyond.

## *I. Background: Externalisation, Digitalisation and the Intertwining of Migration and Security*

Eurodac is an EU-wide information system that has been operational since 2003 and represents the EU's first experiment with biometric identifiers.[6] As the first Automated Fingerprint Identification System (AFIS) at EU level, it plays a central role in the implementation of the Dublin mechanism, which allocates responsibility for examining asylum applications among Member States. In its original design, Eurodac was a relatively limited system reflecting principles of privacy by design: the biometric data it stores – primarily fingerprints – are not directly linked to personal identity data.[7]

However, Eurodac has undergone significant transformation. Vavoula has asked whether this "ugly duckling [is] turning into a swan,"[8] as the system has evolved from a narrowly focused migration tool into a broader instrument for "wider immigration purposes".[9] This shift is reflected in three major developments: (1) an expansion of the categories of individuals whose data are recorded; (2) a broadening of the types of data collected and processed; and (3) an extension of the purposes for which the data may

6 'Eurodac: The European Union's First Multinational Biometric System' (*Thales Group*, 24 May 2023) <https://www.thalesgroup.com/en/markets/digital-identity-and-security/government/customer-cases/eurodac>.

7 cf Recital 78 and GDPR, Art 25; Recital 53 and Police Directive, Art. 20.

8 Vavoula, *Immigration and Privacy in the Law of the European Union* (n 4) 307.

9 Proposal for a Regulation of the European Parliament and of the Council on the Establishment of 'Eurodac' for the Comparison of Fingerprints for the Effective Application of Dublin III Regulation (recast) [2016] COM(2016)272 (2016 Eurodac Proposal), 'Explanatory Memorandum' 4 and 11.

be used, including in the context of law enforcement, irregular migration control, and overall migration management.

The reform process began with the Commission's 2016 proposal to recast the Eurodac Regulation.[10] However, due to the package approach to reforming the Common European Asylum System (CEAS) and political impasses around key files, particularly the Dublin IV Regulation (now the Asylum and Migration Management Regulation (AMMR)[11]), negotiations were stalled.[12] A renewed proposal followed on 23 September 2020 as part of the New Pact on Migration and Asylum.[13] After years of negotiation, political agreement on the Pact was reached in December 2023.[14] The Council formally adopted the revised Eurodac Regulation on 14 May 2024, and it was published in the Official Journal of the European Union on 22 May 2024.[15] The Regulation has since entered into force and must be implemented within two years.[16]

This study was written during the period of reform of the Eurodac system and is based on the new Eurodac Regulation. It therefore engages with a legal instrument that has not yet been implemented and accordingly adopts a primarily forward-looking perspective. Nonetheless, a brief

10 2016 Eurodac Proposal.

11 Regulation (EU) 2024/1351 of the European Parliament and of the Council of 14 May 2024 on Asylum and Migration Management [2024], amending Regulations (EU) 2021/1147 and (EU) 2021/1060 and repealing Regulation (EU) No 604/2013 [2024] 2024/1351 (AMMR).

12 See Niovi Vavoula, 'Transforming Eurodac from 2016 to the New Pact: From the Dublin System's Sidekick to a Database in Support of EU Policies on Asylum, Resettlement and Irregular Migration' (ECRE 2020) 13, 4.

13 Amended Proposal for a Regulation of the European Parliament and of the Council on the Establishment of 'Eurodac' for the Comparison of Biometric Data for the Effective Application of Regulation on Asylum and Migration Management and of Resettlement Regulation, for Identifying an Illegally Staying Third-Country National or Stateless Person and on Requests for the Comparison with Eurodac Data by Member States' Law Enforcement Authorities and Europol for Law Enforcement Purposes [2020] COM(2020)614 (2020 Eurodac Proposal).

14 'Historic agreement reached today by the European Parliament and Council on the Pact on Migration and Asylum' (*European Commission, Migration and Home Affairs,* 20 December 2023) <https://home-affairs.ec.europa.eu/news/historic-agreement-reached-today-european-parliament-and-council-pact-migration-and-asylum-2023-12-20_en>.

15 Council of the EU, Press Release, 'The Council adopts the EU's pact on migration and asylum' (14 May 2024).

16 Regulation (EU) 2024/1358 of the European Parliament and of the Council of 14 May 2024 on the Establishment of 'Eurodac' for the Comparison of Biometric Data [2024] 2024/1358 (Eurodac Regulation 2024).

reflection on the broader political and legal context in which this reform emerged remains essential. In particular, three overarching dynamics have shaped the development of the Eurodac and Interoperability Regulations and contributed to the current configuration of EU migration law: the externalisation of migration control, the increasing use of digital technologies, and the growing convergence of migration and security agendas.

First, the externalisation of migration and border control refers to a series of practices that the EU has been using for some time and that have been described and criticised in legal literature.[17] In this context, externalisation is the attempt of a state to manage migration flows and enforce immigration policies beyond its borders, often by collaborating with other countries or non-state actors. Externalisation can involve various measures, e.g., outsourcing border control functions, implementing agreements with neighbouring or transit countries to intercept migrants before they reach the state's territory, and providing aid or incentives for other countries to prevent or reduce migration flows.[18] Externalisation practices are employed to shift the 'burden' of migration management away from the receiving state and onto other actors or territories, often to limit responsibilities and on the assumption that human rights obligations only apply territorially.[19] A recent example of such instruments, relevant to this study, is the adoption of the Screening Regulation, which heavily relies on the legal fiction of non-entry.[20] The latter is a claim that states use in border

17 See in particular Violeta Moreno-Lax, *Accessing Asylum in Europe - Extraterritorial Border Controls and Refugee Rights under EU Law* (Oxford University Press 2017); see also e.g. Gregor Noll, *Negotiating Asylum: The EU Acquis, Extraterritorial Protection and the Common Market of Deflection* (Brill Nijhoff 2000); Thomas Gammeltoft-Hansen, *Access to Asylum: International Refugee Law and the Globalisation of Migration Control* (Cambridge University Press 2011); Raphael Bossong and Helena Carrapico (eds), *EU Borders and Shifting Internal Security: Technology, Externalization and Accountability* (Springer 2016); for newer developments see Salvatore Fabio Nicolosi, 'Externalisation of Migration Controls: A Taxonomy of Practices and Their Implications in International and European Law' (2024) 71 Netherlands International Law Review 1; Violeta Moreno-Lax, 'Meta-Borders and the Rule of Law: From Externalisation to "Responsibilisation" in Systems of Contactless Control' (2024) 71 Netherlands International Law Review 21.

18 Nicolosi, 'Externalisation of Migration Controls: A Taxonomy of Practices and Their Implications in International and European Law' (n 17) 1.

19 ibid 1.

20 Regulation (EU) 2024/1356 of the European Parliament and of the Council of 14 May 2024 Introducing the Screening of Third-Country Nationals and the External Borders 2024 (Screening Regulation), Art. 6; the concept is also mentioned in Regulation (EU) 2024/1348 of the European Parliament and of the Council of 14 May

management to deny the legal arrival of third-country nationals on their territory, regardless of their physical presence, until granted entry by a border or immigration officer. It is usually applied in transit zones at international airports between arrival gates and passport control.[21] The Screening Regulation provides for a health and vulnerability check, an identity check, registration of biometric data, as well as a security check of asylum seekers and third-country nationals in an irregular situation or that do not fulfil EU entry conditions.[22] While these checks take place within EU territory, legally, these persons will not be considered to have entered EU territory.[23] The Screening Regulation is ultimately the implementation of a supranational transit zone based on the legal fiction of non-entry.[24] Certain results of these checks can later be stored in Eurodac and have consequences for the further course of an asylum procedure. In a briefing, the European Parliamentary Research Service warned that the fiction of non-entry may lead to a risk of *refoulement*, as it limits asylum-seekers' movement and access to rights and procedures, including the asylum procedure.[25] This observation is hardly new. It is well documented that externalisation practices may lead to refugees and migrants not only being denied access to asylum; in addition, their right to access justice in general, e.g., the right to an effective legal remedy, is curtailed or completely denied.[26]

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2024 Establishing a Common Procedure for International Protection in the Union [2024] 2024/1348 (Asylum Procedure Regulation), Art. 54(4); for more on this see Lyra Jakuleviciene, 'EU Screening Regulation: Closing Gaps in Border Control While Opening New Protection Challenges?' (*European Law Blog*, 28 June 2024) <https://eumigrationlawblog.eu/eu-screening-regulation-closing-gaps-in-border-control-while-opening-new-protection-challenges/>.

21 Anita Orav and Nefeli Barlaoura, 'Legal Fiction of Non-Entry in EU Asylum Policy' (European Parliamentary Research Service (EPRS) 2024) Briefing PE 760.347, containing references to Member State practices and case law.

22 Screening Regulation, Art 11ff.

23 Kelly Sinderstrom, 'ECRE Commentary: An Analysis of the Fiction of Non-Entry as Appears in the Screening Regulation' (European Council on Refugees and Exiles (ECRE) 2022).

24 ibid; 'ECRE Comments on the Commission Proposal for a Screening Regulation COM(2020)612' (ECRE 2020).

25 Orav and Barlaoura, 'Legal Fiction of Non-Entry in EU Asylum Policy' (n 21).

26 cf e.g. Moreno-Lax, *Accessing Asylum in Europe* (n 17); Evangelia (Lilian) Tsourdi, 'Of Legislative Waves and Case Law: Effective Judicial Protection, Right to an Effective Remedy and Proceduralisation in the EU Asylum Policy' (2019) 12 Review of European Administrative Law 143; David Cantor and others, 'Externalisation, Access to Territorial Asylum, and International Law' (2022) 34 International Journal of Refugee Law 120; Francesca Tammone, 'Challenging Externalization by Means

Second, digitalisation in migration policies runs parallel to externalisation practices. Researchers have shown that datafication expands beyond databases and surveillance technologies to underpin more and more border infrastructures.[27] In recent years, EU lawmakers have grown more confident in their belief of being able to securely build migration information systems capable of processing vast volumes of data, with capacities reaching up to 300,000,000 individual migrant data files.[28] This development is not a phenomenon that can only be observed in the area of migration. Digitalisation has found its way into different areas of administration, such as social welfare, law enforcement, or tax administration.[29] The introduction of digital administration systems, alongside the use of large volumes of data and algorithms, has sparked a broad debate on the legal handling of these innovations.[30] Key issues include defining fairness in the use of algorithms, determining the state's information obligations, identifying which data must be made accessible to individuals, and clarifying how information on algorithmic behaviour should be presented.[31]

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of Article 4 ECHR: Towards New Avenues of Litigation for Victims of Human Trafficking?' (2024) 71 Netherlands International Law Review 89; Annick Pijnenburg, 'Externalisation of Migration Control: Impunity or Accountability for Human Rights Violations?' (2024) 71 Netherlands International Law Review 59.

27 Ana Valdivia, Claudia Aradau, Tobias Blanke, Sarah Perret, 'Neither opaque nor transparent: A transdisciplinary methodology to investigate datafication at the EU borders' (2022) 9(2) Big Data & Society.

28 Chris Jones, 'Data Protection, Immigration Enforcement and Fundamental Rights: What the EU's Regulations on Interoperability Mean for People with Irregular Status' (Statewatch and PICUM 2019) 25.

29 A notorious example of the side effects that the use of algorithms in administration can have is a case from the Netherlands. For three years, the municipality of Rotterdam used a discriminatory algorithm to profile people and 'predict' social welfare fraud. The fraud investigations led to people having their benefits wrongfully reduced (see 'How Dutch Activists Got an Invasive Fraud Detection Algorithm Banned' (*Algorithm Watch*, 6 April 2020) <https://algorithmwatch.org/en/syri-netherlands-algorithm/>; Gabriel Geiger and Eva Constantaras, 'Suspicion Machines - Unprecedented Experiment on Welfare Surveillance Algorithm Reveals Discrimination' (*Lighthouse Reports*, 6 March 2023) <https://www.lighthousereports.com/investigation/suspicion-machines/>; Melissa Heikkilä, 'AI: Decoded: A Dutch Algorithm Scandal Serves a Warning to Europe — The AI Act Won't Save Us' *Politico* (30 March 2022) <https://www.politico.eu/newsletter/ai-decoded/a-dutch-algorithm-scandal-serves-a-warning-to-europe-the-ai-act-wont-save-us-2/>.

30 cf Mirko Forti, 'Addressing Algorithmic Errors in Data-Driven Border Control Procedures' (2024) 25 German Law Journal 635.

31 ibid; see also Yoan Hermstrüwer, 'Fairnessprinzipien der algorithmischen Verwaltung' (2020) 145 Archiv des öffentlichen Rechts 479; Stephan Grimmelikhuijsen,

Still, digitalisation has been driven forward strongly in the area of migration.[32] 'Smart borders' and 'migration technology' are terms used by the EU to describe policies that are intended to suggest security and deterrence.[33] The EU promised "stronger and smarter information systems for borders and security" and introduced several pieces of legislation, which regulate Schengen border crossings.[34] The information systems that were thus developed will be described in more detail further on. In addition to the development of such individual systems, interoperability, i.e., the linking of different information systems from the areas of migration and security, is a core aspiration of the digitalisation process in migration law. Data flows and communication that take place across borders but also across systems – a vision that will be further analysed in the next section.

The use of biometric data, e.g., facial images and fingerprints collected under the Eurodac Regulation, has become a particularly popular tool in

'Explaining Why the Computer Says No: Algorithmic Transparency Affects the Perceived Trustworthiness of Automated Decision-Making' (2023) 83 Public Administration Review 241.

32 Philippe Bonditti, 'From Territorial Space to Networks: A Foucaldian Approach to the Implementation of Biometry' (2004) 29 Alternatives 465; Dennis Broeders and James Hampshire, 'Dreaming of Seamless Borders: ICTs and the Pre-Emptive Governance of Mobility in Europe' (2013) 39 Journal of Ethnic and Migration Studies 1201; Georgios Glouftsios and Stephan Scheel, 'An Inquiry into the Digitisation of Border and Migration Management: Performativity, Contestation and Heterogeneous Engineering' (2021) 42 Third World Quarterly 123; Marie McAuliffe, 'International Migration and Digital Technology: An Overview' in Marie McAuliffe (ed), *Research Handbook on International Migration and Digital Technology* (Edward Elgar Publishing 2021).

33 See 'Smart Borders Package: Questions & Answers' (*European Commission*, 6 April 2016) at <https://ec.europa.eu/commission/presscorner/detail/en/MEMO_16_1249>; 'Smart Borders' (*European Commission - Migration and Home Affairs*) at <https://home-affairs.ec.europa.eu/policies/schengen-borders-and-visa/smart-borders_en>. These developments have also been a field of illuminating and important sociological, political science and legal research: e.g. Huub Dijstelbloem, Albert Meijer and Michiel Besters, 'The Migration Machine' in Huub Dijstelbloem and Albert Meijer (eds), *Migration and the New Technological Borders of Europe* (Palgrave Macmillan UK 2011); Frans WA Brom and Michiel Besters, '"Greedy" Information Technology: The Digitalization of the European Migration Policy' (2010) 12 European Journal of Migration and Law 455; Evelien Brouwer, *Digital Borders and Real Rights: Effective Remedies for Third-Country Nationals in the Schengen Information System* (Martinus Nijhoff 2008); Matthias Leese, Simon Noori and Stephan Scheel, 'Data Matters: The Politics and Practices of Digital Border and Migration Management' (2022) 27 Geopolitics 5.

34 See 'Smart Borders Package: Questions & Answers' (n 33).

the area of migration. Biometric data are regarded as a fast and reliable way of identifying people, although studies show that this conviction is not entirely justified.[35] It should be mentioned that the use of biometrics in the area of migration is not a European specialty. The United Nations High Commissioner for Refugees (UNHCR), for example, has used iris scans to enable refugees to access cash grants.[36] Also, self-sovereign identity systems using biometrics have been gaining traction in the discourses of policymakers, researchers and practitioners working in migration and aid management.[37]

The digitisation and use of biometric data is certainly driven by the fact that migration and asylum require mass administration; depending on the country, dozens or hundreds of applications must be processed, and people 'managed' every day. Instruments that speed up such processes are therefore desirable. However, critical voices emphasise that this is not the only reason for the rapid development. Many of the most controversial systems, such as biometrics, population databases, 'terrorist' profiling, travel surveillance and so on, have been (and are still being) 'tested' on migrants and refugees or otherwise legitimised at the border.[38] It has been claimed that "acquiescence to these controls and indifference to the suffering of migrants and refugees at the hands of 'Fortress Europe' has paved the way for their use in domestic security scenarios".[39] The EU and its Member States consider the migration context as an ideal laboratory to experiment on technological solutions without considering the effects that

35 For more on biometric data see Els J Kindt, *Privacy and Data Protection Issues of Biometric Applications: A Comparative Legal Analysis* (Springer Netherlands 2013); and especially in the context of EU information systems: Matthias Leese and Vanessa Ugolini, 'Politics of Creep: Latent Development, Technology Monitoring, and the Evolution of the Schengen Information System' (2024) European Journal of International Security 1; Matthias Leese and Silvan Pollozek, 'Not so Fast! Data Temporalities in Law Enforcement and Border Control' (2023) 10, Big Data & Society; Matthias Leese, 'Fixing State Vision: Interoperability, Biometrics, and Identity Management in the EU' (2020) 27 Geopolitics 113.

36 Charlie Dunmore, 'Iris Scan System Provides Cash Lifeline to Syrian Refugees in Jordan' *UNHCR* (Amman, Jordan, 23 March 2015).

37 Margie Cheesman, 'Self-Sovereignty for Refugees? The Contested Horizons of Digital Identity' (2022) 27(1) Geopolitics 134.

38 Ben Hayes, 'NeoConOpticon - The EU Security-Industrial Complex' (Statewatch and the Transnational Institute 2009); see further Liz Fekete, *A Suitable Enemy: Racism, Migration and Islamophobia in Europe* (Pluto Press 2009).

39 Hayes (n 38).

such technologies have on people on the move.[40] Testament to this may be the fact that according to Art. 4(2) Eurodac Regulation, eu-LISA can, in certain cases "use real personal data from the Eurodac production system for testing purposes". Legislators have greater flexibility when enacting laws, such as the Eurodac and Interoperability Regulations, that apply to individuals who cannot participate in the legislative process. "The politics of migration management do not happen after knowledge about migration has been produced. They happen in and through the data practices that are mobilised to know (and enact) migration as an actionable reality."[41]

Third, with the increase in technical possibilities, the conviction that technical progress brings with it a high degree of security prevailed.[42] In the minds of EU lawmakers, migration is closely linked to security risks, resulting in an increasing overlap between migration and security concerns in legal frameworks. A trend in this direction was already described in the 1990s, pointing out that concerns related to crime control are increasingly prevalent in migration law and that more and more criminal law objectives are being pursued.[43] A recent example that illustrates the amplification of this premise can be found in a discussion paper by the Council of the European Union, which wrote in 2024: "It is important to gain a full administrative picture of any person who intends to stay on European territory, whether for the short term or long term, if there are doubts about whether they represent a threat." The paper continues: "[…] the Presidency deems it necessary to extend the scope of the discussions on information exchange between counter-terrorism authorities, on the one hand, and immigration and asylum authorities, on the other hand, to also cover information regarding individuals who do not or no longer have a

40 Petra Molnar, 'Technology on the margins: AI and global migration management from a human rights perspective' (2019) 8(2) Cambridge International Law Journal 305.

41 Scheel Stephan, Ruppert Evelyn, Ustek-Spilda Funda, 'Enacting migration through data practices' (2019) 37(4) Environment and Planning D: Society and Space 582.

42 Philip Hanke and Daniela Vitiello, 'High-Tech Migration Control in the EU and Beyond: The Legal Challenges of "Enhanced Interoperability"' in Elena Carpanelli and Nicole Lazzerini (eds), *Use and Misuse of New Technologies: Contemporary Challenges in International and European Law* (Springer International Publishing 2019); Sergio Carrera, Elspeth Guild and Alejandro Eggenschwiler, 'Informing the Borders Debate' (Centre for European Policy Studies 2009).

43 Didier Bigo, *Polices en réseaux. L'expérience européenne* (Presses de Sciences Po 1996); a later example that describes this nexus is e.g.: Valsamis Mitsilegas, *The Criminalisation of Migration in Europe: Challenges for Human Rights and the Rule of Law* (1st edn, Springer Cham 2015).

right to stay and who pose a security threat."[44] This objective is clearly visible in the new Eurodac system, which has been developed into a much more security-oriented instrument as a result of the legislative reform. The Eurodac's "platform architecture enables surveillant outcomes, making it possible for national police authorities to access asylum seeker records and make decisions based on these".[45]

## *II. A Vision: Interoperability and Automated Digital Identities*

This background has contributed to the emergence of a particular vision in EU migration law: the development of highly digitised systems capable of automatically screening and assessing all individuals before entering the EU or the Schengen area. Systems that are intended to generate information not only regarding an individual's immigration status, but also to assess whether they may pose a potential threat to the security of the Union. To enable this vision, millions of individual data profiles are to be created on the basis of biometric and biographical data and then stored in several large-scale databases that are being interconnected.

The legal foundation for this development lies, on the one hand, in the adoption of legislation expanding three existing databases: Eurodac, the Visa Information System (VIS),[46] storing data on visa applications and decisions, and the Schengen Information System (SIS)[47] which includes

44 6146/24 from Presidency, Council of the European Union, 'Information Exchange between Counter-Terrorism Authorities and Immigration and Asylum Authorities – Discussion Paper' (19 February 2024).

45 Silvia Masiero, 'Digital identity as platform-mediated Surveillance' (2023) 10(1) Big Data & Society 3.

46 Regulation (EC) No 767/2008 of the European Parliament and of the Council of 9 July 2008 concerning the Visa Information System (VIS) and the exchange of data between Member States on short-stay visas (VIS Regulation); see Georgios Glouftsios, Engineering Digitised Borders: Designing and Managing the Visa Information System (Palgrave Macmillan Singapore 2021).

47 Regulation (EU) 2018/1860 of the European Parliament and of the Council of 28 November 2018 on the Use of the Schengen Information System (SIS) for the Return of Illegally Staying Third-Country Nationals [2018] OJ L312/1 (SIS III - Return Regulation); Regulation (EU) 2018/1861 of the European Parliament and of the Council of 28 November 2018 on the establishment, operation and use of the Schengen Information System (SIS) in the field of border checks, and amending the Convention implementing the Schengen Agreement, and amending and repealing Regulation (EC) No 1987/2006 (SIS III - Borders Regulation); Regulation (EU) 2018/1862 of the European Parliament and of the Council of 28 November 2018 on the Establishment,

alerts concerning individuals and objects for law enforcement, judicial cooperation, returns, entry bans and more. On the other, it lies in the creation of three new systems. The Entry/Exit System (EES)[48] automatically detects overstayers and sends lists of them to national authorities to take further action; the European Travel Information and Authorisation System (ETIAS)[49] carries out security, immigration, and health checks on visa-exempt travellers and is the only system not holding biometric data; and the European Criminal Records Information System for Third-Country Nationals (ECRIS-TCN),[50] a criminal records database aimed at simplifying the process of finding criminal convictions handed down against non-EU nationals in another Member State. This architecture is supposed to be made interoperable through the Interoperability Regulations, which entered into force in May 2019 and enable communication and data exchange across all six systems, while also allowing for connections with relevant Europol and Interpol datasets.[51]

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Operation and use of the Schengen Information System (SIS) in the Field of Police Cooperation and Judicial Cooperation in Criminal Matters [2018] OJ L312/56 (SIS III - Police Regulation); see also Brouwer, *Digital Borders and Real Rights: Effective Remedies for Third-Country Nationals in the Schengen Information System* (n 33); Leese and Ugolini, 'Politics of creep: Latent development, technology monitoring, and the evolution of the Schengen Information System' (n 35); Joanna Parkin, 'Difficult Road to the Schengen Information System II: The Legacy of "laboratories" and the Cost for Fundamental Rights and the Rule of Law' (Centre for European Policy Studies 2011).

48 Regulation (EU) 2017/2226 of the European Parliament and of the Council of 30 November 2017 establishing an Entry/Exit System (EES) to Register Entry and Exit Data and Refusal of Entry Data of Third-Country Nationals Crossing the External Borders of the Member States and Determining the Conditions for Access to the EES for Law Enforcement Purposes [2017] OJ L327/20 (EES Regulation).

49 Regulation (EU) 2018/1240 of the European Parliament and of the Council of 12 September 2018 Establishing a European Travel Information and Authorisation System (ETIAS) [2018] OJ L236/1 (ETIAS Regulation).

50 Regulation (EU) 2019/816 of the European Parliament and of the Council of 17 April 2019 Establishing a Centralised System for the Identification of Member States Holding Conviction Information on Third-Party Nationals and Stateless Persons [2019] OJ L135/1 (ECRIS-TCN Regulation).

51 Regulation (EU) 2019/818 of the European Parliament and of the Council of 20 May 2019 on Establishing a Framework for Interoperability Between EU Information Systems in the Field of Police and Judicial Cooperation, Asylum and Migration [2019] OJ L135/85 (Interoperability Regulation - Judicial Cooperation) and Regulation (EU) 2019/817 of the European Parliament and of the Council of 20 May 2019 on Establishing a Framework for Interoperability between EU Information Systems in the Field

A structure like these interoperable information systems was unthinkable in the EU for a long time. In 2010, a European Commission paper remarked: "A single, overarching EU information system with multiple purposes would deliver the highest degree of information sharing. Creating such a system would, however, constitute a gross and illegitimate restriction of individuals' right to privacy and data protection and pose huge challenges in terms of development and operation. […]. The compartmentalised structure of information management that has emerged over recent decades is more conducive to safeguarding citizens' right to privacy than any centralised alternative."[52] This "compartmentalised structure of information management", originally developed to uphold data protection principles, has been increasingly dismantled in the field of migration governance as evidenced by the Interoperability Regulations.

The trajectory that instead emerges is one of automated digital identities, where biometric and biographical data feed into interconnected systems designed to continuously monitor, assess, and categorise third-country nationals. While EU citizens exercising free movement are understood as exercising a right to mobility, third-country nationals are treated as *migrants* – a category constructed as problematic and in need of regulation and control.[53] The development of interoperability reinforces this divide by embedding third-country nationals into systems of automated surveillance and risk analysis, thereby aligning their legal status with security objectives.

From a computer science perspective, database interoperability responds to users' need for "shared access across […] multiple autonomous databases".[54] Yet as legal scholars have emphasised, interoperability in the EU context is far from a neutral technical solution; it is an inherently political process.[55] The EU's ambition to achieve interoperability not only facilitates

of Borders and Visa and Amending Regulations [2019] OJ L135/27 (Interoperability Regulation - Borders).

52 European Commission, 'Communication from the Commission to the European Parliament and the Council of 20 July 2010 – Overview of Information Management in the Area of Freedom, Security and Justice' (2010) COM(2010)385 final.

53 Guild 'Promoting the European way of life: Migration and asylum in the EU' 356 f (n 1).

54 Litwin Witold, Mark Leo, Roussopoulos Nick, 'Interoperability of multiple autonomous databases' (1990) 22(3) ACM Computing Surveys 268.

55 Paul De Hert, Serge Gutwirth 'Interoperability of Police Satabases Within the EU' (2006) 20(1-2) International Review of Law, Computers & Technology 21ff; Filipe Brito Bastos and Deirdre Curtin 'Interoperable Information Sharing and the Five Novel Frontiers of EU Governance' (2020) 26 European Public Law 59ff.

information exchange but also reconfigures the very infrastructure through which European security integration is enacted. Databases become central instruments of governance,[56] shaping how societies define and manage mobility and threat.

This process is underpinned by the construction of digital identities – legible, datafied representations of individuals – through registration and identification procedures. Migrants and asylum seekers often arrive without documents or with incomplete records. In such cases, biometric systems may allow authorities to identify them, particularly when prior entries in EU databases exist, for instance from previous visa applications. As Advocate General Sharpston observed in the Court of Justice of the European Union's (CJEU) case Zh. and O., individuals fleeing persecution may deliberately avoid being identified or be physically unable to carry documents,[57] highlighting both the complexity and the necessity of biometric identification systems. While such technologies may support asylum procedures by facilitating identification, they also create dense layers of datafication and surveillance, transforming bodily presence into a persistent digital trace.

This dual nature of being "seen" through data is captured by the concept of alterity processing.[58] Registration not only identifies individuals but also renders them intelligible to European bureaucratic and political structures – as migrants, asylum seekers, or potential threats. Through these administrative and technological infrastructures, individuals previously unknown to the state are produced as "European-legible" subjects.[59] Yet this process is never neutral. Digital identity systems may only contribute to the protection of human rights if their design actively mitigates risks of discrimination and ensures high standards of privacy and data protection.[60]

Moreover, datafication is not limited to recording factual information. It transforms actions, appearances, and even absences – such as a missing fingerprint – into data points processed by algorithmic logic.[61] This trans-

56 Rocco Bellanova, Georgios Glouftsios 'Formatting European Security Integration Through Database Interoperability' (2022) 31(3) European Security 457.

57 Case C- 554/13 *Zh. and O. v* Staatssecretaris *van Veiligheid en Justitie* [2015], Opinion of Advocate General Sharpston, para 63.

58 Annalisa Pelizza 'Processing Alterity, Enacting Europe: Migrant Registration and Identification as Co-construction of Individuals and Polities' (2020) 45(2) Science, Technology, & Human Values 262ff.

59 ibid.

60 Ana Beduschi 'Digital identity: Contemporary challenges for data protection, privacy and non-discrimination rights' (2019) 6(2) Big Data & Society 1f.

61 Catherine D'Ignazio and Lauren F Klein *Data Feminism* (MIT Press 2020) 12f.

formation contributes to what has been described as the automation and intensification of historical practices of categorisation and control.[62] For instance, in the hotspot at Moria, the rigid design of the Eurodac application prevented the registration of individuals with missing fingers, revealing how technical infrastructures can enforce exclusion in subtle but significant ways.[63]

Ultimately, the interoperability architecture enables more than administrative efficiency. It institutionalises a vision of migration management that is proactive, risk-oriented, and reliant on continuous data circulation across national and supranational actors. Systems like the Common Repository for Reporting and Statistics (CRRS) are expected to apply AI techniques to analyse and draw inferences from data, moving beyond mere storage toward predictive modelling.[64] Yet such ambitions raise serious concerns about legality and transparency.

The emergence of interoperability and automated digital identities reflects a paradigmatic shift in EU migration governance. It is a shift from reactive procedures to anticipatory systems; from rights-based individual assessments to categorisation by algorithm; and from siloed national practices and databases to a supranational data infrastructure. While such systems may improve certain aspects of migration management, they also fundamentally reconfigure the legal, technological, and political boundaries of mobility, belonging, and surveillance in contemporary Europe.

This broader context must be borne in mind in the legal analysis provided by this study. The increasing complexity and opaqueness of EU information systems risk curtailing the ability of migrants to exercise their fundamental rights. It is therefore essential to critically examine the legal safeguards in place – particularly the rights to information, access, rectification, and effective remedy – in order to assess whether individuals subject

62 Sofie Flensburg and Stine Lomborg 'Datafication research: Mapping the field for a future agenda' (2021) 25(6) New Media & Society 1452.

63 Silvan Pollozek and Jan Hendrik Passoth 'Infrastructuring European Migration and Border Control: The Logistics of Registration and Identification at Moria Hotspot' (2019) 37(4) Environment and Planning D Society and Space 616.

64 cf Niovi Vavoula, 'Regulating AI at Europe's Borders Where the AI Act Falls Short' (*Verfassungsblog* 13 December 2024) <https://verfassungsblog.de/regulating-ai-at-europes-borders/>; Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence [2024] (AI Act); cf also Leese Matthias 'Between control and empowerment: Data quality in border and migration management' (2024) No. 4 CURATE Working Paper 4.

to these systems are afforded meaningful control over their personal data and legal status. However, what also should be acknowledged is that the notion of seamless interoperability and fully operational (automated) information systems remains, at present, a vision. The implementation of the aforementioned databases, in particular EES and ETIAS, has been repeatedly postponed[65] and interoperability as envisioned by the Interoperability Regulations exists, thus far, in principle rather than in practice.

### *III. Research Questions and Structure*

Over the past decade, EU information systems have been a major focus of research for many authors. They have analysed individual operational systems like the SIS[66] and the VIS,[67] as well as those still in development, such as the ETIAS[68] and EES.[69] Additionally, some have produced comprehensive studies that examine all these systems and their interconnections.[70] In recent years, the topic of interoperability has garnered significant attention, resulting in a wealth of insightful and valuable articles and studies on the

65 'EU officially postpones ETIAS and EES' (*Visanews*, 7 March 2025) <https://visasnews.com/en/eu-officially-postpones-etias-and-ees/>.

66 Brouwer *Digital Borders and Real Rights. Effective Remedies for Third-Country Nationals in the Schengen Information System* (n 33); Bellanova Rocco & Glouftsios Georgios, 'Controlling the Schengen Information System (SIS II): The Infrastructural Politics of Fragility and Maintenance' (2020) 27(1) Geopolitics 160–184.

67 Georgios Glouftsios 'Designing Digital Borders. The Visa Information System (VIS)', in Marijn Hoijtink, Matthias Leese (eds) *Technology and Agency in International Relations* (Routledge 2019).

68 Niovi Vavoula, '(Discriminatory) Algorithmic Profiling and Ineffective Remedies: The Cases of ETIAS and VIS' [2023] Schweizerische Zeitschrift für Asylrecht und -praxis 13; Amanda Musco Eklund, 'Rule of Law Challenges of "Algorithmic Discretion" & Automation in EU Border Control: A Case Study of ETIAS Through the Lens of Legality' (2023) 25 European Journal of Migration and Law 249; Derave Charly, Genicot Nathan, Hetmanska Nina 'The Risks of Trustworthy Artificial Intelligence: The Case of the European Travel Information and Authorisation System' (2022) 13(3) European Journal of Risk Regulation 389-420.

69 Anita Orav and Alessandro D'Alfonso, 'Smart Borders: EU Entry/Exit System' (EPRS 2018) PE 586.614; Antoni Napieralski, 'Collecting Data at EU Smart Borders: Data Protection Challenges of the New Entry/Exit System' (2019) 2019 Zeitschrift für Kritik | Recht | Gesellschaft 199.

70 Vavoula, *Immigration and Privacy in the Law of the European Union* (n 4); European Union Agency for Fundamental Rights (FRA), 'Under Watchful Eyes: Biometrics, EU IT Systems and Fundamental Rights' (2018).

subject.[71] This study seeks to contribute to the existing body of scholarship by examining a specific information system – Eurodac – which has thus far received comparatively limited academic attention.[72] It also examines the planned interoperability of the Eurodac system, situating it within the broader framework of interconnected EU information systems.

A significant portion of the existing literature on EU information systems and interoperability concentrates on issues related to the right to privacy, which constitutes a fundamental safeguard in this context. Scholars have argued that the purposes for which data are processed, along with the scope and duration of data retention under interoperability frameworks, may exceed the legitimate interests pursued by the EU.[73] Such developments risk infringing upon the right to privacy and undermining key data protec-

71 See e.g. Curtin and Bastos, 'Interoperable Information Sharing and the Five Novel Frontiers of EU Governance: A Special Issue' (n 55); Quintel Teresa, 'Connecting Personal Data of Third-Country Nationals: Interoperability of EU Databases in the Light of the CJEU's Case Law on Data Retention' [2018] SSRN Electronic Journal; Cristina Blasi Casagran, 'Fundamental Rights Implications of Interconnecting Migration and Policing Databases in the EU' (2021) 21 Human Rights Law Review 433; Didier Bigo, Lina Ewert and Elif Mendoz Kuşkonmaz, 'The Interoperability Controversy or How to Fail Successfully: Lessons from Europe' (2020) 6 International Journal of Migration and Border Studies 93; Sarah Progin-Theuerkauf, Margarete Zoeteweij-Turhan and Ozan Turhan, 'Interoperabilität der Informationssysteme im Migrationsbereich – Digitale Grenzkontrollen 2019', *Jahrbuch für Migrationsrecht 2018/2019* (2019); Jones, 'Data Protection, Immigration Enforcement and Fundamental Rights' (n 28); 'Reflection Paper on the Interoperability of Information Systems in the Area of Freedom, Security and Justice' (European Data Protection Supervisor (EDPS) 2017); FRA, 'Interoperability and Fundamental Rights Implications: Opinion of the European Union Agency for Fundamental Right' (2018) FRA Opinion 1/2018; Mirja Gutheil, Quentin Liger and James Eager, 'Interoperability of Justice and Home Affairs Information Systems' (EU Parliament, LIBE Committee 2018) Study PE 604.947.

72 There is some research on older Eurodac versions e.g. Christian Schmid, *Eurodac-Verordnung: Europäisches System zur Identifizierung von Fingerabdrücken* (1st edn, Neuer Wissenschaftlicher Verlag 2003); Benedita Menezes Queiroz, 'The Impact of EURODAC in EU Migration Law: The Era of Crimmigration?' (2019) 3 Market and Competition Law Review; the literature also consists of research from the field of political science: Irma van der Ploeg, 'The Illegal Body: 'Eurodac' and the Politics of Biometric Identification' (1999) 1 Ethics and Information Technology 295.

73 See Vavoula, *Immigration and Privacy in the Law of the European Union* (n 4); Aden Hartmut, 'Interoperability Between EU Policing and Migration Databases: Risks for Privacy' (2020) 26 European Public Law 93ff; Francesca Galli, 'Interoperable Databases: New Cooperation Dynamics in the EU AFSJ?' (2020) 26 European Public Law 109; Evelien Brouwer, 'Large-Scale Databases and Interoperability in Migration and Border Policies: The Non- Discriminatory Approach of Data Protection' (2020) 26 European Public Law 71.

tion principles, including proportionality and data minimisation. Once the scope of an information system has been cast in law, it is difficult for a data subject to argue the disproportionate nature of a purpose or certain data collected. With this premise in mind, this study is dedicated to another central right: access to justice. The latter is understood, in this study, as a right based on human dignity that encompasses various, primarily procedural but also substantive rights. The study examines four 'access to justice rights' that are particularly relevant in the context of information systems: the right to information, the right of access to personal data and information, the right to rectification and erasure of data and information, as well as the right to an effective remedy.

The access to justice analysis is, moreover, concerned with the practical effectiveness of rights. That is, it considers not only whether a right exists in law but also whether individuals affected by a potential rights violation are in a position to effectively exercise and enforce that right. In this context, the study also takes into account that the legal instruments under examination – part of the Schengen/Dublin *acquis* – are applied not only within EU Member States but also in Schengen/Dublin-associated third countries, and efforts are ongoing to effectively connect countries beyond the Schengen Area to the system. (At the same time, it should be noted that not all EU Member States participate fully in the Schengen/Dublin *acquis*).[74]

This study is structured into six parts, comprising the present introduction (A), a concluding section (F), and four main substantive parts (B to E), each consisting of several chapters. Part B lays the conceptual and doctrinal foundations of the analysis. It seeks to clarify the notion of 'access to justice' as employed in this study, drawing on both legal-philosophical and dogmatic perspectives. Part C provides an overview of the key features of the relevant legal instruments, focusing in particular on the new Eurodac Regulation (Regulation (EU) 2024/1358 of 14 May 2024), as well as the two Interoperability Regulations (Regulations (EU) 2019/818 and 2019/817 of 20 May 2019). The analysis primarily refers to the former of these two Interoperability Regulations, as it specifically governs the interoperability of Eurodac. Accordingly, references to the "Interoperability Regulation" in the singular should be understood to refer to Regulation (EU) 2019/818. The central part of the study, Part D, undertakes a detailed examination of four specific 'access rights': the right to information; the right of access to data and information; the right to rectification and erasure of data and in-

74 See chapter: Schengen/Dublin-Associated Countries: The Case of Switzerland.

formation; and the right to an effective remedy. Part E extends the analysis beyond the borders of the EU. It examines the application of the Eurodac and Interoperability Regulations in Switzerland, as a Schengen/Dublin-associated state, and also considers emerging developments and practices beyond the Schengen Area – particularly in the Western Balkans, conceptualised in this study under the term 'Balkandac'.

## *IV. Method*

This study employs information from publicly available sources, including some national and bilateral laws, international and EU legislation, jurisprudence and legal in addition to non-legal publications. At the heart of this research is the analysis of secondary EU law, the Eurodac Regulation 2024/1358 (Eurodac Regulation), and the Interoperability Regulation 2019/818 (Interoperability Regulation). These regulations are, in the case of Eurodac, very new and, in the case of Interoperability, relatively new. Both systems have not yet been implemented in their current form; they are not operational. This leads to a lack of case law that specifically deals with the regulations analysed in this study. Accordingly, due attention is paid to the views expressed by relevant EU bodies, such as the European Data Protection Supervisor (EDPS) and the EU Agency for Fundamental Rights (FRA). Furthermore, especially in the context of Eurodac, the proposals of 2016 and 2021 supplement the analysis of the current law. Further documents of the Parliament, the Commission, and the Council are considered. In addition, various studies by non-governmental organisations are evaluated. The reflections of legal scholars, philosophers, political scientists, sociologists, and information scientists have informed and enriched the study. Court of Justice of the European Union (CJEU) and European Court of Human Rights (ECtHR) case law is used to better understand and interpret the rights examined in this research. Finally, for the right to information, the right of access to and rectification as well as erasure of data and information, an attempt was made to provide an insight into the national case law of the EU and Schengen/Dublin-associated countries, using case-law databases and literature.

## V. Limitations

This study is limited in two key respects: the range of rights examined, and the scope of case law considered. As noted previously and further detailed in the chapter on access to justice, the study adopts a broad understanding of access to justice that encompasses multiple rights, not all of which are addressed here. For instance, the right to legal advice and representation, understood as a core concern of access to justice, is not explored in this analysis. This is due to the fact that it is not included in the Eurodac and Interoperability Regulations. Accordingly, such rights would need to be examined within the framework of national law or other EU instruments, such as the AMMR or the Return Directive,[75] which falls outside the scope of this study. The selection of rights examined thus derives from the Eurodac and Interoperability Regulations themselves, as well as from the necessary delimitation of this study's scope due to time and resource constraints.

An additional limitation pertains to case law. As noted, the regulations under analysis have not yet been implemented, and consequently, no case law exists specifically concerning them. However, relevant case law relating to earlier versions of the Eurodac Regulation has been incorporated into this study. It was not feasible to provide a comprehensive overview of national case law concerning Eurodac-related issues. Offering a detailed examination of the European legal landscape would have exceeded the scope of this study and necessitated a more extensive analysis of individual national legal systems. Accordingly, the study does not offer a comprehensive overview of national case law but rather provides selected examples to illustrate how specific legal issues are addressed.

While this study aims to offer valuable insights, many areas remain open for further investigation. Notably, the complex interplay between security and migration represents a particularly fertile ground for deeper analysis. Additionally, the technical aspects and challenges of data processing, the use of algorithms and AI present promising avenues for future research. With the Eurodac and interoperability systems poised to become

75 Directive 2008/115/EC of the European Parliament and of the Council of 16 December 2008 on Common Standards and Procedures in Member States for Returning Illegally Staying Third-Country Nationals [2008] OJ L384/98 (Return Directive). The Return Directive is supposed to be replaced. In March 2025 the European Commission adopted the Proposal for a Regulation of the European Parliament and of the Council establishing a common system for the return of third-country nationals staying illegally in the Union, COM/2025/101 final (Proposal Return Regulation).

fully operational in the coming years, there is significant potential to study their application, practical implementation, and impacts. It is anticipated that subsequent studies will address these issues, thereby enhancing our understanding and informing the development of more effective policies and practices.