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"Imagining, Enacting, and Justifying Future Borders. The eu-LISA Agency and the Digital Transformation of the Border Regime"

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List of Abbreviations and Acronyms

Organizational entities

EC	European Commission
EDPS	European Data Protection Supervisor
EP	European Parliament
EU	European Union
EUAA	European Union Agency for Asylum, formerly European Asylum Support Office (formerly EASO, until February 19, 2022)
eu-LISA	European Union Agency for the Operational Management of Large-Scale IT Systems in the Area of Freedom, Security and Justice
EUROPOL	European Union Agency for Law Enforcement Cooperation
FRA	Fundamental Rights Agency
Frontex	European Border and Coast Guard Agency (frontières extérieures)
HLEG	High-level Expert Group on Information Systems and Interoperability
INTERPOL	International Criminal Police Organization
LIBE	Committee of the European Parliament on Civil Liberties, Justice and Home Affairs
OSCE	Organization for Security and Co-operation in Europe

Information systems and technological components

ECRIS-TCN	European Criminal Record Information System for Third-Country Nationals
EES	Entry/Exit System
ETIAS	European Travel Information and Authorisation System
Eurodac	European Dactyloscopic database
RTP	Registered Traveler Program
SIS	Schengen Information System
SIS II	Schengen Information System – "second generation"
VIS	Visa Information System

sBMS   shared Biometric Matching Service (Interoperability component)

CIR   Common Identity Repository (Interoperability component)

ESP   European Search Portal (Interoperability component)

MID   Multiple Identity Detector (Interoperability component)

Introduction

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Any traveler who enters or transits through Europe today will encounter multiple sociotechnical infrastructures that regulate their mobility. Infrastructures prevent, facilitate, or arrest movement; they shape its form, direction, and speed. They formalize and sometimes create some of the most commonly used terms to describe mobile people and categories of belonging—*citizens*, *third-country nationals*, *immigrants*, *refugees*, *tourists*, or *bona fide travelers*. As hybrid networks of people, technologies, regulations, and standards, infrastructures determine what kinds of mobility are considered legitimate or illegitimate, regular or irregular, legal or illegal.

Infrastructures are often said to operate in the invisible background (Star and Ruhleder 1996), but they can also perform collective visions, values, social life, and order. Their design and construction often display governmental powers, such as the capacity for grand planning, organizing public space, or safeguarding security. Infrastructures have therefore been ascribed a constitutive role in the formation of states and European communities—in whichever ways the term *Europe* signifies the different legal, political, or social compositions on the continent (Easterling 2014; Opitz and Tellmann 2015a; Schipper and Schot 2011).

In the European Union (EU), Schengen member states and Schengen associated countries have constructed digital infrastructures to collaborate with each other on the governance of mobility. One of the most salient ways this is pursued is through the *buildup and maintenance of large-scale databases* in the EU border regime. Member states' national authorities not only share and process data and information with each other; they also agreed to

establish a joint institution for administering and developing these information systems—the *eu-LISA* agency.[1]

This thesis explores the sites, projects, and activities of eu-LISA and its management of large-scale databases in the Schengen Area. It is concerned with how collective visions of border (in)security govern the digital border infrastructure in Europe.[2] The thesis therefore begins with a notable statement from eu-LISA's director Krum Garkov that appeared in one of the agency's official brochures. Garkov stated,

> The internal security of countries is changing enormously. Guaranteeing their security and that of their people can no longer just be done through physical resources on the ground. The 'virtual world' of IT is now part of the equation, as authorities are increasingly reliant on data and information.

Furthermore, he continued,

> In today's complex and globalised world, a single state cannot look after its security alone. Hence the importance of sophisticated, flexible and integrated IT systems and

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[1] eu-LISA is the official acronym of the *European Union Agency for the Operational Management of Large-Scale IT Systems in the Area of Freedom, Security and Justice*.

[2] The term *Europe* can be understood in various social, geographical, regional, political, or cultural ways. Whenever I refer to *Europe* in this thesis, it will reference the political constitution of Schengen Europe and the borders of the EU as I seek to understand how these formations shape mobility and migration on the continent. I also use *European* or *EU border regime* when referring to the actors, infrastructures, and practices involved in the *bordering* of Europe. *Border regimes*, as conceptualized by most scholars in critical migration and border studies, always emphasize the multiple (and often conflicting) interests, actors, institutions, practices, legal regulations, discourses, migratory movements, and material technologies that construct and shape borders. A *regime* denotes a partial and fragmented field that involves numerous human and nonhuman elements (see, e.g., Casas-Cortes et al. 2015; Eule, Loher, and Wyss 2018; Papadopoulos, Stephenson, and Tsianos 2008; Tsianos and Karakayali 2010).

solutions – designed to enable law enforcement cooperation and integrated border management at EU-Level.

(eu-LISA 2014, 1)

This statement contains three interrelated assumptions. The first assumption holds that we live in a "complex and globalised world" that produces transnational threats and insecurities that single nation-states cannot cope with on their own. The very concept of the "internal security of countries" has changed, according to Garkov, and it can no longer be safeguarded within the traditional boundaries of the state.

The second implicit assumption concerns the heterogeneous and dispersed character of borders today. Garkov's recognition of a complex, globalized world—as well as its patterns of global mobility—undermines our traditional imagination of the modern state, which controls its territory and population within well-defined geographical boundaries. Contemporary borders can no longer be safeguarded by "physical resources on the ground." States have been forced to rethink borders and security—internally, externally, nationally, and intergovernmentally. It brings to mind what Mezzadra and Neilson (2013) accurately describe as the *proliferation of borders* in our globalized world.

Yet Garkov offers a solution—crystallized in the notion of a novel "virtual world" in which law enforcement and border management increasingly require "data and information" and rely on "sophisticated, flexible and integrated IT systems and solutions." This virtual world—also presented as a quasi-unavoidable development—must restore today's seemingly fragile constitution of state security. Data and information must become "part of the equation"—a phrase that articulates the ideal of an equilibrium, imagined and instituted once adequate solutions to the complex threats and challenges of our modern world are applied.

Garkov's statement implicitly wonders how borders can be operated, mobility governed, and security safeguarded in the future if not through the virtual world of information technology.

His statement thus illustrates how imagined orders (and disorders) cannot be separated from the future(s) promised by digital technologies and emerging infrastructures. In the following sections, I further unpack this statement's assumptions. I explain how borders and bordering processes have multiplied and become linked to *digital solutions* to realize these futures. I then elaborate on the role of collective sociotechnical imagination in understanding the contemporary digital transformations of the European border regime.

Probing into the multiplicity of borders

In the early 90s, author and management theorist Kenichi Ohmae (1990) wrote an influential book that articulated the zeitgeist of the period, proclaiming the arrival of a *Borderless World*. In his entrepreneurial diagnosis, he reflected on the widespread optimism and expectation of a flourishing and liberated global economy after the fall of the Berlin Wall and the end of the Cold War—characterized by the victory of liberalism over communism, the globalization of customer demands, and the restructuring of nation-state interests beyond national boundaries. It perfectly epitomized what Boltanski and Chiapello (2018 [1999]) would later call the *New Spirit of Capitalism*, in which information technologies are promoted as core drivers in the networked world of global flows.

As I write this thesis, Ohmae's far-fetched diagnosis is often used today as a counterpoint to the observation that "borders are back" (Mau 2021, 11). Indeed, also this thesis must be introduced against the backdrop of a pandemic that has spread across the globe, leading to the containment or radical restriction of mobility, the worldwide construction of new border walls and fences, states of emergency along militarized border zones, and the ongoing

securitization of mobility—in particular, in the aftermath of the so-called migration crisis in 2015/2016.

It is important to note, however, that Ohmae's theory was never consistent with the reality and development of borders (Mezzadra and Neilson 2013; Paasi 2018). Border security, for instance, has never solely concerned the ability to control a *geographical line* along a state's national territory—as if drawn on a map and then secured on the ground. Instead, borders and their "world-configuring function[s]" (Balibar 2002, 79) have diffused into heterogeneous practices, techniques, biopolitical strategies, and technologies of inclusion and exclusion. Any boundary, as Simmel (2009 [1908]) once declared, must be understood "not [as] a spatial fact with sociological effects, but [as] a sociological reality that is formed spatially" (p. 551). In short, after the end of the Cold War and the optimism and expectation of a borderless world, borders have continued to exist and have proliferated across the globe, operating in their multifaceted forms.[3]

Borders must be understood as polymorphous sites involving processes of de- and reterritorialization and the reconfiguration of the complex relationship between mobility, security, law enforcement, and territory. They have an *infrastructural* character. What is often abstractly presented as a singular line on a map can only be made possible and enacted by the bundling of actors, regulations, standards, practices, and technologies—in short, by

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[3] I discuss the many characterizations of (digital) borders and their functions in the next chapter. At this point, I would like to note that "the border," in general, is notoriously difficult to define. There is no essence or clearly determinable substance that can constitute it. Balibar (2002) highlights this curiosity: "The idea of a simple definition of what constitutes a border is, by definition, absurd: to mark out a border is precisely, to define a territory, to delimit it, and so to register the identity of that territory, or confer one upon it. Conversely, however, to define or identify in general is nothing other than to trace a border, to assign boundaries or borders (in Greek, *horos*; in Latin, *finis* or *terminus*; in German, *Grenze*; in French, *borne*). The theorist who attempts to define what a border is in danger of going round in circles, as the very representation of the border is the precondition for any definition" (p. 76).

sociotechnical infrastructures (Dijstelbloem 2021; Schinkel 2020). As infrastructures, borders emerge as dynamic entities that are always in the making. They are also *multiple*—invoking different meanings, exerting control in different ways, and structuring their politics through an array of actors, technologies, and practices.

Investigating digital solutionism

The Schengen Area is conventionally characterized by the project of a single market and the formal abolition of internal borders between Schengen states. Since the beginning, however, Schengen states have also cooperated in the realm of (border) security. This has led scholars to claim that European forms of border control and border surveillance have gradually shifted toward forms of transnational policing (Feldman 2019; Walters 2006a), based primarily on the gradual construction of digital infrastructures that allow state authorities to collect, process, and share what they define as security-related information. Databases have thereby become what Garkov described as the "virtual world of IT." They might best articulate how the digitization of borders in Europe has led to deployment of IT infrastructures across geographical and virtual space. As Papadopoulos, Stephenson, and Tsianos suggest,

> [t]he most common manifestation of the border is not to be found along the geographical border line of the Schengen area, but rather in digital records on laptops belonging to the border police; in the visa records of European embassies in Moscow, Istanbul, Accra or Tripoli; in the checkpoints of Heathrow, Tegel, Paris Charles de Gaulle or Mytilini Odysseas Elytis airports; in the German central register of asylum seekers […]; in the online entries of the Schengen Information System (SIS), where the data on persons denied entry to the Schengen area is administered;

> in the Eurodac […], where the fingerprints of asylum seekers and apprehended illegalized migrants are stored.

> (Papadopoulos, Stephenson, and Tsianos 2008, 176)

Policy officials speak of the growing use of centralized, large-scale IT systems as a "changing technology landscape" in Europe, especially in the last decade (field note, OSCE Conference, April 10–11, 2019). With the establishment of eu-LISA in 2011, a single agency now administers databases such as the second generation of the Schengen Information System (SIS II), the refugee fingerprint system Eurodac, and the Visa Information System (VIS). eu-LISA is also developing new systems, such as the Entry/Exit System (EES), the European Travel Information and Authorisation System (ETIAS), the European Criminal Record Information System for Third-Country Nationals (ECRIS-TCN), and an interoperability initiative to connect these systems.[4] As recently reported by the nonprofit organization Statewatch, eu-LISA was given roughly €1.5 billion between 2014 and 2020 to spend on private contracts and fund the construction of these new systems and projects (Jones, Valdivia, and Kilpatrick 2022). These developments are a testament to what I call the *digital solutionism* in Europe's contemporary processes of re-bordering.

Morozov (2013) describes solutionism as a belief and a means of framing social and political problems in ways that invite technologies to solve them. By the same logic, the border regime's expanding digital infrastructure appears to offer natural solutions—and it consistently finds consensus among EU institutions and national governments. Solutionism takes different forms and is regularly accompanied by deterministic paradigms. As in Garkov's statement cited above, the digital or virtual world is prescribed not only as a solution but also as a necessary

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[4] For an overview of these systems, see Appendix A.

result of quasi-autonomous developments that determine social transformation. Officials and policymakers, to draw on another example, also invoke new databases and digital technologies as governmental responses to the so-called "real developments in society" that force them to act (Interviews 13 and 21 with EU officials, 2019). Throughout this thesis, different narrative articulations and enactments of digital solutionism will be presented. They must frame the collection, processing, storage, and exchange of data as indispensable solutions in governmental interventions in border and migration control.

Of course, digital technology is not the only reason for today's societies of control and their systems of surveillance, especially in the realm of border and migration management. The design, development, and implementation of dataveillance technologies are also symptoms of the mechanisms and principles of inclusion and exclusion that societies enact. They are predicated on the production of *others* (M'charek, Schramm, and Skinner 2014) through the classificatory practices that sort people's social status according to, for example, economic benefit, perceived societal threat, or security risk. Biometric technologies, documents, identification practices, tracking devices, and even mobile phones are not neutral: they can fundamentally redefine and reconfigure the conditions for accessing mobility, obtaining rights, or carrying obligations.

The digitization of the border regime draws our attention to the complex network of humans and nonhumans through which databases of migration control arise "simultaneously [as] an arena of emerging politics, a space in which old orders may be shaken up and changed, sometimes in subtle and sometimes in dramatic ways" (Hilgartner, Miller, and Hagendijk 2015, 5). In other words, the digitization of the border regime invites us to investigate the assemblages of future visions, shared narratives and promises, institutional actors, material artifacts—and what binds these human and nonhuman elements together.

On the formation of imagination

The distinct imaginative capacities, the ability to craft visions of the future, the mobilization of visionary powers—in short, the *collective forms of sociotechnical imagination*—occupy a privileged place in my understanding of the making of borders and their digital infrastructures. Imaginations direct our attention to more subtle and mundane compositions that nevertheless lie at the heart of the border regime: they articulate the logic and rationale of governance, encode the principles of inclusion and exclusion, and inform the policies that must render migration a digitized, actionable, and governable object. These dynamics are inseparable from the border regime's ongoing violence and militarized activities against migrants and refugees, for example, in the Mediterranean Sea—perhaps one of the most visible and brutal articulation of the formation of European borders that has resulted in a large number of deaths. Migrants' deaths have also been framed as what De Genova (2002; 2013) calls *spectacles of illegality*— mass mediatized events that lend "illegality" an air of objectivity and a "quasi-intrinsic deficiency of the migrants themselves" (2013, 1191).

In comparison, the buildup and maintenance of the EU's digital border infrastructure are less sensational and somewhat silent or invisible. However, these practices form part of the same regime and are built upon the same logic. Large-scale databases are based on societies' principles and mechanisms of inclusion and exclusion and impact migrants' experiences at the border. They have also been widely normalized as indispensable components of border control and unchallenged guarantors of security in today's migration management. To paraphrase Bruno Latour (1993), digital infrastructure has become (border) *politics pursued by other means* (see also Anand, Appel, and Gupta 2018).

This thesis explores how collective imagination materializes in the investment in and development of digital border infrastructures. It traces the epistemic, social, and material efforts to erect and sustain this infrastructural backbone of Europe's borders. I thus mobilize the

conceptual repertoire of science and technology studies (STS) that investigates the desires, hopes, and promises—as well as the imagined threats, risks, and perils—that are reflected in scientific, technological, and infrastructural innovations. Sociotechnical imagination, in short, constitutes what Yaron Ezahi calls "the masonry of political world-making" (quoted in Jasanoff 2015, 12) and is indispensable for the study of social or political order. Imagination thus acquires power; it can outperform alternatives and dominate political discourse. In other words, engaging in collective imagination is a profoundly political act that must be accounted for in Europe's border regime. This thesis will therefore investigate the role of imagination in the construction, maintenance, and justification of digital borders and their futures.

The case of eu-LISA: A laboratory to explore the digitization of borders

As researchers of science and technology, the choice of where to focus our attention in exploring the digitization of the border regime and how to unpack the so-called virtual world of borders cannot be an arbitrary one. I have chosen to feature the eu-LISA agency as a core actor in this endeavor. As a relatively unknown organization that has easily been overlooked in the literature, the agency has become increasingly relevant for understanding the contemporary dynamics and formations of the border regime.

Legally established in 2011 by Regulation (EU) No 1077, eu-LISA is responsible for administering and developing the main centralized databases related to the governance of migration into the Schengen space. It is also considered an institutional body that can actively promote and advance digital technologies as a "key success factor for the implementation of the Union's policies in the area of justice, security and freedom" (eu-LISA 2014, 1). After its creation, eu-LISA was tasked with the operational management of three existing IT systems, the SIS II, VIS, and Eurodac. Even at that time, however, the development of new systems was

already anticipated. Member state representatives reflected "that border management, and, indeed, policy cooperation, asylum, et cetera, were becoming increasingly IT-led businesses" (Interview 4 with EU official, 2018). The agency's creation was thus also a response to policymakers' expectations for the further digitization of EU borders. Since then, eu-LISA has continued to grow, and at the time of writing, employs almost 400 staff members.

However, eu-LISA's formation was not simply an inevitable outcome in a course of events; policymakers had discussed alternatives in their offices in Brussels. One idea was to centralize the existing databases under the firm umbrella of the European Commission—a move that would have required a massive increase in the Commission's human and financial resources. Additionally, member states had reservations about empowering the Commission in the sensitive domains of migration and border security, leading them to ultimately decide that an EU agency would be easier to control. To steer the agency in the right direction, member states installed a management board that was controlled by both nation-state delegates and representatives of EU institutions. eu-LISA thus emerged from what Sabel and Zeitlin (2010) call *experimentalist EU governance*: the absence of an overarching institutional authority that enforces uniform, fixed goals and rules in favor of one that provides an institutional space that allows national and supranational administrative elites enough room to maneuver and negotiate their interests.

eu-LISA serves as a prism through which to observe the manifold work and practices in the digitization of the border regime that normalize mass dataveillance as a legitimate and indispensable form of mobility governance. The agency will also allow us to investigate the heterogeneous groups of actors that participate in this digitization and collectively engage in the policy performances or infrastructural maintenance work. eu-LISA therefore represents a *node* at which officials, delegates, industry representatives, experts, engineers, and technicians

frequently assemble—where infrastructural practice and collective imagination coalesce.[5] eu-LISA's multiple sites reveal the geographically distributed character of its activities: the operational seat and data center are located in Strasbourg (France), its official headquarters is in Tallinn (Estonia), its backup or business continuity site is located in a mountain bunker near Sankt Johann in Austria's Pongau region, and it has a small liaison office in Brussels (Belgium).

In "STS as Method," John Law (2017) argues that the study of science and technology requires special attention to "the tactics and strategies of practice, to methods, and how these stage the world" (p. 48). To carry out STS *as* method, Law suggests working with, and through, case studies that observe how "theory, method, and the empirical get rolled together with social institutions (and sometimes objects). They are all part of the same weave and cannot be teased apart" (p. 32). However, the use of case studies is not always indisputable. Cases should not simply be mobilized in order to replicate (and verify) identical findings and theories (Gad and Ribes 2014, 186).[6] Instead, case studies must stem from STS scholars' conviction that it is impossible to separate the conceptual and the empirical. Similarly, the findings in this thesis should not be generalized or disconnected from the specific case of eu-LISA and its empirical observations and examples. Conceptual work and analysis emerge from specific, situated moments that characterize the digitization of the border regime. Digitization itself is understood as a *situated phenomenon*—mediated by concrete actors, visions, infrastructures, and

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[5] These groups of actors also resemble what scholars describe as "back-office policy-makers" (Ustek-Spilda 2020) or, in reference to John Law, "heterogeneous engineers" (Glouftsios 2019; Glouftsios and Scheel 2021).

[6] Gad and Ribes are somewhat critically referring to Callon's article "Some Elements of a Sociology of Translation: Domestication of the Scallops and Fishermen of St. Brieuc Bay" (1986). Callon's classic piece calls for the observer's agnosticism toward the empirical, but the style of his Actor–Network Theory—initially developed from the specific, local context of his case, with its famous four moments of translation—became one of the most replicated explanatory concepts in the work of STS and beyond (Gad and Ribes 2014, 186).

technologies in the management of mobility and the multifarious procedures for collecting, processing, and working with data.

Thus, I propose to reflect on the agency through the metaphor of an *empirical laboratory* that is constructed to navigate the phenomenon in question. eu-LISA is not simply *another case study*—a convenient means of recycling preexisting concepts and theories (Beaulieu, Scharnhorst, and Wouters 2007). Instead, the case suggests a more experimental, empirical approach that can capture multiplicity—(digital) formations, activities, products, artifacts, and dynamics in the digital border regime—while delimiting the territory of the empirical field. This approach assists in distinguishing the case's *inside* from its *outside* and requires flexibility in the choice of which actors, policies, and situations to observe.

According to this metaphor, the researcher finds themselves in an experimental environment (see Guggenheim 2012). We may also recall Helga Nowotny's (1994) instructive account of how sociologists of science became interested in the *territory of the laboratory*: they sought to unpack "the activities of the scientists, their technical practice in handling apparatus, [and] in measuring and checking natural processes […]. The sociologists of science further encountered what was entered and written down. Notes and diagrams of all kinds, photographs and pictures which are produced with the aid of information technologies" (p. 76). In a similar style, I engaged with various materials, techniques, and activities (such as text, documents, presentations, visuals, interpersonal exchanges, and narratives) to explore how eu-LISA articulates, performs, represents, and intervenes in the making of future digital borders. The metaphor of the laboratory suggests, on the one hand, investigating this organization as an institutionally formed body with distinct tasks and operations. On the other hand, the eu-LISA laboratory is mobilized as a lens through which to render visible the wider dynamics and controversies in the digital border regime. Both perspectives are necessary to trace the

interaction of all the heterogeneous elements that bind this digital border regime together but simultaneously produce its inherent fragility.

Research questions and primary argument

The research direction outlined above can be crystallized into two overarching questions that guide my empirical analysis:

- Which sociotechnical imaginations of borders and their futures are enmeshed in the buildup and maintenance of the digital border infrastructure in Europe?

- How are these imaginations assembled, performed, and stabilized in the border regime?

These questions aim to explore the immense social and material efforts that pursue what I call digital solutionism. Both are firmly embedded in the *concept of co-production*, which postulates the co-constitutive nature of social and technological orders (Jasanoff 2004b). These questions thus depart from Jasanoff's (2004a) influential claim that "knowledge-making is incorporated into practices of state-making, or of governance more broadly, and in reverse, […] practices of governance influence the making and use of knowledge" (p. 3). They investigate the materialized aspects of knowledge and social orders to better explain the broad appeal and persistence of digital solutionism in the border regime.

Furthermore, these research questions have led to the development of several strands of empirical investigation that have produced the structure of this thesis. The research questions provoke queries into the shared visions and imaginations of future border (in)security, how these visions are assembled and collectivized, and what types of actors must share and institutionalize them. They also examine the various spaces in which imagination can be performed and materialized—through managing and maintaining digital infrastructure.

Moreover, these research questions lead to a more in-depth exploration of the different projects and policies of digital borders; the labor necessary to craft, perform, and legitimize them; and how these projects and policies enact digital solutionism in multiple ways. They also demand the unpacking of sets of values and justifications that must underlie all imaginations and lend credibility to their proposed technological trajectories. In other words, these questions create different paths for investigating the collective, imaginative work that goes into the infrastructural making of Europe's border regime.

The central argument of this thesis is that the emergent digital border infrastructure is what Larkin (2013) calls a *vehicle* of collective visions, dreams, and promises of future border (in)security. The eu-LISA agency is thereby examined as an *instrument of co-production* (Jasanoff 2004a)—orchestrating the heterogeneous actors and practices in crafting, collectivizing, and materializing such imaginations. Collective imagination thus features prominently in forming the epistemologies, values, knowledges, and representations that produce and legitimize digital infrastructure in the EU border regime and sustain its digital solutionism. Ultimately, it creates the strategically simplified and sanitized understandings of border control. These understandings express a governmental desire to manage abstract digitized "migrant objects" in experimental ways rather than assume responsibility for the realities of migration and the everyday violence that stems from crossing the EU's highly securitized borders.

Structure of the thesis

Part I—Mapping the Border Regime and its Digital Solutionism, introduces the field of borders, border (in)security, and digital solutionism in the EU. Chapter 1 reviews some of the core strands in the interdisciplinary literature on critical border studies, critical security studies, and

science and technology studies. My thesis is situated among these traditions of researching the forms of governance of (digital) borders and migration. Chapter 2 proposes a methodological approach that provides a detailed exploration of the theories, concepts, and methods in my research. At the same time, the chapter makes a general plea for taking collective imaginations seriously in the study of border regimes and their material and infrastructural manifestations.

The thesis' arguments are presented in the following two sections. *Part II—Probing the eu-LISA Laboratory: Spaces of Sociotechnical Imagination*, delves into the institutional body of the agency and unpacks its distinct character and practices. Chapter 3 studies the sociotechnical imaginary of digital transformation at eu-LISA. It demonstrates how such an imaginary has been carefully crafted, collectivized, and materialized through an experimental approach to the digital border infrastructure in Europe. Chapter 4 analyzes how eu-LISA performs ideas and visions of Europe or Europeanhood through the diverse work of infrastructuring. It examines the acts of frontstaging and backstaging that present the fragmented infrastructure of borders as a promise of European collectivity, integration, and coherence.

Part III—Sites of Infrastructural Experimentation: Enacting Digital Solutionism, investigates the main sites at which actors, visions, narrations, and databases are assembled to create new digital borders. Chapter 5 analyses the creation of smart borders in Europe. It focuses on their distinct epistemology, enabled through modes of collaboration and linguistic repertoires developed at eu-LISA events, conferences, and roundtables. The chapter demonstrates how abstract and logistical visions of digital borders are invoked to strategically detach us from the sociopolitical realities and implications of border crossings. Chapter 6 discusses the making of the interoperability policy. It examines this policy's creation as a *necessary fiction* (Ezrahi 2012) that translated a contested technical idea into a powerful policy

program. This fiction thereby enacts solutionist ways of seeing and speaking about migration and borders and steers collective discourse and behavior in their management.

Lastly, *Part IV—Further Reflections and Conclusions*, explores the valuations and justifications that underpin the making of new digital borders. It also draws some key conclusions from previous empirical findings. Chapter 7 is concerned with *repertoires of justification*. It outlines four modes of argumentation that allow actors to mobilize distinct sets of values, principles of (e)valuation, and principles of worthiness. These modes illustrate that solutionism is not only a convenient techno-fix, readily available to officials, but also a frequent justificatory engagement that must evoke generally accepted values and norms. Chapter 8 summarizes the core arguments and presents implications. It problematizes the dominance of techno-determinism and its solutionist articulations. Moreover, it suggests rejecting the dominant imaginations of digital borders and their futures and fundamentally rerouting them to focus on responsibility and accountability for human beings and their diverse forms of mobility. Finally, chapter 9, a short postscript, addresses two developments, the use of Artificial Intelligence and the COVID-19 pandemic, that have not been included in the thesis but will most likely transform border infrastructures in the future.

PART I

MAPPING THE BORDER REGIME

AND ITS DIGITAL SOLUTIONISM

1   Borders, Technology, and Migration in the Age of (In)Security

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This chapter reviews three core strands in a broad and multidisciplinary literature on borders, technology, and migration in our contemporary age of (in)security. The first part is related to the first strand and outlines what I call the border multiple by revisiting some key contributions in critical border studies. I also summarize some of the termini of the so-called biopolitical turn in the conceptualization of borders that describe the shifting operations and facets of control. The second part of the chapter, related to the second strand, discusses some major contributions to the securitization and surveillance literature that extensively explore digital technologies and databases, among other features, in the border, policing, and surveillance fields. Many of these contributions find, in the emergence of digital borders, a response to the governmental desire to facilitate profitable forms of movement while controlling and arresting others, not least by increasingly targeting the individual mobile body. In the final section, I reflect on the growing number of significant STS-inspired works that have inserted themselves into the gaps in the literature. I then situate my thesis within this third strand by addressing three interrelated primary research dimensions: the study of sociotechnical apparatuses of migration management, how knowledge production enacts forms of mobility, and how borders are reconfigured through digital infrastructures.

1.1 Unpacking the border multiple

1.1.1 What is a border?

Borders have long been subject to theoretical and empirical scrutiny. However, geography and political science scholars, sociologists, anthropologists, and philosophers have been unable or unwilling to provide a satisfying answer to the question: What is a border? Nor does this thesis wish to offer one. Étienne Balibar offers a straightforward reason for this:

> [I]t is not possible to give a simple answer. Why should this be? Basically, because we cannot attribute to the border an essence which would be valid in all places and at all times, for all physical scales and time periods, and which would be included in the same way in all individual and collective experience.
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> (Balibar 2002, 75)

The Roman *limes* has little to do with today's sophisticated, militarized, high-tech borders that have emerged primarily in the Global North. Huub Dijstelbloem (2021) likewise observes that although the term "expresses delimitation and demarcation, it remains a concept with few limits" (p. 1). The point is that borders, as a brief review of human history reveals, are non-essentialist and thus constantly transforming entities in both their material and symbolic aspects. Political scientist Matthew Longo notes that "[f]or most part of human history, the border was a peripheral thing, a dusty land of criminality and relegation, a haven for tax evasion and non-conformity. A forgotten, far-flung place. Today, it is the center of the political world" (2017, xii).

Moreover, today's borders are *dislocated.* Border crossing points, such as the airport in Vienna, may have very different appearances but are nonetheless intimately connected with the militarized maritime frontiers of the EU, and the seemingly unbounded sea stands out as a

border zone conditioned to kill (Heller and Pezzani 2017). The broad spectrum of scholarship and disciplines represented in the field of border studies reflects Balibar's (2002) observations that the border seems to be *overdetermined, polysemic, heterogeneous,* and *ubiquitous* (pp. 85–97). Exploring borders as multiple and polymorphous, however, can be a starting point for grasping broader political and social transformations and revealing power dynamics and mechanisms in today's societies. "Borderings," the term used by sociologist Saskia Sassen (2015), may "cut across traditional borders and become evident both globally and inside national territory" (p. 23), revealing the shifts in state sovereignty in globalization processes. Likewise, political geographers have proposed exploring heterogeneous sites, at which borders become manifest as institutions of categorization and in- or exclusion as well as in "formal, practical, and popular performances of sovereignty" (Johnson et al. 2011, 66).

It has, therefore, become a common denominator to perceive borders as *multiplicities* that require a range of concepts to grasp their changing social, cultural, political, symbolic, and material facets and functions (Paasi 1998; Rumford 2006a; Sohn 2016; Walters 2002; 2006b). Border studies scholar Chris Rumford (2012) suggests "seeing like a border" by embarking on a multiperspectival study that takes into account "those at, on, or shaping the border" and calls for acknowledging "the constitutive nature of borders in social and political life" (p. 897). Sandro Mezzadra and Brett Neilson (2013) are sympathetic to this view in their seminal work, *Border as Method*. They suggest mobilizing the concept of the border as an *epistemic prism* for analyzing power transformations and dynamics; as an instrument for acting on, and knowing about, the world: "It is above all a question of politics, about the kinds of social worlds and subjectivities produced at the border and the ways that thought and knowledge can intervene in these processes of production" (Mezzadra and Neilson 2013, 17; Mezzadra 2019).

1.1.2 Multi-location and the biopolitical turn

Although scholars have not reached a consensus on the general definition of a border, they agree that the specific character of borders and their modes of governance in the world have fundamentally changed over time. The multidisciplinary field of border studies grew rapidly in the early nineties after the demise of one of the most notorious border architectures in history— the iron curtain. It found its agenda in, and against, popularized ideas such as a *borderless world* and *political deterritorialization*. Accordingly, the *Ashgate Research Companion to Border Studies* introduces the field by noting that after the fall of the Berlin Wall, "[i]n summary, borders are still ubiquitous, are manifested in diverse ways, and have various functions and roles" (Wastl-Walter 2011, 2).[7]

A variety of terms have sought to grasp the diverse and various manifestations, shifts, and roles of borders; these include *borderscapes*, *borderlands*, and *border regimes*. As Hess and Kasparek (2017b) argue, border studies "emphasize the transformation of the border from a demarcation line surrounding national territory to an ubiquitous, techno-social, deterritorialised apparatus or regime producing geographical stretched borderscapes" (p. 57). Such notions challenge the linear and fixed imaginations of borders, instead turning our attention to their *multi-location*. The idea of borderlands, for instance, points to the phenomena of whole countries or regions becoming zones of transition and no longer having territorial fixity (Balibar 2009; 2010; Rumford 2006b; Squire 2011a). Even more widely cited is the concept of borderscapes, which is based on Appadurai's (2010) idea of global, deterritorialized *scapes*. It has been mobilized as an epistemic viewpoint for exploring the practices, performances, and discourses of borders—and their distinct spatial, temporal, and political

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[7] For reviews on the development of the field, see *A Companion to Border Studies* (Wilson and Donnan 2016) or Rumford's article, "Theorizing Borders" (2006a).

dimensions—that uncover the hidden geographies and distributions of categories of belonging (Brambilla 2015; Dell'Agnese and Szary 2015; Rajaram and Grundy-War 2007). Borderscapes also refer to processes of *spatial differentiation*, which hold that borders, as Longo (2017) notes, "cannot merely be 'tall,' they must also be 'wide' and 'layered'" (p. 56).[8]

Terms such as borderscapes and border regimes imply that borders have undergone processes of *delocalization*, through which border functions can lead to practices of remote control and preemptive governance (Bigo and Guild 2005; Broeders and Hampshire 2013; Guiraudon and Lahav 2000; Vaughan-Williams 2008). These terms conceptually destabilize borders' presumed fixity and expose the multiple conflictual determinations of the border—i.e., the frictions and struggles that equally participate in their unstable constitution and contribute to political and social order (Mezzadra and Neilson 2013, 9–14; Mezzadra 2019).

A key component in summarizing some of the core transformations of borders is the *biopolitical turn*. It articulates the "multiplicity and multiplication of biopolitical technologies" for the management of mobility and migration (Aradau and Tazzioli 2020, 201). The biopolitical term invokes, perhaps most clearly, the shift in the state's primary concern with *territory* to that of *population*—initially analyzed in Michel Foucault's seminal lectures on governmentality and biopolitics. Foucault (2009) depicts this shift by developing his concept of *security*, tracing biopolitics as a form of governance back to the development of towns in the eighteenth century when the problem of regulating and surveilling populations was first encountered. The objective of governance changed from being concerned with territorial control and domination to the challenge of managing the influx and circulation of populations: governance became a matter of "organizing circulation, eliminating its dangerous elements,

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[8] On the notion of the *border regime*, the predominant notion used in this thesis, see footnote 2.

making a division between good and bad circulation, and maximizing the good circulation by diminishing the bad" (p. 18).

Several scholars have employed these insights to analyze the institution of the border—admittedly, an institution that in itself has hardly been a concern for Foucault (Walters 2010). This meant scrutinizing the distinct techniques and mechanisms of borders, which aim to include and exclude an "indefinite series of mobile elements" that originate *outside* the field of surveillance: "carts, travelers, thieves, disease, tourists, migrants, criminals" (Feldman 2011b, 381). While the literature has predominantly focused on the Global North, its verdict is that the principle of *biopolitics* has supplemented (but not replaced) the principle of *geopolitics*: borders now operate through spatially dispersed and temporally varied tactics of control, semantics, policies, laws, and technical architectures (see, e.g., Leese 2016; Olwig et al. 2019; Salter 2013; Scheel 2020; Schwertl 2018; Szary and Giraut 2015; Tazzioli 2020b; van Baar 2017).

Concerned with the circulation of population, borders now enact "techniques of inclusion, facilitation, and acceleration as well as exclusion, detention, and imprisonment" (Salter 2013, 12). As a consequence, William Walters (2002) conceived the notion of the *biopolitical border*. Applying it to the emergence of the European Schengen space and its governance, he acknowledged what he calls a process of *biopoliticization*—"the political concerns, events, and means by which the border will become a privileged instrument in the systematic regulation of national and transnational populations—their movement, health, and security" (p. 571).

1.1.3 Digital technologies and the proliferation of border termini

As Huub Dijstelbloem (2021) states, borders "have a particular relationship with technology. […] Technologies inform—and limit—how societies are governed and can be imagined to be governed" (p. 9). Unsurprisingly, from the beginning, it has been said that the rise of large-scale

IT systems and digital technologies has enabled, facilitated, or intensified the biopolitical turn. The interdisciplinary scholarship detailed above has gone to great lengths to unpack the distinct actors, discourses, facets, and functions that carry out today's *digitally mediated* border controls.

For example, Longo (2017) observes that the "renewed commitment to us[ing] and deploy[ing] technology at the border" (p. 56) and the interrelated emergence and proliferation of databases targeting mobility are closely tied to the performance of biopower. Databases intensify what Bonditti (2004) calls the *traceability* of mobile individuals and populations. The growing production, collection, and storage of data seek to capture and trace the movement and institutional trajectories of populations, enabling a new form of (digital) *hyper-documentation*, by which "each piece of data is linked to other data, and ultimately to a risk profile" (Salter 2006, 47).

The governmental desire for traceability is thus articulated by the introduction of new forms of biometric identification, the digitization of asylum and visa procedures, the creation of traveler watch lists or blacklists, and other related mechanisms that track mobility. In sum, these processes signal what scholars summarize as increased "datafication of migration and mobility management" (Broeders and Dijstelbloem 2016). The practices of *digital bordering* also illustrate the shift away from the territorial model of the sovereign border to the increasingly *supranational character* of mobility control. The EU's recent centralization of the databases shared by its member states is one of the most prominent examples among many others across the globe.

The increase in the literature on border and migration control through digital means is responsible for the proliferation of terms that seem to describe similar, but not identical, phenomena (—furthermore, they do not necessarily contribute to a better understanding of the entanglements of borders, technologies, and migrations). In addition to Walter's umbrella term,

biopolitical border, scholars have studied *digital borders* (Broeders 2007; Glouftsios 2019; Trauttmansdorff 2017), *technological borders* (Dijstelbloem and Meijer 2011), and *socio-digital borders* (König 2016). All three terms refer to the buildup of large-scale IT systems (especially in the European Union) and the involved data-sharing practices between states to control migration.

Another influential term is Louise Amoore's *biometric border* (Amoore 2006; Muller 2011), defined as the "portable border par excellence, carried by mobile bodies at the very same time as it is deployed to divide bodies at international boundaries, airports, railway stations, on subways or city streets, in the office or the neighbourhood" (Amoore 2006, 338). With this definition, Amoore underscores the diffuse character of biometric control in the contemporary regimes of mobility management, in which facial images, iris scans, and fingerprints seek to establish the migrant's *embodied identity* (van der Ploeg 2000).

In less specific ways, the notions of *mobile borders* (Szary and Giraut 2015) or Côté-Boucher's (2008) *diffuse border* imply the various delocalized and spatially diffused characteristics of borders and their biometric reinforcement. In the same vein, scholars have deployed the idea of the "virtual border" (Zureik and Salter 2006, 1) and the related concept of "bio-informatic border security" (Vukov and Sheller 2013) to mark the shift in borders away from physical or territorial boundaries.

Pötzsch's (2015) idea of the emergence of the *iBorder* likewise seeks to signal the exercise of informational power that digital technologies seemingly enable, as does Rygiel's (2011) politics of *e-borders* (see also Allen and Vollmer 2018). Finally, we add the term *liquid borders* (Moraña 2021) to this growing list of signifiers. However, the idea of liquidity not only points to the dispersed nature of borders but, importantly, also acknowledges the element of *porousness* that haunts every border, no matter how technologized and securitized it appears.

It is important to note that some of these labels are not merely academic or activist concepts; they have also been introduced by politicians, officials, or industrial actors who, contrary to the literature, strongly promote the development of digital bordering practices. In this regard, *smart border* stands out as a term that has shaped the discourse and practice of border and migration management policy. Smart borders have therefore come under special academic scrutiny (see, e.g., Amoore, Marmura, and Salter 2008; Jeandesboz 2016b; Leese 2016; Sontowski 2018; Sparke 2006). As we will see in chapter 5, this vague, homonymous terminology should not be seen as an accidental outcome. This terminology strategically serves industry actors, officials, national delegates, and experts in fostering distinct but coexisting visions and meanings of border security.

My aim is not to refute these notions or to offer a new term. Instead, I will primarily make pragmatic use of the term *digital borders* when speaking about the large-scale border security databases in the EU. Nonetheless, we must warn against an unintended effect of many of these notions (—including digital borders), namely the artificial dichotomy between the digital and the physical, the virtual and the material. Such a dichotomy prevents us from examining the distinct ways and forms in which technologies, devices, artifacts, and the so-called virtual space are continuously shaped by social, cultural, economic, and political worlds and always enacted through actors, narratives, discourse, and materials. In other words, *digitality* always emerge as an outcome of dispersed and multiple practices as well as of imagination and discourse. Moreover, as Ruppert, Law, and Savage (2013) note in a different context, social scientists must account for the ways in which "digital devices themselves are materially implicated in the production and performance of contemporary sociality" (p. 22). In short, we need to be attuned to the *sociotechnical practice* of imagining, assembling, and performing digital or virtual borders. As this extensive body of work has devoted itself to the biopolitical character, functions, and mechanisms of digitally mediated borders—as well as the

manifold implications on the governance of migration—fewer contributions have analyzed the *laborious imaginative and infrastructural work* that is carried out by specific actors and institutions to design and enact digital borders.

As much as the biopolitical turn shifts our analytical gaze away from the border as a demarcating line, we must be attuned to the multiple enactments of borders and border security, which may take place prior to or after their deployment at the state's territorial boundary (Bourne, Johnson, and Lisle 2015; Martin-Mazé and Perret 2021)—i.e., the spaces in which digital borders become not only imagined, designed, and assembled but also administered, maintained, and repaired. Here, borders and border security emerge as a "set of mediated processes situated at the junction between, on the one hand, the actions and worldviews of diverse border security actors and, on the other, security discourses, strategies, policies and technologies" (Côté-Boucher, Infantino, and Salter 2014, 199). This viewpoint proposes exploring digital borders and border security through deliberate ethnographic fieldwork that can investigate the stickiness of lasting imaginations and narratives as well as the material everyday practices of creating and maintaining borders.

1.2 Unpacking (in)securitization and surveillance at the border

1.2.1 Technologizing security and the proliferation of risk

Today, border protection and migration management are permanently tied to the question of global (in)security. The border has transformed from the neglected backyard into the center of a terrorist and immigrant threat, sitting at the heart of contemporary politics (Longo 2017). Scholars of critical security studies have traditionally traced how cross-border mobility and immigration have come to be constructed as a *problem of security*—a process defined and characterized in manifold ways and summarized by the umbrella notion of *securitization* (see,

e.g., Aradau 2018; Aradau et al. 2006; Bigo 2002; 2014; Bourbeau 2011; Huysmans 2000; Neal 2009; Stritzel 2014; van Munster 2009; Vogel et al. 2017). One influential account is provided by Didier Bigo in his "Critique of the Governmentality of Unease" (2002). Bigo observes the expansion of a security prism that produces an entire "continuum of threats and general unease" (p. 63). This targets mobility imperatives under the condition of globalization, continuously blurring the line between international and internal security (Bigo 2001; 2002). Accordingly, borders have undergone a fundamental transformation: security professionals, politicians, and bureaucrats must envision their security policies and strategies on a global scale while embedding them deeply within the fabric of their national societies (Popescu 2011, 92).

In this constructivist and non-essentialist tradition of security studies, technologies and databases have been prominently described as being part of the intensifying process of securitizing migration, especially in the aftermath of the 9/11 terror attacks (Amoore 2006; Balzacq 2008; Bigo 2002; Bonditti 2004). Balzacq (2008), for instance, describes IT systems as *tools of securitization* that shape the "politics and governing modes of EU counterterrorism" (p. 76). More generally, (digital) technology is broadly explained here as a core driver in creating the conditions for mass surveillance and perpetuating the logic of risk in contemporary capitalist societies. As Ayse Ceyhan (2008) states, "[i]dentification technologies, surveillance and risk assessment have become the centerpiece of security policies since 9/11" (p. 103), exemplifying what she labels the *technologization of security*.

Risk must thereby be understood as a wider *dispositif* that frames the governance of migration, mobility, and, by extension, late modern societies. Again, as security studies emphasize, this dispositif is deeply intertwined with the processes of securitization, which are essentially concerned with "the probability of an undesirable event happening in the future" (Aradau, Lobo-Guerrero, and van Munster 2008, 148). Accordingly, border security and

surveillance are primarily tasked with identifying potential threats and dangers, converting them into calculable risks, and preventing them in the future.

In critical security studies, the *material turn* has been of crucial importance in increasing our understanding of how securitization occurs. Therefore, scholars have focused on the material agency of objects and artifacts to analyze how the production of security is distributed *across* a network of actors, technologies, and practices (see, e.g., Amicelle, Aradau, and Jeandesboz 2015; Bourne, Johnson, and Lisle 2015; Dijstelbloem, van Reekum, and Schinkel 2017; Klimburg-Witjes, Poechhacker, and Bowker 2021; Pelizza 2021; Suchman, Follis, and Weber 2017). For instance, as Suchman (2021) argues, today, various material sensitizing devices are "enrolled in particular technopolitical regimes and associated designations of what constitutes a threat and to whom" (p. 19). In other words, the creation of (digital) borders implicates the techniques of imagining the future, the use of technologies, and the production of calculable risks from which one must be protected (Aradau and van Munster 2013; De Goede 2008; Muller 2008). Consequently, scholars of critical security studies have insisted that it has become impossible to distinguish the production of security from *the production of insecurity* (insecuritization) (Bigo 2014; Huysmans 2006).

1.2.2 Externalization between facilitating and securing mobility

The multiplication of borders—away from the physical border, beyond and within territorial boundaries—strongly relates to checks, surveillance, and controls that occur *prior* to the traveler's arrival (Squire 2011b, 1). This is often referred to as the *externalization* of border security. A number of border security researchers have focused on this latter point, especially in the face of the European Union's externalization strategies (Guiraudon and Lahav 2000; Lavenex 2006; Lavenex and Uçarer 2003; Zaiotti 2016). These analyses have critically examined what EU member states euphemistically call a "forward-looking" visa policy (EC

2011b, 10–11) that has fundamentally transformed the visa regime into a transnational model of governance through information networks (Bigo and Guild 2005; Salter 2006b; Salter and Mutlu 2013). These changes also reflect broader observations about the transnationalization of global surveillance networks (Aas 2011).

Externalization is closely associated with what Aristide Zolberg (2006) once called *remote control*—the "projection of the country of destination's borders into the world at large" (pp. 223–24). The digitization of bordering practices has considerably refined this work of remote control (through the storage and processing of data doubles), which can be described as the restriction or movement of mobile subjects *at a distance*, subjecting individuals to enrolment procedures long before they embark on their journey (Popescu 2011; Salter 2013; Vukov and Sheller 2013). Broeders and Hampshire (2013) support the claim that "[t]he governance of border traffic in the digital age is evolving into a multi-sited system of remote control" (p. 1207). Most of these contributions also confirm a more general observation— namely, that border control faces the fundamental problem of guaranteeing security and enforcing control, on the one hand, and facilitating mobility and global flows on the other. This paradox, which sits "at the heart of border management" (Broeders and Hampshire 2013, 1203), articulates the general contradiction between securitization and (neo)liberal globalization (Amoore 2006), or what Popescu (2011) calls "globalization's security dilemma" (p. 100). This is a well-known dilemma for the EU and its member states, who have been seeking to tighten migration controls and restrictions while adhering to the "neoliberal economic paradigm of a— preferably global—free circulation of goods, services, and capital" (Hess and Kasparek 2017b, 60; see also Pallitto and Heyman 2008).

However, scholars tend to ignore the fact that officials, policymakers, and bureaucrats can be perfectly aware of these issues. They inform the imaginative and narrative repertoires that must justify the efforts and investments in deploying digital borders and thereby

reproducing what I termed *digital solutionism*. The persistence of these structural problems and dilemmas raises the following questions: How can the solutionist belief that border security is primarily achieved through information systems and digital technology be upheld? What entrenched narrative repertoires fuel the deployed techniques of digital bordering—from the projection of control beyond territorial boundaries to the constant tracking of migrant bodies within what Follis calls the *prefrontier*? (Follis 2017; Suchman, Follis, and Weber 2017).

The traveler's *mobile body* is an essential part of these problems—it must be captured and identified in order to assess its potential risk, ideally before it reaches the border, and it must be sorted accordingly so as not to disrupt the flow of legitimate traffic. Contemporary processes of securitization and surveillance at the border have thus resulted in the proliferation and diversification of traveler *categories* (Adey 2006; 2012; Dijstelbloem and Broeders 2015; Mezzadra and Neilson 2013), which are granted different rights and ease of mobility and border crossing. The way in which we experience movement today, as Adey (2006) aptly summarizes in his book chapter of the same name, follows the principle of *divided we move.*

1.2.3 The mobile body: Identification, translation, informatization

Border (in)security has also been explored through the lens of the (surveillant) assemblage (see, e.g., Allen and Vollmer 2018; Côté-Boucher 2008; Dijstelbloem and Broeders 2015; Sohn 2016; Tsianos and Kuster 2016; Walters 2006b). Based on Gilles Deleuze's (1992) outline in "Postscript on the Societies of Control," Haggerty and Ericson's (2000) influential account describes surveillant assemblage as the way in which societies are governed through the production of data doubles, which circulate through different centers of calculation with increasing speed and across networks (see also Erwin 2015). In the context of EU databases, Kuster and Tsianos (2016) provide an exemplary approach in their study on Eurodac, mobilizing Latour's idea of *immutable mobiles* to show how migrants are forced to register

their fingerprints to produce data doubles that are both immutable and hypermobile across virtual networks. In their own words, it is an attempt "to liquefy and freeze mutable, alterable, fluctuating, and varying corporealities" (p. 59).

The *human body* is highlighted in the conceptualization of digital bordering practices in terms of surveillant assemblages: here, the body is perceived as the *primary object* of biopoliticization. Popescu has noted that it is, in fact, the *body itself* that makes an "ideal border": "always at hand, ready to be performed whenever circumstances require" (Popescu 2011, 94; Lyon 2005). Likewise, Amoore's (2006) notion of the biometric border centers on the body as the central locus of the modern state's exercise of biopower: "the body itself is inscribed with, and demarcates, a continual crossing of multiple encoded borders – social, legal, gendered, racialized and so on" (p. 337). In a somewhat drastic conclusion, Muller (2010b) infers that, ultimately, "the border and the body merge" (p. 86).

Scholars of border and surveillant assemblages, however, often disregard the very complex and far-from-evident processes, policies, and practices through which the border can become inscribed onto the body. If the multi-located realm of border control is now "located in the very bodies of the mobile" (Olwig et al. 2019, 2), we cannot ignore the often arduous and costly forms of labor that are required by a vast array of actors and institutions. Additionally, this line of work often ignores that these ideas, which underpin various policies and governmental strategies, are repeatedly impeded by people on the move. There is constant friction, failure, and resistance to the processes of convergence between the body and the border, which characterize the diverse patterns of mobility.

This would have to take into account the complex procedures of *translation*, examined, for instance, by Annalisa Pelizza (2021). Studying travelers, migrants, or refugees' encounters with borders, as Pelizza has recently argued, requires a *translational approach* in order to consider the multiple and heterogeneous actors involved in bordering as a performative

production of identity. In this line of literature, two related concepts discuss the central position of the body-as-border in more complex ways: *informatization of the body* and *embodied identity*. Drawing on the case of the biometric identification of asylum seekers in Eurodac, Irma van der Ploeg argues that biometric identification informatizes the body—i.e., it collects not only information *about* the body but screens the body-*as*-information (van der Ploeg 2000; 2005; 2006; Pollozek and Passoth 2019). She claims that the practices of identification do not determine preexisting identities but establish what she calls machine-readable *embodied identity*. The production of potentially illegal bodies has far-reaching consequences for what we understand as bodily integrity: it radically erases "the space between the person and the identifier" (van der Ploeg 2000, 301). It is the space that defines not only the distribution of power between the state (authorities) and mobile individuals but also the degree to which gendered and racialized bodily differences are enacted and potentially intensified (Aradau and Tazzioli 2020; Kloppenburg and van der Ploeg 2020; M'charek, Schramm, and Skinner 2014; Pelizza 2021).

The production of bodily identity at the border, with its inextricable connection to the human body, proves that bodies have become organized and deployed as *evidence* to recognize, categorize, classify, and manage human life itself: they are treated as both "the origin of evidence and the target of evidence-based interventions" (Maguire, Rao, and Nils 2018, 4; see also Leese, Noori, and Scheel 2022). Perceived as such a universally applicable verifier of identity, "the body becomes, in a sense, a passport or a password and an unambiguous token of truth" (Aas 2011, 341; 2006). There is a further need to explore how these regimes of evidence, with the body as the universal token of truth, are imagined, performed, and reperformed in the technopolitics of the digital border regime—how do these regimes continue to enter the policies and practices of digital borders? I will return to this question in chapter 6, where I explore how

these regimes' narratives and assumptions lay the crucial foundations for assembling the interoperability policy in the EU border regime.

1.3 Science and technology at the border

1.3.1 On sociomaterial entanglements at the border

The strands of literature outlined above illustrate how the border has transformed in recent decades. The literature portrays borders as complex and multi-located arrangements that create zones and spaces of control and circulation, notions and images of "trusted" and "risky" travelers, and a globalized hierarchy of mobility rights. Digital borders have also become expressions of the increasing (in)securitization and surveillance of mobility, which have sought to target and digitize the mobile body for social categorization and sorting. In this section, I delve into the ways in which science and technology studies have complemented and enriched these insights. Furthermore, researchers in this discipline have deployed its vast conceptual repertoire and strong empirical orientation toward the study of science, technology, and infrastructure at the border, responding to two widespread critiques of the study of border and migration regimes.

First, previous work on the securitization of borders and migration has often invoked an instrumental understanding of (digital) technologies and IT systems. They are often presented as part of a broader rationale (of security and surveillance) that forms a somewhat somber background for political goals and public policy. Only recently have the contested character, frequent failures, or (un)intended consequences of its design been addressed. In this way, STS has contributed to these gaps with its emphasis on a more symmetrical understanding of human agency and material structure (Jasanoff 2004b; Latour 2013). Andersson, for instance, summarizes this viewpoint when arguing that

the fences, control rooms, and data systems […] act as mediators in a network or 'collective' made up of human and nonhuman links. Migrants here function as key connectors or 'tokens'; their circulation is the language and currency of the networks.

(Andersson 2016, 25)

In similar terms, scholars of the STS Migration and Technology Network (STS MIGTEC) postulate a situated understanding of migration and border control, exposing the "complex entanglements between policies and regulations, technologies and other devices, people and practices" (Pollozek et al. 2021). These approaches investigate the securitization effects and consequences of border technologies, IT systems, and data practices as well as how they are imagined, designed, represented, and therefore, contested and subverted. In brief, they account for both the epistemic and material politics in the entanglements of border control.

Second, work on border securitization and surveillance has often underestimated, if not ignored, the difficult and painstaking sociotechnical labor that goes into assembling, maintaining, and extending the various spaces of border control and security (Walters 2011). Borders are not the stable, durable, robust artifacts and instruments they are often portrayed to be. Instead, their operations require continuous work—imaginative efforts to envision certain epistemic and material orders, the design of policies that perform and represent the border, and the maintenance labor that goes into upholding their underlying infrastructure. Furthermore, the spaces of border control and security host multiple encounters between technologies and the movements of people, who subvert, sabotage, escape, or reappropriate them.

Critical migration studies have often contended that the *autonomy of migration* must be taken as the primary starting point in order to denaturalize borders and foreground the movements of migrants, their subjectivities, and their practices (De Genova 2017; Mezzadra

2011; 2019; Papadopoulos, Stephenson, and Tsianos 2008; Scheel 2013; 2018).[9] While STS shares the intention of denaturalizing borders, their technologies, and discourses, it claims that mobility, technology, and security orders are *co-constitutive* phenomena that take shape in their concrete and situated encounters. Amelung and colleagues (2020b), for instance, conclude that not only mobility can be autonomous; there is also the "autonomy of migration technology and infrastructures" (p. 589), which enables or impedes migrant subjects from performing acts of citizenship.

In the remainder of this chapter, I will outline three central themes that demonstrate the importance of STS approaches in providing insight into the technological infrastructures of borders and bordering processes. Furthermore, by clarifying some of the themes' epistemological principles and emphases, I specify how this thesis on the digital transformation of the EU border regime contributes to each of them.

1.3.2 Enacting migration through knowledge making

A perennial concern in STS is the relationship between knowledge and order. Knowledge-making practices—from designing policies and conducting experiments to collecting and visualizing data—are essential for articulating and framing order; knowledge and order reinforce each other's existence (Jasanoff 2004b).

In line with this principled understanding, Scheel, Ruppert, and Ustek-Spilda (2019) introduced their special issue, "Enacting Migration Through Data Practices," in which they call

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[9] This is, of course, only an abridged view of the autonomy of migration perspective. Its importance lies in its explicit *denaturalization* of the border, contending that human mobility is a right constrained and impeded by states and always precedes the buildup of border regimes—in any shape or form. In this perspective, migration is the result of the various attempts to govern the heterogeneous, recalcitrant movements of people. For comprehensive discussions, see Mezzadra (2011) and Scheel (2013, 2021a); for a critique, see, in particular, Çağlar and Glick Schiller (2011).

for studying the onto-politics of data practices—i.e., the performative and political implications of border regimes' various data practices that make migration knowable and governable (see also Leese, Noori, and Scheel 2022; Oliveira Martins and Jumbert 2020). They postulate that migration must be *enacted* "as a single, coherent, measurable reality that can be ordered according to certain policy objectives through data practices" (Scheel, Ruppert, and Ustek-Spilda 2019, 585). The same can be said about border and surveillance infrastructures—information collection, radars, drones, vessels, satellites—as they seek to render visible (or invisible) specific forms and patterns of movement. In particular, scholars emphasize the *practices and technologies of (in)visibilization* that produce (non)knowledge about certain people and their movements, as Tazzioli and Walters (2016) correctly argue: "[M]igration visibility works not only as a means of surveillance and control but more importantly as a way of producing knowledge *on* migration and migrants" (p. 454). However, it is likewise the production of ignorance and nonknowledge—from omission, mistakes, or deliberate deflection—that can equally shape discourses and (digital) practices in the governance of mobility (Scheel and Ustek-Spilda 2019; Scheel 2020; 2021; Ustek-Spilda 2020).

In other words, knowledge and data do not simply *represent*; "[d]ata enacts that which it represents" (Ruppert, Isin, and Bigo 2017, 1). This is a *performative* process that intervenes in the politics of bordering, usually in the service of those in power. At the same time, the techniques of data extraction and collection at the border, and the knowledge they produce, are controversial and contested procedures—they are inherently technopolitical (Dijstelbloem, van Reekum, and Schinkel 2017; Pezzani and Heller 2019; Plájás, M'charek, and van Baar 2019; van Reekum 2019). Migration, as a coherent and actionable object, as well as borders and the wider "migration situation" (Feldman 2012, 20), must be rendered knowledgeable and represented by officials, policymakers, delegates, experts, or statisticians. This is illustrated, for

example, by Scheel and Ustek-Spilda (2019a), when experts mobilize "metrological realism" as a central epistemic technique to gain objective knowledge (p. 676).

Thus far, most studies have focused on various knowledge productions *at the border* and how technologies of visibilization and datafication have been shaped and used by various actor constellations. However, knowledge and representation also take place *before* the digital border. Little research has been conducted on the technoscientific and industrial sites in which (future) borders are designed and developed, conceptually emerging from the everyday discussions, visions, and negotiations between actors such as technicians, engineers, scientists, corporate industry representatives, and security professionals (Baird 2018; Binder 2020; Gammeltoft-Hansen 2013; Lemberg-Pedersen 2013; Martin-Mazé and Perret 2021; Schwertl 2018). Digital borders in the EU, for example, emerged under conditions that were shaped by EU funding programs and research and development programs, stakeholder and industry conferences, or in scientific laboratories (Bourne, Johnson, and Lisle 2015; Martin-Mazé and Perret 2021). Bourne and colleagues provide a rare meticulous account of how laboratory practices stabilize the (future) border, supported by the promises, norms, and values of a variety of actors:

> [B]ordering action emerges in the mediations of scientists, end-users, materials, international standards and policies, laboratory practices, immaterial imaginations, and phantasmic figures (terrorists, smugglers, border guards) as they circulate and combine with wider forces of political economy (from government funding to imperatives for fast and accurate bordering decisions).
>
> (Bourne, Johnson, and Lisle 2015, 309)

The case of eu-LISA will shed additional light on how borders must be imagined and represented upstream. Its various gatherings, roundtables, and conferences represent spaces in which various epistemic communities meet and interact, engaging in the laborious work of imagining, performing, and justifying digital borders and their solutionist promises. These are the first moments when large-scale databases are experimentally introduced, rendering the Schengen Area itself a *laboratory* (see chapters 3, 5, and 7). Furthermore, these spaces allow us to scrutinize how particular forms of expertise on future borders are forged and infused into policymaking processes in the border regime (see chapter 6). This thesis' empirical chapters will therefore focus less on the specific deployment of digital technologies and data practices *at* the border but rather on the gradual process of infrastructural *laboratorization* that is enabled through the interaction of heterogeneous actors drawn together from various fields, such as EU institutions, security professionals and technicians, national border and asylum authorities, the IT community, and the security industry.

1.3.3 Illuminating the apparatus

Unpacking the different forms of knowledge- and nonknowledge-making practices in the border regime sheds a light on what the anthropologist Gregory Feldman describes as the *acephalous world of migration policymaking* (Feldman 2011a; 2011b; 2012; 2014; 2019). Feldman (2014) has extensively examined this "de facto apparatus of migration management form[ed] through countless policy processes and [that] regulat[es] ex post facto what the EU now identifies as 'Area of Justice, Freedom, and Security'" (p. 14). In his work, migration management is approached as a heterogeneous field of elements and strategies that must be continuously brought into alignment and that connect different groups of agents, institutions, technologies, practices, and narratives (see also Shore and Wright 2011; Tazzioli 2020b). They also connect different policy portfolios, such as migration and asylum, borders and visas,

internal security and terrorism, and law enforcement cooperation, that are crafted by the European Commission's Directorate-General for Migration and Home Affairs.

Feldman's approach is instructive for understanding the EU's migration management strategies of combining the disparate elements, actors, narratives, and technologies that are tied to specific forms of mobility, ultimately producing migrant (il)legality. This approach is also useful because it explicitly integrates nonhuman artifacts into the analytical framework, such as the Asylum and Migration Glossary or interactive maps that become performative and standardize the patterns of behavior and language of officials, experts, security professionals, and border guards alike (see esp. Feldman 2012). At the same time, apparatuses and their decentralized organization change with the emergence of new "mediating agents" that "organize[] social relations between disconnected actors" (Feldman 2011b, 378). In this sense, this thesis places a particular focus on the burgeoning agency eu-LISA as such an agent and the increasingly dominant role that large-scale IT systems have played in its formation by "interconnecting," as Glouftsios (2021) rightly notes, "the spaces where controls targeting international mobility are enacted" (p. 453).

Moreover, and as I will argue in the next chapter, STS emphasizes two aspects that are indispensable for understanding apparatuses. It reminds us that material artifacts and infrastructure cannot be solely responsible for the convergence of the loosely affiliated network that apparatuses represent; *collective*, *imaginative work* is also necessary. Again, the case of the eu-LISA agency allows us, on the one hand, to observe the spaces in which actors such as experts, delegates, technicians, representatives, mediating brokers, and professionals gather and interact to draw up, perform, and represent future borders and visions of (in)security. On the other, it shows us how imaginative work is an integral part of building and administering databases, such as the Entry/Exit System or the European Travel and Authorisation System, and their interoperability. In brief, this thesis seeks to enhance our understanding of today's

"piecemeal formation of a comprehensive web of migration surveillance" (Feldman 2011a, 44), of which the digitization of EU borders has emerged as a central cornerstone. The thesis thus highlights the core actors and collective imaginations that constantly direct this apparatus toward the apprehension of migrants as well as the extraction and transmission of their data to state authorities.

1.3.4 Infrastructuring borders and migration

One of the most intriguing STS-informed strands in the border and migration literature focuses on processes of infrastructuring. Lin et al. (2017), for example, develop a broader frame of analysis by proposing to analyze migration through the lens of infrastructure, allowing them to "[shift] away from the people who move […] towards those human *and* nonhuman actors that move migrants within specific infrastructural frames" (p. 169). Thus, "migration infrastructures" conceptualize the formations of "interlinked technologies, institutions, and actors that facilitate and condition mobility" (Xiang and Lindquist 2014, 124). STS scholars have mobilized the concept of infrastructure/infrastructuring to analyze how infrastructure mediates and engenders the work that "configure[s] actors, elements and their relations, organize[s] access, incorporate[s] political agendas, and treat[s] some issues as irrelevant" (Pollozek and Passoth 2019, 619). More broadly, border infrastructures embody the sociomaterial entanglements that connect the digital and the physical and shape new relationships between authorities and technology, mobility and control, and states and people (Dijstelbloem 2021; Pelizza 2020; Pelizza and Van Rossem 2021).

Data infrastructures, such as the Schengen Information System II, as Bellanova and Glouftsios (2022) claim, "bring together hardware, software and users" and advance what they call "the flickering foundations of the Schengen Area as a controlled space" (p. 170). These are powerful *enablers* of networked control but are also highly fragile, as their ever-growing

capacity for data and information circulation is constantly undermined by technical failures and breakdowns (Bellanova and de Goede 2022; Glouftsios 2021; Pollozek 2020). The concept of infrastructure, therefore, prevents us from seeing border control as enforcing the ever-present and all-seeing *panoptic gaze* on mobility. Instead, as sociotechnical configurations in the making, the lens of infrastructure renders borders a provisional, incomplete patchwork (Dijstelbloem 2017; 2021; Tazzioli and Walters 2016). It directs our attention to the variety of methods of knowledge production through infrastructures; these may create migrations as visible and actionable objects, but are also always "dependent upon relatively regulated sequences of interpretation and movement" (De Goede 2018, 27; see also van Reekum 2019).

In their work on hotspots as an infrastructural assemblage, Pollozek and Passoth (2019) recommend considering the different modes, techniques, and strategies for moving people as *infrastructuring* (i.e., as a verb). Such a subtle conceptual shift would allow us to grasp the dynamic constellation of the involved actors, practices, narratives, and technologies through which people become digitized, filed, and processed—in short, it highlights the materiality of migration governance as a meticulous organization of mobility across space and time. As such, the practices of infrastructuring borders and security require a great deal of harmonization and standardization work—a core concern for the actors involved in the EU's governance of migration (Feldman 2012; Leese 2018; Walters 2011).

As scholars have inferred, infrastructuring also poses anew the question of *European borders* (Balibar 2009; De Genova 2017; Kasparek 2017; Walters 2009) in whatever form European or Europeanization may take in the changing configurations of the border regime. STS scholars of (border) infrastructure have complemented the work of technology historians whose arguments situate infrastructural projects at the core of Europe's integration project, which occurred long before official attempts at political rapprochement (Misa and Schot 2005; Schipper and Schot 2011). For example, scholars such as Pelizza (2020) and Dijstelbloem

(2021) or Amelung, Granja, and Machado (2020) have reinvigorated this debate by conceptualizing border infrastructures/infrastructuring as an essential additional component of the European project. They have made clear that in converting mobile populations into "European-legible" identities (Pelizza 2020, 262) border databases become inevitably tied to the infrastructural constructions of Europe. Processing *alterity* (Pelizza 2020) via transnational information systems is thus an integral part of European order because it underpins the bordering processes of social sorting and defining categories of belonging.

Most contributions in this line of research analytically focus on the techno-material aspects of infrastructuring. At times, this comes at the expense of the collective meanings, values, visions, and promises that any material infrastructure acquires and embodies to exert its power of ordering. This thesis, therefore, focuses on the visionary aspects of infrastructuring that deserve a more systematic analysis and have thus far been largely omitted from existing accounts of infrastructuring borders. It attempts to unearth the relationships between collective imaginations and digital infrastructuring, for instance, by exploring eu-LISA's efforts to design the imaginary of digital transformation (see chapter 3) or how "the very imaginability of Europe" (Hess and Kasparek 2019, 8) is fostered through the mundane practices of maintenance, care, and repair of data streams (see chapter 4). To clarify how my thesis contributes to and complements the above-mentioned themes, I will now turn to my own conceptual account and methodological strategy that explore the digitization of the border regime. I will justify my perspective on why we need to better acknowledge the central role of sociotechnical imaginations and their materializations in eu-LISA's construction of large-scale digital infrastructure.

2 Locating Sociotechnical Imagination in the Digital Border Regime: A Methodological Approach

The first, chaotically styled observation resembles a chaos of feeling: amazement, a searching for similarities, trial by experiment, retraction as well as hope and disappointment. Feeling, will, and intellect all function together as an indivisible unit. The research worker gropes but everything recedes, and nowhere is there a firm support. Everything seems to be an artificial effect inspired by his own personal will. Every formulation melts away at the next test. He looks for that resistance and thought constraint in the face of which he could feel passive. […] The work of the research scientists means that in the complex confusion and chaos which he faces, he must distinguish that which obeys his will from that which arises spontaneously and opposes it.

(Ludwik Fleck 1981 [1935], 94–95)

*

2.1 Introduction: Designing a method assemblage

This chapter begins with a perhaps unusual quotation by Ludwik Fleck—a pioneering figure in tracing the social and cultural conditions of science. The quotation could easily describe the early stages of social-scientific research. Research on the "social" is mostly procedural and iterative, and it often includes spontaneous and opposing observations that call into question researchers' presumptions, prejudices, or prepared hypotheses. As John Law (2004) argued, the

scientific method must deal with mess. Scientists should account for the *messy realities* they face rather than sanitizing and simplifying empirical reality by enclosing it in their ready-made boxes of social theory. For a simple, practical start, Adele Clarke and colleagues (2018) suggested that scientists should "enter a field of inquiry with curiosity and to emerge as a different person, with new ideas and concepts" (p. 85). Nonetheless, researchers require sensitizing devices and conceptual convictions that are capable of guiding their methodological directions and allowing them to confront the messiness of the empirical world while supporting them on the unfolding path of qualitative analysis.

In this chapter, I formulate an approach that prepared my research on the digital border regime to navigate through various messy situations and the conglomerate of what in Fleck's words first appear to be "complex confusion and chaos." Broadly, my work has departed from the assumption that these situations are always empirically constructed and constantly updated compositions; it is "[t]he situation we hold, the actions we [as researchers] take, the data we generate, and the analyses we construct" (Clarke et al. 2018, 7). To this end, I describe a *set of conceptual and methodological sensitizing devices and strategies* and propose to describe them in the context of John Law's metaphor of *method assemblage* (2004). A method assemblage preserves the principles of openness, non-closure, and multiplicity in research practice. According to Law, an assemblage

> needs to be understood as tentative and hesitant unfolding, that is at most only very partially under any form of deliberate control. It needs to be understood as a verb as well as a noun […]. So assemblage is a process of bundling, of assembling, […] in which the elements put together are not fixed in shape, […] but are constructed at least in part as they are entangled together.
>
> (Law 2004, 41–42)

My use of the metaphor *method assemblage* proposes an interconnected constellation of theoretical vantage points and sensitizing concepts, methodological orientations, or sensitivities—a set of analytical principles and empirical methods that has helped me to collect and analyze my data. In their constellation, they served to both imagine and set foot onto the geography of my unfolding field of research. Method assemblages may at times appear messy and unsatisfactory in research practice; however, they map and correspond well to the complex and indefinite ways in which our world is enacted. At the same time, they should not be considered as an arbitrary choice, but rather as being assembled in specific ways to craft or— remaining with Law's terminology—*enact the hinterlands* that tie the researcher's practices, methods, and the situation of inquiry together. In this work, the scientific method itself is situational and procedural; it becomes *performative*. Rather than the application of a pre-defined set of rules and techniques, method assemblages enact realities rather than uncover a singular reality—"out there"—that claims to be prior or beyond research practice.

In the remainder of this chapter, I will bundle together sensitizing concepts, methodological sensitivities, and the designed methods for the data collection and analysis. I begin by formulating a co-productionist approach to *sociotechnical imagination* in the digital border regime. I thereby attempt to bring together two main lines of thinking that run through this thesis: sociotechnical imagination and digital infrastructure. I deduce from these sensitizing concepts the methodological need to be specifically attentive to performance, practice, and narration. I then explain the sets of empirical data that were collected for the analysis from 2018 to 2021. Returning to Adele Clarke, I describe how this empirical material has produced the various *units of analysis*. Lastly, I end on a more personal reflection on my intervention and acting as researcher in the border regime and point to some (not all) limitations of my thesis.

2.2 Sensitizing concepts

2.2.1 First point of departure: Imagination and infrastructure in governmentality

Imagination and infrastructure are two frequently used conceptual notions that may seem to point to opposite directions. Imagination, or the imaginary, point to the blurry realm of ideas, ideologies, doctrines, fantasies, the abstract and symbolic. Infrastructure, at least according to its original understanding, is commonly associated with materiality, physicality, substance or substrate (Carse 2016). The following section represents my attempt to connect these two notions, to better conceptualize and understand the inner-workings and operations of the border regime and the meaning of contemporary border (in)security in Europe.

An obvious important theorist to consider in trying to understand border regimes' governmental logics and mechanisms has been Michel Foucault. For instance, Feldman (2012) developed Foucault's notion of the *apparatus of security* to grasp how the EU's migration management is composed of "a bewildering array of actors, knowledge practices, technical requirements, labor regulations, security discourses, normative subjectivities, and repurposed institutions that create the conditions for the orderly movement of bodies by the millions" (p. 180). In somewhat simplifying terms, apparatuses pursue a double purpose of controlling populations and managing economy at a particular historical conjuncture. The central function of apparatuses is to *enable and manage circulation* "whether that means the circulation of data, people, diseases or commodities" (Aradau and Blanke 2010, 54). In the context of borders, this description almost seems to be a contradiction. However, as previously elaborated, contrary to their popular representations of walls and fences, borders are also *machineries of sorting* (Mau 2021) that must curb and prevent the mobility of some while enabling the circulation of others—whether they be people, capital, commodities, or information. In Michel Foucault's lectures on *Security, Territory, Population* (2009), which have been broadly cited in the field

of critical border and security studies, apparatuses produce particular types of knowledge and orchestrate particular practices for organizing and optimizing circulation, sorting out what is perceived as dangerous, classifying "good" and "bad" elements, etc. (see earlier on pp. 31–32).[10] As Foucault (2009) explains, one of the core features of apparatuses is "that one works on the future" and a permanent preoccupation with anticipating and regulating an "indefinite series of events" (p. 20).

A rather neglected aspect in the vast literature on apparatuses and biopolitics of borders, collective imagination plays a crucial role in the apparatus because it can design, shape, and sustain what constitutes the futures, values, ideas, and identities with which populations are governed. Collective imagination is thus also an inevitable agent of the apparatus' own reproduction under conditions of general uncertainty. It informs the selection of threats and dangers that must be identified and prevented; it constructs and affects *possible futures* that must be rendered knowable (to be governed).[11] For Foucault, then, the very idea of defining *security* as a problem of managing populations is grounded in (re-)imagining the operations, strategies, and techniques that bring it into being as a new *form of governmentality*. Security is the

> ensemble formed by the institutions, procedures, analyses and reflections, the
> calculations and tactics that allow the exercise of this very specific albeit complex

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[10] Foucault elsewhere defines the apparatus as a dispositif consisting of "strategies of relations of forces supporting, and supported by types of knowledge" (Foucault in Rabinow 2003, 53). Bussolini (2010) points to this concept's anticipatory and logistical orientation in referring to its etymology: "Apparatus, or adparatus, from apparo in Latin, refers to a preparation or making ready for something: a furnishing, providing, or equipping. It has the sense of laying in sufficient supplies, provisions or instruments, of establishing a plan to deal with a situation by ensuring the proper supplies" (p. 96).

[11] Scholars have mostly analyzed this concern with the future in the so-called war on terror through the prism of risk (Amoore 2011; Aradau and van Munster 2013; Hall and Mendel 2012; Opitz and Tellmann 2015b).

form of power, which has as its target population, political economy as its major

form of knowledge, and apparatuses of security as its essential technical instrument.

<div align="right">(Foucault 2009, 108)</div>

A second crucial aspect of security apparatuses is the role of technological infrastructures for governmental rationalities as they reveal the underlying "built networks that facilitate the flow of goods, people, or ideas and allow for their exchange over space" (Larkin 2013, 328). Infrastructure supports and stabilizes apparatuses, for instance, by guaranteeing, and thus often naturalizing, their operations of management, regulation, and control. They are crucial for silently responding to a core puzzle of this modern governmentality: "*How* should things circulate or not circulate?" (Foucault 2009, 65; emphasis added). Along the same lines, Paul Edwards (2003) writes that "[i]nfrastructures constitute an artificial environment, channeling and/or reproducing those properties of the natural environment that we find most useful and comfortable; providing others that the natural environment cannot; and eliminating features we find dangerous, uncomfortable, or merely inconvenient" (p. 189). Both *imagination and infrastructure*, future visions and their material inscriptions, play crucial parts in the governmental logics of security apparatuses.

2.2.2 Second point of departure: The co-production of technological and political orders

Turning to imagination means to investigate a particular form of power in making and sustaining digital borders in the EU. Imagination is what political theorist Yaron Ezrahi (2012) describes as one of "the most neglected form of power in the field of modern political science" (p. 7). However, there has been a growing recognition in the fields of social sciences and humanities of the *capacity to imagine* as a crucial constitutive element in shaping social and political life. Social scientists have attempted to come to terms with imagination's potentially

world-configuring impact—crystalizing it in fictions, illusions, metaphors, ideologies, and many other forms. However, imagination points to the sphere of ideas, memories, or images, and thus has an elusive quality, which requires us to make some strategies for its operationalization explicit.

One strategy to account for imagination is what STS has called the *co-production of knowledge and order* (Jasanoff 2004b; see also Felt 2015; 2017a; Jasanoff and Kim 2009; 2015; McNeil et al. 2017; Rommetveit and Wynne 2017). Jasanoff (2004b) define co-production as "shorthand for the proposition that the ways in which we know and represent the world (both nature and society) are inseparable from the ways in which we choose to live in it" (p. 2). The ways in which knowledge is produced, ordered, and represented are inextricably linked to how societies arrange and configure their ways of living. Co-production scrutinizes forms of governance and power by exploring how knowledge is enmeshed in technological and political practices and embedded in the materiality of technological systems. Co-production can also be an *idiom* that assists us in describing networks of knowledges, people, policies, and material artifacts that account for the emergence and stabilization of security apparatuses.

Science and technology are sites of co-production because they frequently carry or encapsulate social and moral order; they incorporate more or less collectivized visions of how social life ought to be lived and attained and what perils and threats must be prevented (Jasanoff and Kim 2009; 2015). Technological and scientific innovation persistently pursue and shape collective forms of ideas, promises, fictions, and ideals of larger social groups. They often crystalize in collectively imagined futures that guide individuals and societies in organizing life and order and articulate "society's shared understanding of good and evil" (Jasanoff 2015a, 4). Similar things can be said of making material infrastructures (Anand, Appel, and Gupta 2018; Hetherington 2016; Larkin 2013). For instance, Ribes and Finholts (2009) speak of *the long now* of material infrastructures that testify to the social desires and futures inscribed into their

design or by continuing maintenance work to keep them alive. Imagination shapes *infrastructuring* processes such as the creation and design of large-scale technological systems, the construction of standards and interfaces, or the practices of categorization and classification through which societies envision the governing of subjects (Bowker and Star 1999; Scott 1998).

Work in STS thus often proposes to examine collective imagination more closely to trace the *co-production of technological and social order*. These are not simply variations of the old idealistic claim that *ideas drive history*—imaginaries do not fall from the sky, but are always embedded in their own materialities (Balibar 2002, xiii). Co-production instead captures the perpetual interplay between technology, politics, and society. It is interested in notions such as *technological imagination* and how that sparked artistic or political movements such as the Italian futurists (Berghaus 2009), or *techno-cultural imaginaries* (Prasad 2014) and *techno-scientific imaginaries* (Marcus 1995) that have grappled with how social and political knowledges and the materiality of technosciences are mutually entangled. Prasad's concept of *technocultural imaginaries*, for instance, points to manifold narratives, desires, and material worlds that interweave the realities and (national) myths in techno-scientific developments. As a space of knowledge-making, laboratory activities, and technical expertise, techno-science is inevitably engrained in (potentially shifting) local cultures and hierarchical networks of power and administration. Similarly, the anthropologist George Marcus (1994) described the "various kinds of scientific practice in their fully embedded social and cultural contexts" (p. 4).

Scientists, technicians, and engineers pursue imagined social purposes; however, they are also always nurtured and intertwined with practices of researching, with manufacturing and developing techno-scientific and infrastructural artifacts (Aarden 2017; Fujimura 2003). These practices encode broader ideals, visions, promises, and desires. *Co-production* is perhaps the most consequent framework for these entangled processes, as it also rejects the misleading emphasis of some of the above outlined notions on the "social and cultural context" in which

technological systems evolve; "context" can never be presumed, but is always brought into being through the various situated practices and materialities of technology (see also Latour 1987).

2.2.3 Third point of departure: Zooming into the ordering work of imagination

Political imagination

Political theorists such as Benedict Anderson, Cornelius Castoriadis or Charles Taylor have conceptualized the role of imagination as a key to solve the puzzle of the historical emergence of phenomena such as nations and nationalism. If properties of imagination are "deemed irrational or arbitrary and therefore not to offer reliable accounts of reality" (McNeil et al. 2017, 436), then why, Castoriadis wondered, does the imaginary potential of the nation appear to be more enduring than all other realities (1990, 255). Anderson's (1991) groundbreaking study of nationalism revolved around a similar question: how could the nation emerge as a finite and sovereign entity, a powerful provider of "horizontal comradeship" that demanded socially accepted "colossal sacrifices" (p. 7)? In his answer, he explained that the nation persisted as an *imagined community* and thereby gave a particularly striking example of the potential consequences of collective imagination for social and political life. Imagined political communities thus testify to the existence of a shared mental life that articulates itself in invented traditions and standardized narration of histories, thereby acquiring the power to sustain and legitimize order (see also Hobsbawm and Ranger 1983; Renan 1990).

The notion of the *imaginary* captures the ideational, often diffuse and emotionally charged, but also strongly homogenizing construct that binds people together and produces

shared systems of meaning and identity.[12] As Claudia Strauss (2006) argues, the decisive question in the study of imagination concerns the relationship between individual and collective imaginaries, a recurring theme that she traces back to Marx's famous theses on ideology and commodity fetishism (p. 323). Strauss finds that imaginaries need to "have a concrete location in material objects, institutions, and practices" to become *collectivized* in the first place (p. 325). Scholars like Taylor, Appadurai and Anderson have acknowledged this in different ways by understanding imagination as an *organized field of social practice*; as Appadurai (2010) claimed, "no longer mere fantasy […], no longer simple escape […], no longer elite pastime […], no longer mere contemplation," but a central component for the making of new worlds and global orders (p. 31). Likewise, Taylor (2004) anchors the social imaginary as an emerging, underpinning *fait social* of collective social life in Western modernity. It does not merely mark out a set of ideas of beliefs, but rather "is what enables, through making sense of, the practices of a society" (p. 2). For Taylor, the imaginary of modernity becomes a socially accepted form of moral and social order, generating "common practices and a widely shared sense of legitimacy" (p. 23) for institutions such as the modern market economy, the public sphere, or the self-governing of people.

Yaron Ezrahi (2012) perhaps most explicitly identified the power of imagination in social and political life as a central building block of political orientations and systems such as liberal democracy. *Political imaginaries*, he argues, must produce necessary fictions that are adopted when societies establish political systems. Ezrahi's political imaginaries are brought into being by "fictions, metaphors, ideas, images, or conceptions that acquire the power to regulate and shape political behavior and institutions in a particular society" (p. 3). The

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[12] Castoriadis (1990) notes that the imaginary is as pervasive in modern, rationalized worlds than it was in "archaic" or historical cultures. For instance, as he argues, the modern bureaucratic rationality in Western capitalism has emerged as a specific historical figure of the imaginary (pp. 272–73).

importance of his conception lies in his emphasis on how imaginaries define (and strengthen) the relationship between individuals, societies, and states once they become naturalized and are made hegemonic. *Political power*, then, relies on performances and affirmations of imaginaries. They ritually produce shared norms, cultural values, collective desires and futures, thereby assembling and characterizing political cultures (Berezin 1997; Jasanoff 2005). Imaginaries connect the affective dimensions of politics, the field of ideas, norms, values, and culture through which groups collectively strive towards possible futures. They thus differ from ideologies in so far that they do not necessarily represent entrenched, explicit systems of ideas and ideals. Nor do they represent the distorted interests of the people or articulate false consciousness. The imaginary forms a potentially powerful, productive quality precisely because it is embedded into social practice and—as we will see—often (tacitly) encoded into scientific production, material infrastructure, and technology.[13]

Sociotechnical imaginaries

In *Dreamscapes of Modernity*, Jasanoff and Kim (2015) have collected a set of comprehensive investigations into the role and power of *sociotechnical imaginaries* (see also Jasanoff and Kim 2009; 2013). They define sociotechnical imaginaries as "spatially and temporally larger and more symmetrically" than conventionally held imaginations. They are *larger* because they can span over communities, nation-states, transnational regions, or even over the entire globe. They are additionally *more symmetrical* because they are essentially concerned with "mutual emergences in how one thinks the world is and what one determines it ought to be" (Jasanoff

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[13] In a revised version of *Imagined Communities*, Anderson (1991) also explicitly acknowledges the role of technology in building colonial nations by illustrating how technologies such as the census and the map produced the "grammar" of a national people, and, vice versa, influenced the style of imagining the colonial state (pp. 163–85).

2015a, 22), but also address the mutual entanglement of technological and scientific trajectories with political power, social morality and institutional hierarchies. In Jasanoff's words, sociotechnical imaginaries investigate

> how, through the imaginative work of varied social actors, science and technology become enmeshed in performing and producing diverse visions of the collective good, at expanding scales of governance from communities to nation-states to the planet. This is why we choose the term "*sociotechnical*" (not technoscientific) to characterize our elaboration of imaginaries.
>
> (Jasanoff 2015a, 11)

As indicated above, imaginaries offer nuanced ways to study what Jasanoff terms the processes of co-production. Initially, the modern nation-state was perceived as a primary unit of analysis to trace the emergence of imaginaries (Jasanoff and Kim 2009; 2013). Nations were hereby not conceived as analytical black-boxes or containers, but rather as dynamic formations that need to be continually (re-)imagined and performed along with the projected visions of progress and future. Based on Anderson's work, STS has now produced a robust literature on national imaginaries, which are particularly germane to the study of large-scale technological innovation operating "as sites of contemporary state-making and societal reconfiguration" (Pfotenhauer and Jasanoff 2017, 788). In *Dreamscapes of Modernity*, Jasanoff and Kim (2015) explicitly extend the concept to investigate imaginaries not only as part of the national reservoir of power but also as "collectively held, institutionally stabilized, and publicly performed visions of desirable futures, animated by shared understandings of forms of social life and social order attainable through, and supportive of, advances in science and technology" (p. 4). As such, imaginaries provide a strong explanatory potential for why (some) social groups or

communities pursue specific sociotechnical trajectories, goals, or policies (and others do not)—for instance, via governmental authorities and institutions, scientific representatives and organizations, or expert bodies. The sources, instruments, and materials through which they perform and anchor their conception of a desirable (or undesirable) future can be likewise diverse: policy documents, official discourses, shared narratives, public announcements, scientific reports, advertisements, and many more artifacts can potentially integrate and diffuse "deep-seated beliefs and cognitions embodied in a polity's vision of the world and what needs to be done" (Hilgartner, Miller, and Hagendijk 2015, 7).

Imaginaries, in other words, are reservoirs of power that are mobilizable by a myriad of collectives on different scales. As STS scholars have illustrated in various ways, sociotechnical imaginaries can solidify on a global level (Miller 2015), manifest on regional scales, or be translated from supra-national into national contexts (Mager 2017); they can be carried and promoted by smaller "vanguard" groups (Hilgartner 2015)—for instance, by commercial and industrial collectives (Sadowski and Bendor 2019), professional experts (Ruppert 2018), and global elites (Schiølin 2020).

Tracing imaginaries-in-the-making

For all its explanatory potential, the concept of imaginaries is difficult to operationalize. How can we trace powerful performances of imagination, visions of progress and future, and their materializations? And where to locate the collective actors that are powerful enough to design, stabilize, and diffuse them? Jasanoff (2015b), Felt (2015; 2017a; Bayer and Felt 2019), and Hilgartner (2015), amongst others, have insisted on following and tracing sociotechnical imaginaries from their early design to their stabilization and extension across space and time.

Felt's (2015) understanding has been particularly helpful, as she insisted on the need to focus on the gradual process of making and consolidating imaginaries—through acts of assemblage, rehearsal, and stabilization. Her case of the Austrian imaginary of *keeping technologies out* illustrates how a particular vision of a technopolitical future was assembled by various visual and discursive narratives and collectivized until "[s]uccessful rehearsals gradually lead to stabilization through the creation of standardized history […] where few other interpretations are given space" (p. 118). Visions of progress and desirable futures may be designed by what Hilgartner calls *vanguards* and subsequently advertised among their communities; however, they ultimately need to be collectivized to determine the wider relationship between society, politics, and technoscience.

These processes are far from self-evident; they are deeply engrained in, and contingent on, a myriad of cultural, social, and material practices that require deeper scrutiny. Social actors need to develop their capacities and instruments to carry out acts of assemblage and rehearsal as a community. Future visions must be disseminated, stabilized, and ultimately translated into dominant imaginaries. As we will see, I suggest considering the eu-LISA agency as an excellent case of how social groups can acquire the material and organizational resources not only to promote but also rehearse and, to a certain degree, stabilize their visions of progress and future. Here, the making of a sociotechnical imaginary becomes entangled with, and gradually embedded in, the growing digital infrastructure of the EU border regime through technological innovations, policies, and political initiatives.

Empirically tracing sociotechnical imaginaries requires us to be attentive to communities or social worlds as well as the material structures involved in their production, performance, and dissemination. The gradual extension of imaginaries is hardly ever a linear or natural process; it is contingent on the individuals, collectives, narratives, and performances and usually confronted by various obstacles, contestation, and failures. It is important to note

that rival visions, dissent, or contesting actions always occur on the imaginary's path to extension or durability; however, once they become integrated into the practices of governance, imaginaries tend to "structure the life worlds of larger groups" (Jasanoff 2015b, 239) and become increasingly difficult to be replaced with alternative visions of progress or the public good. Nonetheless, I contend that imaginaries are hardly ever fully "closed" and continuously remain in the making. If we zoom into the spaces of imagination as well as the myriad of small scales of social, epistemic, and material practices, we can observe a wider heterogeneous, dynamic network of actors, discourse, policies, and technologies that is constantly on the move and never fully stabilized, permanently renegotiating the relationships among its elements. Here, we enter the "understudied regions between imagination and action, between discourse and decision, and between inchoate public opinion and instrumental state policy" (Jasanoff and Kim 2009, 123).

At the same time, this is not to say that the translation of vanguard visions into imaginaries does *not* develop a homogenizing force among the actors required to make them durable. Multiple ideas or visions among different communities may be at play and even in contention; however, it is the performative power of imagination that can filter, combine, repackage, or standardize narrative framings and epistemologies (while suppressing others). Often, this performative power aligns a vaster, heterogeneous actor-network consisting of officials, national delegates, experts, and industry representatives to support and disseminate a sociotechnical imaginary.[14] In this way, collective imagination is enacted in the formation of the digital border regime, this "outrageous and heterogenous collage" (Law 1991, 18), that performs what is commonly referred to as the *European* management of borders and migration.

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[14] This point is strongly made by Kim's (2015) reconstruction of the formation of the dominant sociotechnical imaginary in South Korea, which suggests that wider networks of actors on multiple scales were needed to sustain and extend the Korean imaginary.

2.2.4 Fourth point of departure: Infrastructuring borders

Slota and Bowker (2017) provide a useful definition of infrastructure that is highly reminiscent of what Foucault's apparatus or *dispositif* aimed to unravel—"infrastructure," they argue, "is not so much a single thing as a bundle of heterogeneous things (standards, technological objects, administrative procedures […])—which involves both organizational work as well as technology" (p. 531). Such a relational and procedural approach must trace how social, political, legal, and technical elements become arranged to form a larger, powerful network. In his study on the formation of borders in Europe, Dijstelbloem (2021) suggested something along similar lines, claiming that borders should be understood *as infrastructure*. This heuristic lens perceives borders as emergent sociotechnical arrangements in which both human and non-human elements interact and turn into *mediators*. In other words, they enable

> *interactions* among actors, institutions, and technologies that constitute borders generate *changes* that affect the constituting elements, from which new relationships and entities emerge. [… T]hey include the circulation of all kinds of information, knowledge, and techniques. […] Combining the functions of managing passenger flows, checking goods, and regulating migration at the airport leads to new connections and disconnections among the actors, institutions, and technologies that execute these tasks.
>
> (Dijstelbloem 2021, 5)

In this thesis, eu-LISA's digital infrastructure will serve as a particularly well-suited example for how these connections and disconnections are made and maintained. New digital borders can also only come into being through successfully mediating heterogeneous actors,

institutions, and technologies. I am not using the adjective "digital" here to suggest that IT systems such as Eurodac or the Visa Information System were purely virtual phenomena. To the contrary, their *infrastructural* quality is defined by the "institutional, physical and digital means for storing, sharing, and consuming data across networked technologies" (Kitchin 2014, 32). In an analysis of the Schengen Information System (SIS II), Bellanova and Glouftsios (2022) explicate this point by elaborating on infrastructures in the border regime:

> They are both "things" – fairly complex material entities, storing an enormous amount of digitised information – "and also the relation between things", i.e. means of data-based cooperation across spatial and organizational boundaries (Larkin 2013, 329). [… They] interlink[] geographically dispersed sites and state authorities that are enmeshed in the control of international mobility across the EU.
>
> (Bellanova and Glouftsios 2022, 161)

During this thesis, I will continuously return to two core aspects that are essential for my understanding of digital infrastructure. First, digital infrastructure must be permanently redesigned, monitored, maintained, and repaired in order to create the preconditions for data to be produced, processed, circulated, and shared—in short, to create the silent and invisible material conditions to govern mobility via classifying and sorting procedures. This means that there is a wide array of *infrastructuring work* at play—construction work, fixing and cleaning communication networks, coordination, monitoring, and prevention, and with that work comes a whole actor-network of technicians, employees, officers, and experts. This work is usually conducted in the mostly invisible background of information systems and can only be found in what Star (1999) describes as the "traces left behind by coders, designers, and users of system" (p. 385).

However, visibility and invisibility are crucial elements of the *politics of infrastructuring* (Anand, Appel, and Gupta 2018; Larkin 2013). Maintenance and repair work *invisibilize* infrastructures as they ensure their continued taken-for-grantedness and normalized use, which produce the powerful effects of order (Star 1999). Maintenance and repair, for example, should to be taken as inevitable parts of the *technopolitics* of borders and investigated as subject to the political negotiations, controversies, and social struggle that shape the design and development of (digital) borders (Bellanova and Glouftsios 2022; Dijstelbloem 2021; Glouftsios 2021; Graham and Thrift 2007; Sontowski 2018). It would be misleading to locate infrastructural power only in the invisible, sustaining background work of infrastructures. As previously noted, infrastructures "are not just technical objects but also operate on the level of fantasy and desire. They encode the dreams of individuals and societies and are the vehicles whereby those fantasies are transmitted and made emotionally real" (Larkin 2013, 333). Larkin considers the symbolic dimensions of infrastructures as *metapragmatic* objects that must also be perceived as "signs of themselves, deployed in particular circulatory regimes to establish sets of effects" (p. 336).

The visions and values, the promises and futures of societies and polities are thus not simply and only scripted into infrastructure through the silent and invisible work of maintenance and repair. All too often, they are (publicly) staged and performed through and with infrastructure or gradually realized through infrastructural initiatives. As Dijstelbloem (2021) argues, infrastructural (in)visibility "much depends on the event at hand and the specific constellation of actors, institutions, and technologies" (p. 178). With this in mind, we can begin to see how eu-LISA's digital infrastructure is not simply a backstage tool in bordering Europe, but also generates particular visible effects and operates as a vehicle that stores and displays collective imaginations of (in)security, future borders, or European identity (—as discussed in later chapters).

2.3 Methodological sensitivities

2.3.1 Following an agency as both a multiple and single actor

As argued in the Introduction, eu-LISA serves as an empirical case through which I can follow the various sites of creating digital borders in Europe. It provides a distinguished example that attunes us to the mutual constitution of collective imagination and digital infrastructure in the border regime. eu-LISA often brands itself as a "Schengen information engine"; however, upon closer inspection and with our sensitizing concepts, we are now cautioned against accepting the mechanistic (and seemingly innocent) rhetoric of an "engine" that delivers "raw" information on travelers and migrants. Instead, this thesis will illustrate how such engine implicates a vast range of social, epistemic, and infrastructural labor for imagining and sustaining digital borders. Furthermore, eu-LISA exemplifies how a continuously increasing amount of data collection and data processing transforms the ways in which border (in)security can be imagined, articulated, and justified.

Studying the agency and its activities means to grasp its role as a *single* institutional body in the border regime that represents, tests, and affirms values, forms of expertise, knowledges, and justifications. At the same time, eu-LISA also allows me to investigate the acephalous interaction between heterogeneous actors—policy officials, bureaucrats and delegates, industry representatives, brokers, experts, and technicians from national governments and agencies—that are all involved in rehearsing and stabilizing imaginaries, aligning policies, and normalizing border dataveillance. This peculiar tension of examining the eu-LISA agency as single and multiple will be present throughout the thesis. I do not intend to resolve this tension; I suggest rather drawing on it as analytically productive element. This has led me to inquire the agency's role as a *vanguard* in designing a sociotechnical imaginary of

the future while also aligning a wider actor-network to support and embed this imaginary (see chapter 3). Furthermore, I was able to study the agency as a single European body that repeatedly performs a coherent European identity while, at the same time, representing a negotiated, dispersed, and fractional infrastructure (see chapter 4). In sum, the agency carries us, as researchers, to the multiple sites at which collective imagination and infrastructuring work is performed. The full spectrum of its activities and significance can only be revealed by following the agency as both a multiple and single actor.

2.3.2 Performing narration and practice

I propose to develop two notions that will further operationalize the conceptual directions for my analysis: practice and narration. I thereby proceed in the spirit of a long-standing STS tradition that has been devoted to studying the (public) performances of technoscientific instruments, scientific methods, and scientific results as absolutely crucial and highly contested sites for the production of power and social order. As Annemarie Mol (2002) points out, performance has more than one connotation. In her *praxiographic* understanding, she investigates performances "not only [as] social, but material as well" (p. 40).[15] Practice always both performs and is performed in particular ways. As scholars of critical security studies argue, practice can therefore constitute and maintain "complex relationships with security discourses, legal regimes and policies" (Côté-Boucher, Infantino, and Salter 2014, 196).

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[15] In *The Body Multiple*, Mol (2002) ultimately decides to choose the notion of *enactment* over that of performance. Although appreciating the performance metaphor's praxeological inquiry, she expresses hesitancy to adopt this notion for some of its "inappropriate connotations"—e.g., the suggestion that a real reality is hidden behind performative acts or the assumption that there are effects beyond the moment of performance (p. 40). However, for our purpose, the metaphor of performance, with its connotation of frontstage and backstage, will in fact prove perfectly valuable (see esp. chapter 4).

Schatzki's (1996) seminal work on the conceptual *turn to practice* in the social sciences considers practice as a "temporally unfolding and spatially dispersed nexus of doing and saying" (p. 89). This understanding can provide a more solid grounding for unearthing the *meanings* that imaginations and visions acquire in the border regime and how they are materialized through technologies and infrastructure. As Schatzki (1996) explains, "[e]ach of the linked doings and sayings constituting a practice is only in being performed. Practice in the sense of do-ing, as a result, actualizes and sustains practices in the sense of nexuses of doings" (p. 90). In other words, through performance, both social and material elements of imaginations, visions, and narratives are made meaningful.

It is precisely what Schatzki calls *nexuses of connection* that need to be enacted and reproduced by the sayings and doings of actors and on which the methodological focus of my inquiry into the digital border regime will focus. Here, practices are conceived of as "embodied materially, mediated arrays of human activity centrally organized around shared practical understanding" (Schatzki 2001, 11). Following Schatzki, Stanley Blue (2019) highlights how routine and regularity play crucial roles in connecting and stabilizing nexuses of connection. However, nexuses need not be exclusively established or characterized by the frequent repetition of sayings and doings. The more extraordinary and public performances of collective imagination can equally establish nexuses of sayings and doings and interweave narrative threads to produce shared understandings, collective meanings, or justifications, i.e., of what new digital borders must mean and represent.

Sayings and doings inevitably include *narrations*. Narration as a repeated performance makes sense of social action more generally, but also potentially endures and stabilizes social order. Narratives are not necessarily fixed from the beginning; they can be altered, contested, and renegotiated. However, their continued performance can solidify and transform them into legitimized types of knowledge or naturalize the relations between technologies and the forms

of governance. In Czarniawska's (2004) words, a narrative can become a *mode of knowledge* that organizes "experience with the help of scheme" (p. 7) while also transmitting interpretation, meaning, and stories as a *mode of communication*. Tracing narratives means to understand them as *constitutive practices* through which actors establish, make sense of, or justify ideas and representations of technologies. Through narratives, technologies can be introduced as both material and social artifacts from the beginning; in other words, databases, their digital infrastructure, and visions of border (in)security are woven into collective narratives and enacted in textual and visual ways. Narratives accordingly not only manifest in "spoken or written text giving an account of an event/action or series of events/actions, chronologically connected" (Czarniawska 2004, 17); they can also appear in (series of) visual graphics, tables, or pictures.

These manifestations obtain their efficacy from the particular social and epistemic conditions and circumstances in which narratives are set. Connecting events and action, every narrative operates as what Law (2002) would call a "strategy of coordination"—a form of ordering "of what might otherwise be disconnected objects" (p. 70). In this sense, agents, interaction, meaning, and materiality can be assembled into *stories* that organize a series of events into an *intelligible whole*. In distinguishing stories from narratives, Felt (2017b) uses the Deuten and Rip's metaphor of *narrative infrastructures* to underline that we are not simply dealing with a collection of loose stories, but rather a network of temporally stabilized narratives through which knowledges, meanings, and values can be circulated and exchanged across space and time. Contrary to a story, narratives are then *collective* and may emerge in clusters; they are always employed "in material settings and the situation [that] are essential ingredients" (Deuten and Rip 2000, 73).

To connect the elements presented in these conceptual and methodological elaborations, practices and narrations serve as important heuristic notions that provide a more profound

understanding about the ways in which sociotechnical imagination is shaped and performed. These notions are key to understanding how imagination gets woven into infrastructure or inform the infrastructuring practices in the border regime. In other words, practices and narrations allow us to identify the elements and relations that comprise sociotechnical imaginaries and the sites, moments, and technologies of their materializations. We can now better comprehend the documents, ethnographic observations, and interview situations as (empirical) *sites of narrative production* where actors generate, and re-produce, shared forms of knowledge, communication, and imagination.

2.4 Collected material and analysis

2.4.1 Documents

The materials analyzed through the above-elaborated lens have been collected through ethnographic methods—the first set of which consists of *documental artifacts*. As Annelise Riles (2006) argues, documents are paradigmatic artifacts of modern knowledge practices, and as distinct narrative discourse materials, they are integral to almost any form of ethnographically oriented research. The gigantic bureaucratic machinery of the EU is notorious for its vast production of various forms of documents. The EU relies on written documents as "durable reports that store, process, and update images of reality" (Dery 1998, 678). As a bureaucratic organization, it creates, maintains, and lives by what Dery calls *papereality*, a world of symbols and representations that can powerfully obtain primacy over the things and events represented.

The sheer volume and diversity of documents by the EC, the Council, the various European agencies, working groups, and other bodies invite us to speak rather of plural *paperealities*. For my analysis, I selected documents from on a very diverse body of 106

documents collected prior to and during my fieldwork, including legal regulations, official communications by the EC, conference reports, technical reports and information brochures by eu-LISA, reports by working groups, or opinion and study reports authored by institutions such as the Fundamental Rights Agency (FRA). Additionally, I consulted the website of the NGO Statewatch, which regularly releases official or disclosed documents of EU institutions or composes brief reports on negotiations and comments on general developments.[16] I also occasionally drew on newspaper websites that covered issues relevant to the topic, such as the founding of eu-LISA. The core thematic focus of documents has been related to the agency's project and activities, the creation of new IT systems, and the interoperability policy.

These documents cannot be treated by the analyst in equal terms; rather, they had to be selected according to their intention and their style of writing and mobilized at different stages of my analysis. In short, they can significantly differ according to "the practices, objects, rules, knowledge, and organizational forms that produced them" (Shankar, Hakken, and Østerlund 2017). For example, official communications by the EC such as the "Communication from the Commission to the European Parliament and the Council—Stronger and Smarter Information Systems for Borders and Security" (2016) aim to set a broader agenda, determine issues and "problems" of migration, and legitimate future legislative proposals on digital border technology. In contrast, working group reports published by eu-LISA such as the "Report of the Working Group on ICT Solutions for External Borders (sea/land)" frame and detail the challenges of bordering in very particular ways, incite actors—from national delegates to industry representatives, and are circulated via email to participants of industry roundtables. They seek to create common ground to facilitate discussion. For instance, an email by eu-LISA to registered participations would typically request: "[I]n order to support the exchange of

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[16] Statewatch's work is available at https://www.statewatch.org, accessed April 5, 2022.

precise and fruitful information at the event, documents outlining the outcomes of the Working Group have been made publicly available on eu-LISA website […]. Those intending to participate are kindly requested to make themselves familiar with the content of those documents."

Such examples point to the multiple ways in which documenting and documents enact paperealities. In my view, they should not be underestimated: officials and experts repeatedly and officially claim that documents legitimize their activities, narratives, and discourses; in various ways, then, documents are *constitutive* and have a transformative capacity (Asdal 2015).[17] Just like the production of other textual artifacts, such as PowerPoint slides at conferences, which I also considered important artifacts for my analysis, *documentation* is a practice that reflects, performs, and justifies ideas, narratives, and imaginations. Documentation carries "abstract semiotic constructions through time and space" and can embody multiple histories (Shankar, Hakken, and Østerlund 2017, 62).

2.4.2 Interviews

Interviews constitute another major empirical set of sources. In the spirit of Clarke and colleagues (2018), I see interviews as narrative production sites (pp. 241–68). Over the course of my fieldwork, I conducted in total twenty-eight qualitative interviews and multiple informal conversations. I designed the interviews as semi-structured conversations and oriented the protocol towards my overall research questions (broadly following Silverman's suggestions [2006, 109–53]). Interviews were conducted either in person or over telephone or Voice-Over-IP, and they were subsequently transcribed (with one exception). All conducted interviews were

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[17] Asdal's (2015) approach to documents is explicitly praxeological, i.e., "pursuing a practice perspective on texts with an interest in exploring the ways in which documents enact, or take part in enacting, realities – that is, how words and things go together" (p. 87).

either held in English or (in a few cases) German.[18] They sought to investigate into a variety of aspects and—depending on the interviewee—center around the interviewees' life worlds, qualitative knowledge(s), specific expertise and themes, experience, etc. (see Kvale and Brinkmann 2009, 28). Generally, I sought to obtain empirical knowledge of my interviewees' experiences, their knowledges of social and political developments, their visions, the genealogies of policy trajectories, or their expertise on developing and managing border databases.

As Czaniawska (2004) emphasizes, interviews are crucial *inscriptions* of narrative production; they can evolve into "micro-site of such production or just a site of distribution where a researcher is allowed to partake in narratives previously produced." (p. 51). The narratives and stories told during interview situations were opportunities to make sense of social reality, biographical trajectories, and the wider actor-network in which the interviewee is embedded. In other words, the interview has been a helpful site for eliciting and analyzing the diverse repertoires and devices of narration as they are mobilized and resorted to by the interviewees—heavily depending on their professional practice and position.

Of crucial importance (and challenge) was the *choice* of interview partners. A wide array of actors operating in the EU digital border regime was potentially relevant: policymakers, officials, agency representatives, national delegates, consultants, industry players, and IT experts. The core focus of my choice revolved around eu-LISA representatives and EC officials, who were explicitly working on policies and technologies of databases for the management of borders and migration. These individuals were mostly approached via email and requested to participate in an interview for approximately one hour. A key technique in this regard was to

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[18] All English citations from interview transcripts or field notes in this thesis are either in the original or translated into English.

apply an exponential, non-discriminatory snowball sampling to identify the active network of individuals involved in the policymaking or administration of relevant border databases (either on European or national level), and of those representing national or European interests in the respective working groups of eu-LISA.

As in any snowball sampling, there can be no guarantee of accurate representation, and not all respondents provided contact details of acquainted professionals or colleagues. Nonetheless, this technique has allowed me to collect interview material that was not limited to the experiences and perceptions of officials and experts formally representing eu-LISA or the Commission. Instead, the sampling encompassed a broader informal group of actors with profound knowledge on policies and technologies of digital borders, including officials from institutions such as the Secretariat of EU Council, national program managers active in eu-LISA working groups or on its Management Board, actors engaged in the European Parliament or the Committee on Civil Liberties, Justice and Home Affairs (LIBE), and experts acting informally for the EC. Furthermore, I conducted interviews with representatives of EU institutions that presented different expertise on digital borders, such as of the European Data Protection Supervisor (EDPS) or FRA. To preserve anonymity, I have refrain from specifying the interview partners' positions and affiliations but cite interviewees as "EU officials" or "member state representatives."

My conversations with these individuals typically began with biographical questions about their position and role, which provided me with important hints about the different social arenas at eu-LISA, the ways in which advisory and working groups operate, and the social and material character in which supranational cooperation takes place in the EU.

In sum, these interviews provided profound insights into the inner workings of the digital border regime and the everyday practices of its core actors. Ultimately, these interviews were supplemented with observations at conferences and field visits—sites where I was able to

meet most of my interviewees or recruit additional interlocutors for either semi-structured interviews or informal conversations.

2.4.3 Field visits and participant observation

Observational research by the researcher begins with an initial interest in practice and routine (Silverman 2006). As an ethnographic method, it requires the researcher to be able to maintain a learning position, constantly negotiating access and shifting focus by following new data when they become available. It can thereby draw on a variety of supporting empirical sources—from documents and newspaper articles, to email correspondence and informal, interpersonal exchange. Making meticulous fieldnotes and analyzing them throughout my research, but particularly during the early stages of seeking access, was a crucial technique that revealed many features of the social environments that eu-LISA creates (Delamont 2007). Through approaching an early contact, a gate-opener, I was able to establish primary access to the agency and conduct several important interviews that allowed me to familiarize myself more intimately with the agency's activities. Moreover, it opened opportunities to participate in events regularly organized by eu-LISA.

Another contact, established through a previous work relation, helped me to participate in a conference hosted by the Organization for Security and Co-operation in Europe (OSCE) and the industry-leaning nongovernmental organization called Biometric Institute in 2019. I treated this conference as an "observation test"—ultimately convincing me of the crucial importance of such meetings, precisely because they further the interaction between the social arenas of policy, science, and industry (see, e.g, chapter 5). In such situations, eu-LISA, the EC, national representatives, and industry players share the stage to present their agendas and products to establish digital borders in Europe.

In the further course of my research, I physically observed a series of events, including the OSCE conference "ID@Borders and the Future of Travel" in Vienna (April 2019), an industry roundtable in Bucharest (April 2019), as well as the eu-LISA conference, its evening event for participants, and the ensuing eu-LISA industry roundtable in Tallinn (October 2019). The COVID-19 pandemic forced organizers to switch into online formats, which allowed me to participate in another series of virtual events, including a conference with eu-LISA organized by the technology company Vision-Box as well as the eu-LISA conference and subsequent eu-LISA industry roundtable in 2020 (see also Annex B). Furthermore, I conducted field visits to eu-LISA's headquarters in Tallinn, its Liaison office in Brussels, and its operational center in Strasbourg.[19]

Observational research activities and field visits were essential components for my analysis. Inspired by Annelise Riles (2000), fieldwork at the events and policy meetings brought a wide array of material and artifacts into view that I otherwise would not have gathered. These networks of conferences, roundtables, policy meetings in the EU border regime serve as crucial and standardized sites of knowledge production and essential spaces where future borders are imagined. They produce a series of ethnographic artifacts that enable the proliferation of ideas, values, imaginations, and other types of knowledge through artifacts such as reports and presentations, or the routinized exchange of contacts. From each of the visits and observations, I was able to construct extensive field reports including field notes, photos, PowerPoint slides, videos, and informal conversations.

These events moreover demonstrated the dispersed and multi-sited character of not only the digital border, but also the eu-LISA agency, and, by extension, the apparatus of border and

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[19] I did not access the headquarters' building in Tallinn. Furthermore, I failed to visit the highly protected site in Sankt Johann im Pongau in Austria, where eu-LISA runs a business continuity site for its IT systems.

migration management.[20] Accordingly, field work and participant observation required me to conduct research at multiple sites, as the events and official activities stretched across the territory of the EU, including Romania (the then Presidency of the Council of the EU), Estonia and France (the agency's main host countries), Belgium and Austria (additional representations of the agency). Following eu-LISA thus required engaging with an entity that is mobile and performs multiple situated activities—in other words, one must conduct *multi-sited ethnographic work* (Marcus 1995). It is important to emphasize that multi-site research does not necessarily oblige the participant-observer to take the specific geographical locations and their practices as primary objects of study. Rather, as Feldman suggests (2011a; 2011b), it requires researchers to acknowledge both the organization of the (digital) border regime as a *relational* composition of multiple actors, practices, policies, futures, and technologies. The researcher describes practices, narratives, discourses "present in multiple locations but […] not of any particular location" (Feldman 2011a, 33). Ethnographic observation must therefore operate beyond locality and with a focus on relations.

2.4.4 Situational Analysis

Clarke and colleagues' (2018) *situational analysis* (SA) provides a comprehensive methodological and analytical guide to analyze the situated sociotechnical ensembles of human and non-human elements (see esp. pp. 77–100). SA explicitly recognizes that research situations are heterogeneously composed and incorporate changing dynamics. It follows a distinct compositional and iterative approach for the analysis of research material. SA's

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[20] The participant lists revealed a wide range of actors and institutions, including EC officials, parliamentary representatives, delegates of foreign and interior ministries, diplomats, representatives of agencies such as the EDPS or FRA, officials from eu-LISA, Frontex, and EUAA (formerly EASO), industry actors, brokers, consultants and IT companies, and researchers.

cartographic tools include the making of (both messy and organized) *situational maps* and *social world/arena maps*. These maps allowed me to re-compose and specify my *situation of inquiry* in an iterative process that entailed going back and forth between ethnographic material, interview data, documents, conceptual reflections, and maps. I thereby followed Clarke and colleagues' (2018) observation that "[e]very study developed within a situation and likely is transformed by multiple situations throughout inquiry" (p. 7). Each empirical chapter of my thesis was accordingly constructed as a newly emerging situation, for which I selectively chose data from the corpus of documents, interviews, reports, vignettes, and other empirical artifacts.

In a first step, my material was approached by carrying out initial coding of transcripts and reports compiled after participant observations and grouped in correspondence with the emerging chapter themes. In parallel, I constructed *messy maps* of empirical situations. These parallel procedures allowed me to collect and sort the elements constituting the empirical situation and determine their relationships among each other—narrative elements, discursive items, buzzwords, important social actors, infrastructural sites, technological concepts, and sociotechnical practices. I thus followed a flexible, procedural, and relational procedure that could enrich, complement, or correct my respective situation of inquiry with relevant material. Whereas some elements depicted on a map could be devised codes, others could be actors, buzzwords, or discursive elements to which I did not want to immediately allocate to a unit of meaning. Using the software Atlas.ti, I created codes on both practice and action, in-vivo codes, and thematic codes for narrative/discursive elements.

Guided by social worlds/arena maps, SA allowed me to systematically map various communities, practices, and shared narratives at and around eu-LISA—especially those related to moments marked by the performance of visions, fictions, or futures. Social worlds are typically characterized by collectives that have a life of their own, are of varying sizes, and pursue their own agendas, discourses, or goals. In this step of the analysis, mapping was mostly

paralleled by assembling codes that thematically corresponded to significant discursive/narrative elements. *Code groups* also assisted me in modifying and refining subsequent versions of maps (both messy and discursive worlds maps).

Throughout the process, the exercise of memo writing provided a crucial means of clarification and to bridge elements on different analytical levels, i.e., code groups, distinct elements on the maps, or more extensive text and transcript passages. Memo writing was also one of the most obvious and practical articulations of my orientation towards the paradigm of *analytic abduction*—understood as the process of "tacking back and forth between the empirical materials of a study and trying to analyze and conceptualize them more abstractly toward making a more general set of claims about the phenomenon" (Clarke, Friese, and Washburn 2018, 27; see also Tavory and Timmermans 2014). Overall, creating memos was an immensely helpful research activity in that it spurred me to return to some of the key literature and lead the inquiry back to the chapters' respective research questions. Thus, almost all my memos in some way incorporated core themes of the existing literature and attempted to further build upon them.

2.5 Chapter epilogue: Doing research within the border regime and what this thesis cannot offer

I conclude this chapter by acknowledging some of the pausing moments that occurred during my work, which helped me to think through my own positionality in the field as well as the conditions of access that had to be negotiated. In addition, I reflect on my personal involvement, some of the risks of this research, and the limitations of the thesis.

From day one, I documented various experiences of approaching and learning the field—difficulties, frustrations, and peculiarities—in a research diary. Like memo writing,

diary-keeping was a important instrument for enacting the method assemblage of my sensitizing concepts, empirical observations, methodological orientation, and analytical strategies. It supported me in moments when the "research worker gropes but everything recedes," and formulations melt away the next morning—to return to Fleck's quote (1981 [1935], 94).

Moreover, it was crucial to systematically reflect on the contingent local and social conditions of field access and the varying gate-keeping practices of agency professionals. In hindsight, access was not simply dependent on the good-will of some of established contacts, but rather had to be negotiated with a plethora of emails and requests I sent to various officials, who in turn pursued their own interests in my research. For instance, I observed interlocutors at the agency strategizing about ways to utilize my research to the agency's benefit. It is also worth noting that my attempts to access eu-LISA based on direct personal communication with individual could be deemed unusual for how to approach an official border security agency of the EU. This was facilitated by the fact that the agency operates as a relatively young agency that has not yet fully formalized or standardized its relationships to social researchers—i.e., through restricted channels of communication, granting formal permissions for research, or strictly controlling access to its individual staff members. Like any agency, eu-LISA has been embroiled in institutional competition, struggling for visibility and resources, which also impacts its accessibility. As one representative complained, "I'm not criticizing, but I'm saying it's much […] eas[ier] to say, 'let's give 10.000 border guards to Frontex.' Because this [will] impact the public opinion: 'look, we are doing something!' But if you look at eu-LISA, [you do] what? [… P]ut someone behind a computer?" (Interview 12 with EU official, 2019). One can only speculate whether these circumstances have facilitated access to at least some of the agency's members or its events, while overall research access to the agency remains very complicated—as security institutions and fields are conventionally characterized (Bosma, De Goede, and Pallister-Wilkins 2020).

Researching and data collection in (border) security contexts often take place in secured or sensible environments, which have concrete ethical implications for social scientific research. My case required me to articulate my own research position very clearly vis-à-vis officials, such as by clarifying my intentions and the study's directions. My primary strategy was to provide my interviewees with a one-page document that outlined the main goals and cornerstones of my research. Furthermore, the research required a strictly confidential treatment of collected data (especially interview material) by anonymizing transcriptions and storing audio files on non-sharable servers. In the beginning of interviews, I informed my interlocutors that I wished to record the interviews and about the conditions and duration of audio storage—if possible, by jointly signing a form of consent.

Another point relates to my own movements within eu-LISA's contexts, which required my own consent (voluntary or involuntary) to provide data. Providing data can have concrete disempowering implications—as any scholar of digital borders will testify. In relatively conventional and harmless forms, doing so meant to indicate information, such as name, nationality, and address to gain entry to eu-LISA events. On another occasion, I had to provide passport copies and my fingerprints to access one of eu-LISA's buildings—without knowing about the potential whereabouts of my data. In such situations, there is hardly any time to make an informed decision and ponder its ethical implications for the research. What is left is a firsthand experience of a particular security culture in which biometric usage of fingerprinting seems to be completely normalized. Obviously, such firsthand experiences raise questions about the limited meaning and extent of the concept of *informed consent* in highly securitized, biometric environments more generally.

My last point relates to the broader context in which my ethnographically oriented research is placed. I am finalizing this thesis at an Italian university, in a country where the former Italian Minister of Interior currently stands on trial in his country, charged with the

deprivation of liberty and abuse of authority. In 2019, he gave the order to refuse the Sea Watch 3, which had rescued 53 migrants off the coast of Libya, entry into Italian waters. When after more than two weeks at open sea in critical conditions, the boat decided to enter the port of Lampedusa, an Italian patrol boat unsuccessfully attempted to block it. The patrol boat's captain, Carola Rackete, was arrested, and the ship was seized. The then-Minister of the Interior accused Rackete and his crew of being "criminals" that had committed an "act of war" (D'Alessio 2021). I am also finalizing this thesis during a time when Poland has imposed a state of emergency on its border to Belarus, a military sealing-off of a three-kilometer strip that has denied everyone access, including journalists, nongovernmental organizations, or other civil society actors. The EU and Poland have accused Belarus of using migrants as a "weapon" by luring them with false promises onto EU territory and then conducting hybrid warfare—pushing back migrants and leaving them trapped in a deadly border zone. The above are only two examples that characterize the context of an increasingly violent and deadly border regime in which seemingly exceptional cases of violence against basic human rights, push backs, or denying the right of asylum, become increasingly normalized alongside the criminalization of rescue and militarization of borders. Russia's invasion of Ukraine, having started on 24 February 2022, has now caused millions of people to seek protection in EU countries. While EU states have made an important decision to open their borders for the temporary protection of war refugees from Ukraine, their doors largely remain shut for non-Ukrainian nationals— displaying the border regime's inherently racist rationale.

My research took place at places that on the surface seem far from such occurrences today. However, they are embedded in the very same border regime and its goal to regulate human mobility and deny entry to those that are undesirable. They are devoted to ensuring the border regime's greater "effectiveness," including its violent enterprises. At the same time, this *seeming distance* is interesting. It requires a researcher to be aware of how one can learn about

the gradual making of digital borders and of the directions to which their gaze is led. For instance, learning to understand the machinery of digital bordering, first and foremost requires learning a *specialist language* that is abstract and expert-driven. The clearest indication of this situation is the omnipresent use of acronyms that is manifest in the (state-related) social and political arenas of the EU border regime. How to speak and write about digital borders—*how to use language*—is a sensitive issue. Engaging with the actors, their behaviors, and their discourses means to also learn how they think and speak, and, perhaps even more delicate, learn to think and speak *like* them. Acronyms are a particularly obvious case for adopting and internalizing this specialized language, as they give one a sense of control over highly complex and legally technologies and regulations. As Cohn (1987b) stated in her seminal piece on defense intellectuals' use of nuclear language, "[a] more subtle […] element of learning the language is that, when you speak it, you feel in control" (p. 704). This is inevitably also the technical, bland language of policymakers and designers of digital borders. It is a language that successfully black-boxes or avoids human reference in the machinery of bordering (see also MacKenzie 1990, 25–26; chapter 5 of this thesis). Any study on the inner operations of the digital border regime bears a considerable risk in reproducing and normalizing its language and logics. I do not believe that there is a generalizable solution to this problem by, let's say, avoiding acronyms whenever possible. My own stance is instead that it is crucial to listen to this professionalized discourse and narratives and understand how they contribute to what I call, along with Cohn, *technostrategic effects*. The reader will decide whether I have appropriately done justice to this issue in this thesis on imagining, enacting, and justifying future digital borders.

As a result, my work is committed to analytically prioritizing something like the inner workings of the digital border regime. It is therefore limited in that it does not offers the important *perspectives of migration*. Autonomy of migration approaches argue that borders

must be explored by privileging (the perspective of) mobility and migration, which always precede the logics, developments, and operations of borders (see, e.g., De Genova 2017; Mezzadra 2011; Scheel 2013; Tsianos and Karakayali 2010). While this work does not fully embrace this standpoint, it must be acknowledged that any lack of such perspectives constitutes a gap. This thesis cannot include the concrete situational encounters of bordering, which would give these perspectives more weight. This does not mean that the contemporary injustice, violence, and oppression in contemporary border regimes are simply made invisible. Nonetheless, it leaves me with modest intentions: I seek to expose the EU border regime's sociopolitical character, continued viability, and continued fragility through an investigation into collective imagination and digital infrastructuring work. Thus, I write this story in a spirit that Nikolas Rose would describe as a *partial grasp*; it means recognizing

> what little one grasps and the great gulf of ignorance which that partial grasp reveals. [… F]or to satisfy the demand that one might write without ignorance would not only make writing impossible; it would also deny that encounter with the unknown that carries with it the possibility, however slim, of contributing to a difference.
>
> (Rose 1999, 13–14)

PART II

PROBING INTO THE EU-LISA AGENCY: SPACES OF SOCIOTECHNICAL IMAGINATION

This empirical section of the thesis includes two chapters that investigate the entanglements of imagination and infrastructure, enacted by some of eu-LISA's key activities. Chapter 3 explores the agency's crafting of the sociotechnical imaginary of digital transformation and the way in which this imaginary is gradually stabilized through infrastructural experimentation. Chapter 5 examines how eu-LISA stages ideas of collectivity and visions of Europeanhood, while performing the maintenance work on digital border infrastructure.

3 Between Infrastructural Experimentation and Collective Imagination: The Imaginary of Digital Transformation

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3.1 Introduction: Infrastructuring EU borders[21]

The registering, processing, and storing of migrant data have proliferated and have transformed the landscape of border control in Europe. In particular, large-scale IT systems have become an integral part of the discursive and material infrastructures of the border regime in the EU that currently hold the complex logics and the imaginaries of control in place. As these infrastructures are built, they "become spaces of bordering practices in their own right" (Walters 2009, 495). This is aptly demonstrated by the legal and technological expansion of biometric IT systems such as the Eurodac system, the centralized fingerprint database for asylum seekers, or the Visa Information System, which stores and crosschecks the biometric identities of visa applicants. In official terms, the EU now seeks to govern and control migration by continuously improving "the Union's data management architecture for border management and security" (EU 2019a, 1), which is based on the promise of constructing new databases, such as a centralized Entry/Exit System (EES), and promoting interoperability between databases, for example, through an underlying common identity repository of biometric templates.[22] This

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[21] This chapter is a slightly modified version of an article, published together with Ulrike Felt: "Between Infrastructural Experimentation and Collective Imagination. The Digital Transformation of the Border Regime," in *Science, Technology, and Human Values* (Trauttmansdorff and Felt 2021), https://doi.org/10.1177/01622439211057523.

[22] See also Appendix A for how the use of databases has significantly expanded, i.e., by gradually extending access opportunities to law enforcement authorities.

continuous buildup and expansion of transnational databases and the practices they involve not only testify to a digital solutionism (Morozov 2013) behind contemporary processes of rebordering but can also be seen as part of the "reaction formations" to cross-border mobility (De Genova 2017, 5)—a process best described as the digital infrastructuring of EU borders.

In this chapter, we want to move away from focusing on the heavy investment in databases and related IT infrastructures to reconfigure borders and instead investigate collective visions of border (in)security as key actors within these developments. In doing so, we specifically look into the role of eu-LISA, which is the responsible body for developing and building IT systems and the underlying infrastructure for the purpose of managing EU borders. It is the agency that "provide[s] continuous monitoring of infrastructure, services and systems" (eu-LISA 2015a, 8). Being interested in the imaginative dimension of this technological project, we devote specific attention to how databases and related infrastructures encode and translate future visions of (in)security and social order. We aim to study how collective imagination and processes of digital infrastructuring mutually shape each other. We thus direct our attention to eu-LISA's construction and rehearsal of a sociotechnical imaginary (Jasanoff and Kim 2015; Felt 2015) of digital transformation that aims at stabilizing both the shared vision of border (in)security and the related infrastructure.

We start by describing the efforts of eu-LISA in trying to implement its vanguard vision (Hilgartner 2015) of the sociotechnological problem at stake and then show the work done to transform it into a widely shared and institutionally stabilized sociotechnical imaginary, which is actualized through the emerging digital infrastructure. Unpacking the making of this imaginary allows us to understand why and how the visions of certain futures seem to prevail over others and, most importantly, become politically normalized and powerful—even though officials and experts oftentimes refer to the actual construction and operation of databases/digital infrastructures as yet fragile and uncertain.

The chapter's analysis contributes to a growing body of scholarship at the intersection of migration and border studies, on the one hand, and science and technology studies (STS), on the other. These studies have explored the various processes of infrastructuring to bring out the often invisible, laborious, and taken-for-granted work needed for the creation and maintenance of contemporary borders. We might also call this turn a heuristic shift to studying how actors, institutions, and technologies "move migrants within specific infrastructural frames" (Lin et al. 2017, 169) and become part of an increasingly logistified management of migration (Altenried et al. 2018; Mezzadra 2017). A common denominator among scholars is to focus on the emergence and proliferation of techno-material devices and practices that enact migrations in and to Europe (Leese, Noori, and Scheel 2022; Scheel, Ruppert, and Ustek-Spilda 2019; see also chapter 1, section 1.3.2). The digitization of border and migration management has moreover been examined as the formation of an "administrative ecology" (Dijstelbloem and Broeders 2015) that calls for exploring the hidden scripts of a violent border regime. Migrations are brought into being and rendered governable through practices of inscription and visualization (Dijstelbloem, van Reekum, and Schinkel 2017; Follis 2017; Pezzani and Heller 2019; van Reekum 2019). At the same time, infrastructures also "reveal and […] perform broader legislative, political and administrative transformations in the European bureaucratic order" (Pelizza 2020, 263). In other words, border and migration control infrastructures are co-produced with the sociopolitical orderings of Europe (Pelizza 2020; Pollozek and Passoth 2019). However, what these studies have given less attention to is the powerful role of sociotechnical visions, which will be the core contribution of our following analysis.

After outlining our conceptual approach to borders as sites of experimentation, we conduct the empirical analysis for this chapter. First, we revisit the making of eu-LISA as a relatively young institution in the EU border regime and how it enables its member states to centralize a growing digital infrastructure of borders. We believe that the agency, in

orchestrating relations between various actors in the EU border regime, positions itself as a vanguard in forging and rehearsing a particular vision of reconfiguring borders by digital means. Second, we elaborate on the practices of narration and visualization that construct a particular future imaginary to be realized through the "digital transformation." Third, we examine when and how this imaginary is rehearsed in order to align new actors. In doing so, the agency embraces an experimental approach, gradually developing and testing potential options and thus working toward stabilization. In conclusion, we reflect on this process of reimagining EU borders by discussing some of its implications and point to related areas of further research.

3.2 Conceptualizing EU borders as sites of experimentation

3.2.1 Infrastructural experimentation

To capture the heterogeneous bordering processes in Europe, the notion of the *regime* has been used to describe the "multitude of actors whose practices relate to each other, without, however, being ordered in the form of a central logic or rationality" (Tsianos and Karakayali 2010, 375). More recently, scholars have argued that digital infrastructures have become key sites and arenas for the interplay and contestation between state and nonstate actors, (im)mobilities, and various regulatory practices in the border regime (Amelung et al. 2020; Lin et al. 2017; Pelizza 2020; Pollozek 2020). The distributed character of infrastructures has moreover directed scholarly attention to the multiple and dispersed operations of control through which borders enact and maintain their "double function of politics at a distance and virtual data collection" (Tsianos and Karakayali 2010, 374).

However, to capture the distinct experimental character through which these digital borders are currently developed, deployed, and policed, it seems productive to use the notion

of the *laboratory* as a sensitizing concept. As a metaphor, this notion has long been used to describe Schengen as a testbed for European integration and transnational cooperation between security actors to govern mobile populations (Hess and Kasparek 2017b, 60; Zaiotti 2011, 74–75). Here, we suggest considering the introduction and expansion of a large-scale digital infrastructure as the laboratorization of the Schengen Area (allowing free movement of people), turning the borders into sites of experimentation. According to Knorr Cetina (1999), the laboratory is a space in which objects can be manipulated and reconfigured so that "they match with an appropriately altered social order" (p. 44). However, experimentation has also been increasingly carried out beyond the classical laboratory, and we have witnessed the emergence of concepts such as "living labs," "real-world laboratories," and "society as a laboratory" (Guggenheim 2012; Van De Poel, Mehos, and Asveld 2017). This is in line with Engels, Wentland, and Pfotenhauer's (2019) argument that, currently, "it is society *as well as* technology that are subject to experimentation and testing" (p. 3, emphasis in original).

In our understanding of the border laboratory, we follow Guggenheim (2012) who defines a laboratory not as a physical, fully controlled territory but as space of experimentality that aims to bring under control the data and objects it seeks to manage. The laboratory is a "procedure that often results in a space with the properties to separate controlled inside from uncontrolled outside" (p. 101). Not only do borders move into the laboratory (Bourne, Johnson, and Lisle 2015), but the Schengen space as a laboratory "must be permanently brought into being, and it must be imagined and practiced" (Felt 2017, 153). The introduction of large-scale infrastructures in the border regime must therefore be imagined and gradually implemented to establish this space of experimentality. Take, for example, this statement of a senior official in the EU: "Now, the real test is with the development of new systems. And we have to see how that works out" (Interview 13 with EU official, 2019). This official does not understand and anticipate the buildup of IT systems in the border regime to be an infrangible project with stable

and transparent outcomes. Instead, he implies that uncertainty and instability might be gradually reduced through a process of experimentation. In that sense, experimentation turns infrastructures into emerging sites for engaging with and producing "new worlds" (Jensen and Morita 2015, 85) and the limits thereof. It is a procedure that performs what Callon, Lascoumes, and Barthe (2009) call laboratorization, a constant "interminable undertaking, always starting up again" (p. 67).

3.2.2 Collective imagination

What is central to the (experimental) process of infrastructuring, as we argue throughout this chapter, is how it is imagined and performed and by whom. How, in other words, can infrastructures become those "emblematic reflections and representations of particular social or political agendas" (Aarden 2017, 754)? Following Jasanoff and Kim's framework of sociotechnical imaginaries (2009; 2015), we therefore trace the collectivized visions of social order and (in)security that are promoted as "attainable through, and supportive of, advances in science and technology" (Jasanoff 2015a, 15). As Jasanoff argues, designs of the future, articulated as collective acts of imagination, operate as "a crucial reservoir of power and action [that] lodges in the hearts and minds of human agents and institutions" (p. 17). Promised by science and technology, futures of border (in)security are propagated to become "integrated into the discourses and practices of governance" (Jasanoff 2015b, 329). The unabated strength of this framework lies in its explanatory power in demonstrating how a particular technological trajectory of the border regime is related to the construction and gradual domination of certain visions of order and progress—through advances in digital technology.

Imaginaries have been associated predominantly with the modern nation state that orchestrated the co-production of visions of science and technology with national policies,

regulations, and institutions. However, forging and advancing imaginaries are frequently carried out by smaller collectives, such as institutions or corporate actors that may operate on the transnational level (Sadowski and Bendor 2019; Schiølin 2020). Pickersgill (2011) uses the case of neuroscience and law to show how imaginaries of transnational collectives (other than states) can be constitutive of, and simultaneously produced by, anticipatory and normative discourses that either develop and promote, or limit and restrict, certain engagements and ways of thinking. Institutional actors can secure their ascent and positions of power if they possess the means and resources to assemble and stabilize imaginaries, that is, to homogenize the visions of collectives and gradually silence alternatives. In this context, Hilgartner (2015) speaks about vanguards who often portray themselves as the chosen harbingers of change by promoting "bold" or "progressivist" visions yet to be stabilized or embraced by larger political or social collectives.

Our empirical study of eu-LISA is a case in point, as we explore the agency as a European vanguard that attempts to assemble, rehearse, and stabilize the sociotechnical imaginary of digital transformation. Although its representatives tend to emphasize the technocratic character of this agency, their shared imaginations routinely focus on the digital infrastructure of borders, turning it into a vehicle "whereby those fantasies are transmitted and made emotionally real" (Larkin 2013, 333). By the example of the emergence, the projects and activities of this European institution, the eu-LISA agency, we can explore how a particular future of borders, its materialization, and its underlying norms and values are gradually assembled and rehearsed promising order and stability.

Connecting these two lines of thinking—infrastructural experimentation and collective imagination—we will investigate the Schengen borders as sites of infrastructural experimentation and trace how an imaginary can obtain agency in shaping technological and

infrastructural change as it gets scripted "into the hard edifices of matter and practices" (Jasanoff 2015b, 323).

3.3 A brief note on method

For the analysis of this imaginary, we drew on materials including ethnographic observations, documents, and field notes—described in detail in chapter 2. In this chapter, we focused particularly on interviews with eu-LISA and EC representatives as well as on the observations made at events organized by eu-LISA that addressed a broader audience beyond the agency's inner circle. Both ethnographic observations and interview situations are here crucial scenarios, in which actors generate, share, and collectivize narratives as modes of knowing and communicating (Czarniawska 2004). With the tools of situational analysis, this collected material was thematically coded in order to map out central narrative elements and strands and to locate them in the broader research situation. For our analytical interest, it was particularly important to establish links between key narrative elements, the experimental practices, and the infrastructural sites of the agency. In other words, sites of narration and visualization were iteratively related to the experimental practices of the agency. This allowed us to sketch out the future imaginary and identify the practices of assemblage and rehearsal as well as how the imaginary has been gradually integrated into the eu-LISA's overall governance of large-scale IT systems.

3.4 "Not just an IT system": Eu-LISA as vanguard

The eu-LISA agency was legally established in 2011 to become a centralized node in the digital infrastructure of the EU border regime. Although the agency administers and develops all relevant large-scale databases related to the governance of borders and migration, only a few

academic contributions account for the distinctive role of this institutional actor and its practices. Bigo (2014), for example, mentions that the agency represents a regrouping of software engineers and technicians and institutionalizes a perception of borders as "something to be analysed as points of entry and exit, connected through computerized networks that gather and analyse the traces of travelers" (p. 217). A notable exception is also Tsianos and Kuster's (2016) article on "the power of big data within the emerging European IT agency," which conceptualizes eu-LISA as a "technological zone" that ultimately intensifies surveillance through its expansionist and technocratic character, striving for the "optimization of technical process solutions, advanced data convertibility, and the excess of data" (p. 240). In a similar fashion, Glouftsios (2021) analyzes eu-LISA's mundane technological work to make visible how maintenance and repair "sustains the power to govern international mobility by digital means (p. 457). While it is certainly worth pointing out this technocratic character, we propose to explore eu-LISA as a central agent in imagining and anticipating a vision of border (in)security that should be materialized through its sociotechnical experimental practices. We furthermore consider the agency as a hybrid institutional space in which various epistemic communities interact and various futures of borders are anticipated and negotiated. As one official describes it, eu-LISA is "not just an IT system; it's an agency that ensures many things" (Interview 3 with EU official, 2018).

In the EU's emblematic regulatory jargon, Regulation No 1077/2011 sets forth the rationale for establishing the agency: "With a view to achieving synergies, it is necessary to provide for the operational management of large-scale IT systems in a single entity, benefitting from economies of scale, creating critical mass and ensuring the highest possible utilization rate of capital and human resources" (EU 2011, 2). The creation of the agency is explained as a rational and cost-sensitive step to efficiently govern the expected expansion of large-scale IT systems in the so-called area of justice, security, and freedom. At the same time, this story

successfully conceals the complex and diverging interests and contestations involved in the making of this institution, which involved the rearranging of knowledge patterns and governmental practices vis-à-vis techno-scientific developments.

The European Commission's continuous aspirations of Europeanizing the agenda of border security through building centralized IT systems, such as the Visa Information System and Eurodac, have been met with growing skepticism by EU member states. The states did not embrace the prospect of a large-scale border infrastructure project being part of the Commission's domain, as it would mean boosting the Commission's resources and thus its institutional power over the sensitive agenda of migration and borders. The increasing extension of borders into the virtual realm of databases (Côté-Boucher 2008, 160) thus turned European IT systems into sites of institutional struggles for sovereignty and power. Consequently, one interviewee stressed, "this is the member states' data. So, we are owning the data, which is important, so it is still, […] let's call it communication towards the member states […] that this is our agency" (Interview 24 with member state representative, 2019). EU agencies are not simply the European Commission's little helpers but are often compromise solutions that epitomize the experimentalist framework of EU governance (Sabel and Zeitlin 2010). Established as an agency, eu-LISA allowed the necessary technical, human, and financial resources to be shifted to a "European" body that member states could better control. A management board with representatives of the member states and the Commission was installed to oversee "the effective and coherent delivery of the eu-LISA vision" (eu-LISA 2022a). Accordingly, the agency must ensure it is "continuously aligning the capabilities of technology with the evolving needs of Member States" (eu-LISA 2017a, 4).[23]

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[23] While Tallinn (Estonia) became the city of eu-LISA's headquarters, French authorities insisted that Strasbourg remained the operational datacenter. It had previously hosted both the central systems of SIS II and the Visa

This brief account of the negotiated establishment of the agency also explains the relative institutional autonomy that allows the setting and driving forward of its own agenda within broader goals of border and migration policy. At the same time, it gives member states a sense of centralized control over the transnational IT systems. We go one step further by arguing that the agency establishes itself as a vanguard, formulating and acting "to realize particular sociotechnical visions of the future that have yet to be accepted by wider collectives" (Hilgartner 2015, 34). eu-LISA should thus be considered an institution-in-the-making that solidifies and legitimizes a growing transnational dataveillance infrastructure in the EU border laboratory. It is therefore important to dissect its narrations through which ideological and normative elements are enmeshed with future visions of border (in)security and its material infrastructure.

3.5 Narrating the "transformation": inevitability, unidirectionality, and crisis

Three core narrative elements repeatedly emerged in our conversations with senior officials and higher representatives of eu-LISA and in their public appearances at official events. At times, they clash with individual statements made by national experts and practitioners at the agency, which tend to highlight their strictly executive mandate. However, as we argue, the agency actually operates as a vanguard by imagining and anticipating a particular future, creating a moral economy around it, and discursively setting "the conditions of possibility for action in the present, in which the future is inhabited in the present" (Adams, Murphy, and Clarke 2009, 249). These narrations are frequently combined in the concept of "digital transformation," which articulates an abstract future horizon and echoes broader contemporary imaginaries such

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Information System. The EC in turn ensured that many of its staff were transferred to the agency, while the member states took the opportunity to recommend their own national bureaucrats to the agency (see also chapter 4).

as the "digital revolution." At the same time, it signals the agency's desire for change and the promise to actualize change through its infrastructural practices.

The first narrative element relates to the inevitable and totalizing character of digital transformation to bring into being our secure future. Techno-optimist sentiment prevails in this narrative, but the meaning of inevitability also disempowers social actors, framing them as exposed to and not agents of technological change. They are passengers without the capacity to steer: "One of the things I constantly repeat in different fora, […] indeed, today we see [a] very major transformation of border management and internal security" (Interview 1 with EU official, 2018). Another high-ranked official claims likewise: "We are witnessing a deep transformation as a fast process of convergence" (field note, eu-LISA conference, October 16, 2019). As such statements are omnipresent, they together discursively affirm and reproduce inevitability and situate the future in the here and now. It is a quasi-compulsory vision calling for immediate action in the present. During an eu-LISA event, one of the presenters argued, "You are starting this journey whether you want it or not" (field note, eu-LISA Industry Roundtable, April 24, 2019). The policy fields of border control, migration management, and internal security are framed as converging pieces fully determined by the "whole"—they become, inevitably, elements of the same "bigger and unique journey" (field note, eu-LISA Industry Roundtable, October 17, 2019). This "digital journey," in which everyone is perceived to be a voluntary or an involuntary passenger, conditions the scope and rationale of the agency's interventions: "We step into the future and invest into the future, that is what we do today" (field note, eu-LISA Industry Roundtable, April 24, 2019), whereas "all these expenses, if you like, are in fact investments for the future of all" (Interview 3 with EU official, 2018). Rendering the transformation inevitable in the name of a secure future frames the agency's building and expansion of a digital border infrastructure as a mandatory intervention.

The second core element constructed through narration and visualization is unidirectionality. It provides another powerful resource for officials to endow digital transformation with authoritative determination. For instance, during an official presentation, the agency would symbolize unidirectionality by a linear, blue arrow (see Figure 1, p. 105). The arrow signals the integration of both time and technology into one clearly directed progression, leading to a fully virtualized space. The caption "a shift from physical to virtual" plainly invokes the notion that we find ourselves on a trajectory of change, on "a cumulative journey […] from now to then" (Appadurai 2013, 223). In a conversation, a senior official explained that the transformation's "most obvious aspect, of course, is movement from the physical to the virtual world, which means that today, border management and internal security, migration management, all those areas are totally dependent […] from the data and information available" (Interview 1 with EU official, 2018). While these representations remind us of neoliberal dreams of data-driven, seamless global networks and flows in contemporary capitalism, they also appear to render invisible the physicality of border environments, migrant bodies, barriers, queues, and checks by shifting them to a virtualized space. This image promises to detach human mobility from its very physical and local situatedness and render it into data streams and data points that are visible and actionable in a laboratory-like environment operating on a seemingly global scale. Conceptualizing the transformation as a unidirectional shift from "physical to virtual" neglects not only the human dimension of such transformation, but also the many "collateral realities" (Law 2015) that are created and that migrants have to confront. The virtualized laboratory articulates a desire to obtain one particular mode of authorized seeing (Jasanoff 2017), that is, a view from beyond, that conceals any frictions between human mobility and border control. The lab then seeks to dissolve the boundaries between the site and object of experimentation, translating both border settings and migratory human subjects into data that ought to be channeled and calibrated.

The third recurrent narrative element we identified is the double sense of urgency and insecurity, repeatedly conjured by a future that is couched not only in progressivist notions but also in visions of crisis and undesirable threats. For instance, eu-LISA's (2017) public strategy implies that its activities seek to avoid the "dramatic consequences on the future of Europe" if Europe reveals itself of being "too open and therefore exposed to the effects of globalization" (p. 7). More generally, the concept of crisis is routinely invoked to render necessary the continuous buildup and implementation of large-scale IT systems. As one official argued, "we experience in Europe a lot of immigration and financial crises, two crises at the same time, especially with immigration and war around the Mediterranean. [… Y]ou will see that indeed, the situation […] we experienced the last three, four years augmented, if you like, the need for the systems" (Interview 3 with EU official, 2018). The "digital transformation" presents a project that secures European order against a future that is pictured as potentially undesirable and dangerous. The invocation of "crisis" both naturalizes and affirms challenges to social order while calling to solve them via a technological fix. As a permanent diagnosis, as Schinkel (2015) defines Walter Benjamin's conceptualization of crisis, it appears "in the form of a crisis-recovery, of a crisis-as-opportunity and therefore at best of an affirmative critique" (p. 44). The transformation imaginary therefore engenders a crisis/order combination that, at the same time, perpetuates the illusion of techno-scientific progress.

Figure 1. eu-LISA's slide presented at the conference "ID@Borders," organized by the Organization for Security and Co-operation in Europe, Vienna, April 11, 2019. Courtesy of eu-LISA.

eu-LISA's sociotechnical imaginary is thus assembled by means of a specific set of narrations and visualizations that portray the digital transformation as inevitable, unidirectional, and urgently needed. These elements may not be exceptional and resemble similar tropes in large-scale technological projects or innovation; however, they gain credibility and compose this imaginary only through specific, situated narrative performances. They allow the agency to portray itself as a vanguard with almost eschatological potential. One official argued, "we are the people who materialize the needs of the European citizens […]. We are the people who make their concerns […] or their wishes reality, through technology" (Interview 3 with EU official, 2018). The invocation of the "European citizens" and their desires that must be directly realized by the agency's techno-material intervention implies that its vanguard role does not

require conventional democratic legitimacy. It seems to be substituted by the agency's role as a harbinger and frontrunner in driving the transformation—"this very fast process of convergence between border management, internal security and migration management" (Interview 1 with EU official, 2018). The sense of urgency is important to the evocation of an exceptional space in which the agency wants to offer a disciplining guidance and epistemic orientation, demanding compliance with techno-centric transformations promising security for the future. At the same time, it limits the discursive space in which this future could be called into question, marginalizing alternative visions or framing them as destabilizing.

3.6 Embedding and rehearsing the transformation imaginary

3.6.1 Aligning Actors—Turning a vision into a shared imaginary

In the institutional machinery in this Schengen border-laboratory, eu-LISA's function as a "knowledge hub" should provide an arena in which different actors and communities can engage in collective acts of imagination. At the agency's official events, this sometimes can happen in overemphatic ways, for instance, when the audience is called upon to acknowledge the "power of thought and imagination to create something," and Abraham Lincoln is quoted as saying "the best way to predict the future is to actually create it" (eu-LISA 2019a). Conferences, industry roundtables, and other forums are spaces in which to circulate discourses or problematizations of "smart" or "new" technologies among a variety of policy delegates, technical experts, industry representatives, and national bureaucrats in the police and migration sectors. These professionals use these meetings to communicate as "peers" in the border regime, speak about potential future challenges, and foresee and anticipate change (Interview 17 with member state representative, 2019). As Feldman (2014) crucially observed, the protocols of such ritualized meetings "ossify" social patterns that create the "epistemological condition for

policy knowledge, and a discourse through which migration can be described as a particular kind of problem" (p. 49). These gatherings then also engage professionals and delegates in particular future-making practices and give them the feeling of speaking a common language.

The ostentatious, anticipatory orientation toward the future testifies here to the important role of building aspirational regimes and transnational communities for digitally infrastructuring borders (Wienroth 2018). Participants must embark on the almost impossible task of creating a shared epistemological space in which they can discuss a "European" understanding of digital borders. This sense is expressed, for instance, by one of our interviewees:

> [T]here is a very big difference [in] understanding what this all means. [… W]e have different actors: ministerial actors, there are agencies, there are different agencies, there are ICT people, there are people working with the national legislation. And it's very hard, […] to form a common understanding of what's happening and what is needed on the national level. So, these seminars, […] it's actually distributing information to everybody.
>
> (Interview 26 with a member state representative, 2019)

Despite these apparent challenges, meetings allow the agency to align other actors and rehearse the transformation imaginary in a setting inhabited by a wide range of European security professionals and commercial stakeholders. A high ranked official, for example, appeals to "the industry to join in this broader project, in this bigger and unique journey" (field notes, eu-LISA Industry Roundtable, October 17, 2019). eu-LISA therefore constitutes the "territory" in which technological promises and futures are collectively framed and promoted. Beyond policy meetings and conferences, the agency seeks to enroll actors by publishing in quarterly

publications such as "Border Management Today," which likewise address the broader epistemic communities of security and IT professionals.[24] Here, the buzzwords and slogans are pitched, in repetitive style, to illustrate the contours of the imaginary: "the digital transformation of border management in the EU and globally will continue at high pace in the coming years" (Garkov 2020, 29). "Stakeholders," such as "carriers, passengers, airport and seaport operators and other relevant actors," need to be integrated into the process of "redesign[ing] of business models at the borders" (Garkov 2020, 29) and aligned with this vision. Therefore, the alignment of a growing number of diverse actors must be achieved to stabilize eu-LISA's sociotechnical imaginary and to fully unfold the power of its material realization—the IT infrastructure of border control.

3.6.2 A Process of experimentation

In the EU border regime, the transformation imaginary is furthermore embedded in concrete practices and activities, assembling the material infrastructure, the meaning it should acquire, and the normative values that promise to preserve order. We describe these as practices of experimentation with and through the gradual infrastructuring of borders to illustrate how futures are not simply imagined collectively in a vacuum but rehearsed in specific contexts and integrated into, and thus stabilized through, concrete artifacts and projects. Experimentation is here understood not as a sudden, large-scale social experiment, but as a continuous, staged process driven forward by agencies such as eu-LISA that subject EU borders to a regime of testing. The agency promotes and performs these experimental practices as preferred modes of assembling technologies, databases, institutional and human actors, and futures, through either

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[24] This quarterly was published by the International Border Management and Technologies Association, which describes itself as a "not for profit international nongovernmental organization" bringing together experts, practitioners, policy makers, and technology providers (see http://www.ibmata.org/about/).

large-scale IT projects or its hybrid agenda of research and development.

A good example is the so-called Smart Borders Package, proposed as "the next steps in border management" (EC 2008). Initially, it contained a set of legislative proposals that planned to biometrically register and store all non-EU citizens' entries into and exits from the Schengen territory in an Entry/Exit System. Sontowski (2018) demonstrates how smart borders have evolved as a contentiously debated project repeatedly brought to the brink of failure. A key turn in these controversies has been the involvement of eu-LISA, which was tasked with establishing "a unique and large-scale EU pilot" (eu-LISA 2015b, 3). The pilot branded the project as "testing the borders of the future" to anticipate the "significant transformation" that the border management of the EU would undergo. The agency conducted the pilot in collaboration with the consultancy PricewaterhouseCoopers to explore how "we make the external border a reality […] in this European question of borders," according to one consultant (Interview 5 with private consultant, 2019). In twelve EU member states the pilot tested the enrollment procedures of biometric registering and identification, that is, various amounts and combinations of fingerprints, facial images, and iris scans, of third-country nationals at eighteen border crossing points. Casting biometric (re)bordering into the language of testing became an instrument to confront vocal opposition against new smart borders, especially in the European Parliament, where the roll-out of biometrics on this scale was criticized as disproportionate, ineffective, and expensive. Through its involvement and subsequently released technical reports, eu-LISA aimed to produce "(counter)evidence" (Sontowski 2018, 2739), which also envisioned "smart borders" to be a realizable goal on a linear trajectory that is propelled by experimental activities such as research and testing.[25] The reports of the pilot visualized these experimental activities

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[25] The eu-LISA pilot study report ultimately claimed that a large-scale biometric system (such as the EES) and its comprehensive enrollment at the Schengen external borders were, in principle, "feasible (in terms of accuracy, effectiveness and impact)" (eu-LISA 2015b, 12).

as cornerstones in the construction of smart borders (see Figure 2 below). They seem to enroll various actors, such as consultancies, vendors, member state experts, representatives of the EC, and technicians, into this gradual process of realizing a large-scale IT system—a move that is hoped to support the imaginary of transformation to materialize.

Our second example is the large-scale project of interoperability that is being developed by the agency. Its widely debated legal framework was adopted in 2019 to render possible the rearrangement of the infrastructural architecture of EU borders by interconnecting all databases used in the management of migration and borders (EU 2019a; 2019b). The interoperability project attempts to technically converge databases that have been operating separately on principles of data protection, thus pooling and repurposing sensitive personal data of third-country nationals. Although much more could be said about this new architecture (see chapter 6), we are interested in reflecting on it as an additional moment in the gradual process of infrastructural experimentation. Its mechanisms and actual effectiveness are often described as complex, precarious, and uncertain, that is, as a test. One interviewee explained, "that's going to be a big test; […] there is no other way to do it. [… Y]ou need an agency to do it, and now we have to see what comes out" (Interview 13 with EU official, 2019). The infrastructural project is here conceptualized as an experimental process that can only gradually reduce uncertainty and complexity in the border regime (Van De Poel, Mehos, and Asveld 2017). In a feasibility study on interoperability as the *future architecture* (eu-LISA 2019b), the agency furthermore argues: "Given the significant changes to come, it is critical that new developments and evolutions currently being planned and even under way proceed with full knowledge of the intended future state" (p. 5). Testing activities are seen as means not only to acquire "full knowledge" about any IT system but also to broadly rehearse and thus gradually stabilize the imaginary of digital transformation as the solution to future problems. Documentation and reporting, more generally, play an important role in rehearsing the sociotechnical imaginary in

different contexts, which in turn allows the agency both to distribute the relevant knowledge and to navigate moments of friction or contestation.

A third example of this experimentality relates to the agency's goal and its declared intention in its new mandate to evolve into a *center of excellence* and node of research and development within the border regime (EU 2018a). As one official argued, the agency assumes "a completely new role in terms of research. […] We have also reinforcement in terms of pilot projects, proofs of concept, testing. So, basically more and more the role of eu-LISA is there, it's clear, kind of" (Interview 28 with EU official, 2019). The mandate endows the agency with the ability to increasingly carry out activities that bring to life, according to another interviewee, "a knowledge hub by default" (Interview 25 with EU official, 2019), that is, research, individual pilots, and prototypes of bordering devices (EU 2018a, Articles 14–16). Again, enhancing experimental activities is perceived and promoted by the agency as a "contribution growing over time as the pace of change quickens" (eu-LISA 2022b). The agency is promoted as a site where ideas, values, norms, and future visions are again and again assembled in moments of infrastructural experimentation.
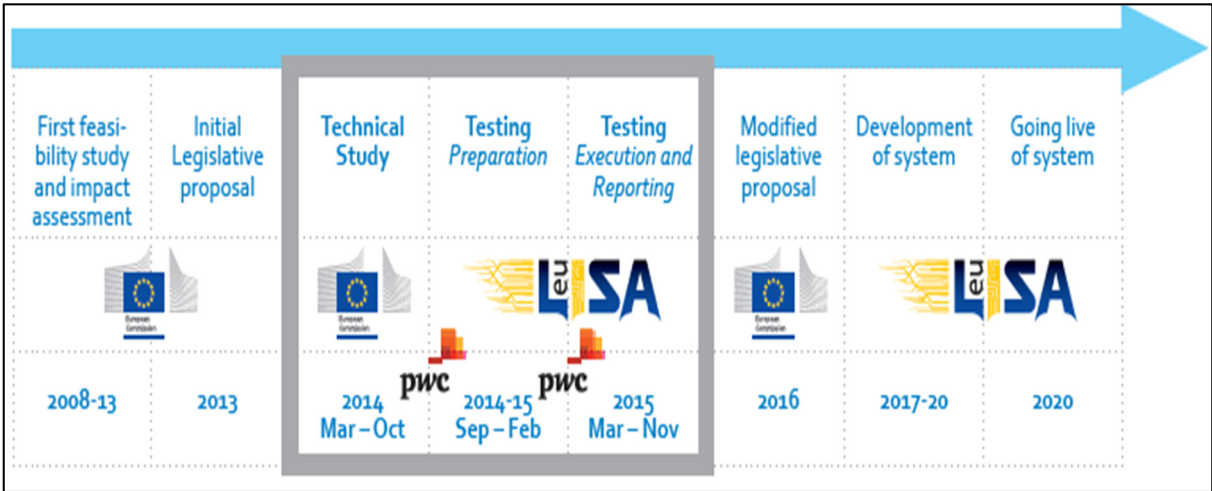
Figure 2. "Indicative Timeline for the Establishment of Smart Borders," taken from eu-LISA's report (2015b). Courtesy of eu-LISA.

3.7 Conclusion

This chapter aimed to carefully unpack the making of the sociotechnical imaginary of digital transformation to illustrate how visions become collectivized and transformed into powerful agents in infrastructuring both borders and the transnational regime of migration control. We argued that the materiality of technologies and the devices of rebordering are not the only issues that need closer attention when studying border regimes. As in the case of eu-LISA, dissecting and analyzing the visionary dimensions of infrastructuring helps to understand how collective imagination opens up or closes down sociotechnical realizations, tacitly governing the realm of the possible and contributing to the mounting normalization and public acceptance of border dataveillance. The agency mobilizes the performative power of the imaginary—that is the inevitable, unidirectional, and urgently needed digital transformation for ensuring border security, and aligns a diverse set of actors and practices in the project of infrastructuring. This permits the agency to present itself as a harbinger of compulsory change and its activities as legitimate means to realize the imaginary. The notion of transformation contains a promise of gradual and unidirectional change, through which digital solutions can arrive in almost arbitrary forms—whether they relate to the coordination, interconnection, implementation, or the automatization of border control. The transformation imaginary contributes to naturalizing a deeply held solutionism that proposes (future) techno-fixes to fundamentally social and political problems (Morozov 2013).

Moreover, this imaginary allows the emergence of a *space of experimentality* that exposes human subjects to numerous technological and social interventions with unclear outcomes. The EU's Schengen Area hereby becomes a laboratory, in which the governance of human mobility is detached from physical bodies and border environments. It portrays the

complex governance of mobility as securely manageable in a flattened world of calibrated and aligned data streams. While the collection of data related to mobile subjects is a complex issue, the imaginary and the related laboratorization enact the powerful idea of simplification, supporting the illusion of making humans and their mobility "behave as in the research laboratory" (Callon, Lascoumes, and Barthe 2009, 65). Simplification suggests the idea of "infrastructuring people," which, in reality, would happen through an immensely complex process. In the first step, IT-assisted bordering practices would transform humans into sets of data, turning them into IT-readable and, in theory, clearly categorizable identities. In addition, simplification promises to enable digital-ordering practices such as sorting and selecting. The consequence of such laboratorization is the black-boxing of complex local and temporal conditions of bordering, which bodies encounter and try to resist. The search for this technoscientific manipulation and conditioning of mobility resembles Shiv Visvanathan's characterization of the *laboratory state* (1997). It produces the *hyperobjectification* of migrants (Feldman 2011b, 389), through which people, rather than being encountered as qualitative subjects, are transformed into and managed as abstract, quantitative, and calculable objects based on the digitized fragments of their identity. European institutional actors also promote and present Schengen border interventions as techno-scientifically certain and accurate, whereas the potential mistakes and inaccuracies that frequently occur in data entry and processing are difficult to expose to public scrutiny. Thus, making mobility conform to the lab not only allows to generate an increasing indifference toward migratory human beings but also to ignore the social implications deriving from mistakes in digital bordering processes. Infrastructural experimentation at border sites seems to nonetheless emerge as a mode of operation in the increasingly logistified environments of border and migration regimes (see, e.g., Altenried et al. 2018; Pollozek and Passoth 2019).

Finally, infrastructural innovations such as those implemented by eu-LISA as materializations of a specific imaginary pose questions of responsibility in new ways. Akrich's *geography of responsibilities* (1992) as a sensitizing concept would invite us to acknowledge the role of eu-LISA as an agent that not only imagines and supports the implementation of the digital border regime but also decides what kinds of actions with regard to migrants are delegated and to whom. First, geography refers to the infrastructural innovation of digital borders creating a space in the world—the Schengen space—that is to be protected; thus, generating an inside to be secured and an outside to be kept in its place, that is, to remain excluded. However, upon closer examination, we see that what is imagined and performed as abstract and unidirectional in the laboratory comes into being in the real world as distinctly distributed, messy, and contested infrastructures. Second, geography alludes to the places where these seemingly abstract actions become located in space and time and points to the need to better understand how responsibilities are distributed and where/by whom power can be exercised. We want to end with the question of how to better identify and make visible the distribution of responsibility and accountability that currently seems to be ambiguously allocated across this transnational border regime. We believe this question is necessary in order to keep this increasingly dominant imaginary of the digital transformation, and the geography of exclusions it produces, open to scrutiny and contestation.

The next chapter will turn to additional performative aspects of eu-LISA's infrastructuring work. More specifically, it will investigate the performative character of infrastructuring by exploring how agency representatives, experts, and technicians envision ideas of Europe or Europeanhood, and attach them to the digital infrastructure of borders. In chapters 5 and 6, I will moreover return to the mechanisms of abstraction and simplification.

4 Staging Digital Infrastructure, Assembling a Fractional Europe

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4.1 Introduction

In this chapter, I explore eu-LISA's management of IT systems and infrastructures as one of the sites at which Europe must materialize. As historians of science and technology have argued, infrastructures have emerged as "the essence of European integration" because their material constitution and qualities "form the physical basis for transnational flows of people, goods and services" (Badenoch and Fickers 2010a, 2). This argument has also been made to explain the gradual construction (and extension) of the Schengen space, which, through the progressive dissolution of internal borders between its member states, has fundamentally shaped the governance of mobility across the continent. More specifically, the 1985 agreement between France, Germany, Belgium, Luxembourg, and the Netherlands to establish the Schengen Area depended upon what they called *compensatory measures* for abolishing border controls between their countries. One of these compensatory measures was the creation of the Schengen Information System (SIS) that would allow national security authorities to exchange data on individuals and objects classified as a risk and has since been massively transformed and expanded into a surveillance tool (Brouwer 2008; van Munster 2009).

The SIS was the first transnational database to become part of a broader emerging digital infrastructure that has *denaturalized* the border and its connection to nation-states, shaping what William Walters (2002) calls a European space of transnational mobility governance "despite the continued existence of different national economic and social systems" (p. 569). Schengen thus represents a form of *infrastructural Europeanism* (Schipper and Schot 2011)—a

constellation and procedure through which infrastructures constitute the "material backbones for the emergence of new transnational communities and societies" (p. 249).

By examining eu-LISA's database management, I ask how the issue of border (in)security becomes a matter of infrastructure. More specifically, and paraphrasing Star and Ruhleder (1996, 112), I question *when* border security should be constructed and achieved as distinct *European* digital infrastructure. I therefore turn to the imaginations and visions of Europeanhood or European identity that are attached to the digital infrastructure of borders and their governance. eu-LISA serves as my lens for investigating these questions. The agency's role might "sometimes [be …] not so well understood at first sight," as one official admitted, but "eu-LISA is this agency, that if something […] happen[s], Schengen will end immediately" (Interview 12 with EU official, 2019). I focus on the agency's *infrastructuring* work, which Walters (2011) defines as the "difficult and painstaking labour that goes into assembling, maintaining or extending […] new spaces of security" (p. 54). This includes, for example, the European space of border security. I am therefore interested in eu-LISA's onerous investments and practices that are required to ensure the continuity of infrastructures and information exchange over time (Edwards 2003, 207). These are elements that the wider imaginary of digital transformation almost entirely fails to acknowledge. As we saw in chapter 3, the transformation imaginary reinforces the idea that society and politics must undergo rapid, inevitable, technology-driven change.

Infrastructuring, on the other hand, suggests a praxeological understanding of infrastructure. It privileges the process over the seemingly static product and explores the entanglement of social, imaginative, and material infrastructure practices and activities (Felt,

Öchsner, and Rae 2019).[26] It also requires us to be attentive to both the "conceptual plasticity and the undeniable materiality" (Carse 2016, 35) of infrastructures. In other words, it is a *co-productive* perspective that considers material practices (that easily fade from view when emphasizing higher orders and promises) as well as the imaginations, ideologies, and visions that are continuously written into infrastructural interconnections, standards, and networks. In this sense, infrastructures "define imaginaries of what is possible and potentially possible and are presented politically as a pathway to those potentials" (Slota and Bowker 2017, 535). As most studies of infrastructure nonetheless tend to privilege the technological (even if they emphasize the hybrid character of human and nonhuman actants), it is necessary to recall Larkin's important argument that infrastructures always

> operate on multiple levels concurrently. They execute technical functions […] by mediating exchange over distance and binding people and things into complex heterogeneous systems and by operating as entextualized forms that have relative autonomy from the technical function.
>
> (Larkin 2013, 335–36)

In order to explore eu-LISA's infrastructuring work in creating and maintaining digital borders, we must first study how the agency contributes to ensuring cooperation through complex and technical means among the various authorities who operate borders (connecting, for example, border crossing points, police stations, and consulates). This concerns the methods by which streams of traveler data are processed and shared, ultimately becoming an integral part of the

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[26] See also Korn et al. (2019), who argue that infrastructuring offers a "shift of perspective from a structuralist or system theory-led approach that attempts to characterize systems as entities to a practice theory-inspired view on phenomena as results of systematically linked and synchronised practices" (p. 17).

multiple means through which circulation mobility is selected and filtered in ways that are often no less violent than the exceptional exclusionary measures at borders today. Second, we must explore what Larkin (2013) calls *entextualization*, which, as I will argue, is the process through which complex heterogeneous networks appear to emerge as a *European* infrastructure— administered and performed by eu-LISA.

A small note of caution: this chapter is not interested in whether eu-LISA serves as a successful agent of European integration, enabling the smooth administration of the Schengen space. Instead, it draws on the work of Steven Hilgartner (2000) to develop an understanding of infrastructuring as the performative technique of *front-* and *backstaging*. Infrastructuring involves processes and practices that distribute what is sensible and render certain elements and characteristics of infrastructure visible or invisible. In other words, we will have to understand eu-LISA not only as an ordinary technical operator of IT systems but as a body that *performs* digital border infrastructure that is necessarily tied to material and historical contexts. To explore these dimensions, I introduce the agency's two main sites via ethnographic vignettes of my visits. The following sections thus illustrate how digital border infrastructure is managed and performed in material, social, and imaginative ways. In the chapter's final section, I discuss my findings in relation to what has been discussed under the heading of the *infrastructural making of Europe*. Referencing the work of John Law, I reflect on how the case of the eu-LISA agency allows us to observe the making of a *fractional Europe*, which is performed as both multiple and singular, as a coherent whole and irreducibly dispersed and decentered.

4.2 Performing the digital infrastructure of Europe's borders

In the first two vignettes, I describe scenes from my fieldwork. Vignette 1 chronicles a visit to eu-LISA's new headquarters in Tallinn, which hosts regular meetings with national delegates,

officials, agency representatives, and industry stakeholders. As previously mentioned, Estonia is the official seat of the agency, and it is where eu-LISA is *represented* as an official EU agency. The vignette offers a brief impression of the local environment in which this IT systems agency is situated. The second vignette recounts a particular event at the agency: the inauguration of its new headquarters, narrated in a YouTube video. As we will see, *events* play a critical role for the agency, and eu-LISA is engaged in various types. These events sensitize us to how performance is played out, what dramaturgical elements must be employed, and what kind of audiences are thereby addressed.

Vignette 1: A visit to the agency

In 2018, the German daily Süddeutsche Zeitung reported on an EU agency known only to nerds and police officers.[27] In this piece, eu-LISA was described as a likely candidate for "the most obscure agency" in the EU. The article suggested that it had built up a rather dubious reputation, operating databases with massive amounts of personal information largely in the background, away from public scrutiny and transparent governance. I had read the article before I embarked on my journey to Tallinn, Estonia, to visit eu-LISA's headquarters (HQ) for the first time. Although I was invited to its annual conference taking place at Tallinn's Hilton Hotel—one of the more conspicuous, ritzy places in town—I was unable to schedule a meeting with my contact at their HQ. They suggested that it was not an appropriate time to visit because of the large amount of preparation work required to accommodate multiple stakeholders (industrial tech companies and member state delegates) prior to a conference. To see the agency's new HQ from the outside, I took a bus to Lennusadam station in the Kalamaja (meaning "Fish House") district, a small area on the coast of Tallinn Bay, which owes its name to the city's former fishing harbor. Kalamaja itself is a place of infrastructural history. Factories were built here when the railroads connected Tallinn and Petersburg and brought an influx of workers into the city. Today, the neighborhood is home mainly to Estonian bohemians. eu-LISA's HQ is located next to two historical buildings, both tourist attractions: the infamous, abandoned Patarei Prison, a so-called lost place of dark

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[27] "Neue Macht für die obskurste Behörde der EU" by Jannis Brühl. Available at https://www.sueddeutsche.de/digital/fluechtlinge-eurodac-eu-datenbanken-migration-ueberwachung-kriminalitaet-1.4219070, accessed April 5, 2022.

tourism, having served as barracks, a high-security facility, and political prison both in Soviet times and during the Nazi occupation; and the Lennusadam, the Seaplane Harbour, an old hangar building that houses the Estonian Maritime Museum, which contains large-scale replicas of a World War I seaplane and submarine and dozens of old weapons. Lennusadam also serves as a venue for eu-LISA's official evening events (see also chapter 6). Adjacent to this is eu-LISA's new HQ. Its entrance gate, like the entire building, is highly secured. Three flags represent Estonia, the eu-LISA agency, and the European Union—small references to Europe that visitors and passersby may be able to recognize. Security fences enclose the larger plot of land, giving the impression that space has been left for the compound's possible expansion. The building's architecture resembles a hypermodern glass cube. Set in the environment of Kalamaja and located next to two strange, historic places, it looks as spectacular as it is obscure and seems somewhat out of place. It almost appears to be an ironic testimony to its reputation: set next to the open sea, it is surrounded by its high protection fences with fully transparent walls that, in the distance, look more opaque than welcoming.

Figure 3 and 4. eu-LISA's HQ in Tallinn, Estonia, © Paul Trauttmansdorff 2019

Vignette 2: A promotional video on the construction of the HQ

How did this building come into being? On eu-LISA's official YouTube channel, which has approximately 400 subscribers (in March 2022), there are short videos about the training the agency offers to member states, videos that promote "interoperability to achieve a safer Europe," recorded speeches by the executive director on Europe Day, and highlights of eu-LISA conferences. These videos are, of course, primarily promotional, but they also showcase the agency's role as an official organization and are made as a gesture of transparency for an anonymous (online) public.

There is one video that I am particularly interested in: it documents the groundbreaking ceremony for eu-LISA's new HQ.[28] The video, entitled "Cornerstone Laying Ceremony," uses drone shots to provide a bird's eye view of the site with the seacoast and what I later identified as the Lennusadam and Patarei Prison visible in the background. More importantly, it chronicles a visit to the construction site of the future eu-LISA HQ by some of the agency's staff, its Director Krum Garkov,

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Northern Tallinn's mayor, and the Estonian Minister of the Interior. They wear white safety helmets, giving the participants a uniformed appearance that oddly matches their business attire. The video of this event and the acts undertaken at the site convey several possible representational and symbolic meanings. They promote the emergence and growth of an agency, manifested in the construction of a new office. The video guides the narrative by showing clips of prepared speeches and focuses on the symbolic act of laying the cornerstone, where a time capsule was placed into the concrete. It assembles familiar discursive elements that give meaning to the laying of the cornerstone. We see the Estonian minister, standing at the construction site, praising a "really, really great moment" and congratulating the agency that "already [had] a great history in Estonia." He continues, "[S]etting a cornerstone for a new head office for eu-LISA is not only a cornerstone for eu-LISA; we can also say that it's a cornerstone for [the] digitalization of [the] security of [the] European Union. I hope that in the future more and more new startings of different databases in the European Union will be started from this house." Director Garkov follows this speech by recalling how "it all began," underscoring the agency's increased significance: "eu-LISA is one of the foundations of [the] Schengen Area, one of the foundations [of] border management, internal security, and migration management in Europe […] We found a very good home here in Estonia, in Tallinn." This "new home," as the YouTube description adds, will "provide our staff with a modern working environment to successfully perform our tasks as required by the continually progressing digital era."

In all the speeches, buzzwords such as "digital transformation" are repeatedly linked to Europe and the (in)security of its borders. At the same time, they are also grounded in Estonia's national self-image of a digital state, society, and economy—signifiers that are easily detected in several public places, such as Tallinn's airport. Upon arrival, big letters welcome the traveler to "the world's most digitally advanced society." Estonia is promoted as "e-Estonia," and "the first digital country," and its innovative "e-administration" is praised. These are the fashionable elements of a vocabulary that must design and nurture a progressivist imaginary of Estonia as a European nation.

4.2.1 Events: Putting digital infrastructure "on stage"

> Performance, the enactment of the poetic function, is a highly reflexive mode of communication.
>
> (Bauman and Briggs 1990, 73)

In his seminal description of iron construction, Walter Benjamin (2002 [1982]) states that iron was destined to serve the architecture of the future. With railroad construction in mind, he wrote that "technological production, at the beginning, was in the grip of dreams. (Not architecture alone but all technology is, at certain stages, evidence of a collective dream.)" (p. 152). However, we must question where and when collective desires, dreams, or political agendas are made accessible and how they are performed and mediated to an audience.

These questions require us to reflect on the *events* that allow us to observe and capture what Hilgartner (2000) (in reference to Erving Goffman) terms the techniques of frontstaging and backstaging by organizations that must stage and enact their (technoscientific) authority. Events, like the inauguration ceremony described in Vignette 2, are perfect occasions for deploying techniques that *perform infrastructure*. Badenoch and Fickers (2010a) therefore suggest focusing on "infrastructural events" as occurrences "that bring multiple elements and levels of infrastructures into view and reconfirm and/or reorganize the relations between them" (pp. 13–14). Similarly, Horst and Michael (2011) argue that the event is "an actual occasion comprised of the coming together of numerous entities that are social and material, human and non-human, macro and micro, cognitive and affective, available and unavailable to consciousness" (p. 286).

Front- and backstaging are thereby techniques that define, shape, and mediatize this coming together of entities for (imagined) audiences. In other words, they make certain entities

more visible or articulate while backgrounding others and rendering them inaccessible. They produce *entextualized* forms and qualities of infrastructure. Seen in this light, the video of the eu-LISA event served to generate forms of mediated participation for an anonymous audience that became part of the performance of an emerging digital border infrastructure (a form of participation that would be completely inaccessible through personal visits to the eu-LISA headquarters, such as the one described in Vignette 1). The inauguration event had to articulate and make visible a European moment (however vaguely defined) that spotlighted the agency as the infrastructural agent responsible for digitizing European security. At this moment, this *eventing of infrastructure* (Badenoch and Fickers 2010a) rendered the agency a spokesperson for Europe and staged its authority over the digital border infrastructure and its purported security guarantees.

While the inauguration ceremony on eu-LISA's YouTube channel is a particularly useful example, similar patterns of mediatization take place at the agency's annual conferences, roundtables, and other policy meetings, usually organized in extravagant settings and sometimes livestreamed on the agency's public channel. Events incorporate dramaturgical elements that provide observers and audiences with a collective experience: they communicate the digital border infrastructure as an emergent, significant, and unified object under the agency's governance.

To this end, events may be characterized by ritual elements and a repetitive, standardized discourse on migration and border policy "problems." However, they are also specific performances of the digital border infrastructure that engage observers and participants in the forging of political identity and European selfhood. Accordingly, one can observe the constant use of the plural pronoun "we" in reference to imperatives of action: "we are not going to build that alone," "we need," "we must," or "we now can." Similarly, during the 2019 annual conference, a presenter not only emphasized how the future buildup of new databases was

centralized under the institutional umbrella of eu-LISA but also metaphorized it as a European response to "Eurosceptics" and a reason for "Euphoria" (field note, eu-LISA Conference, October 16, 2019). During the conference breaks, video screens played various promotional videos about "the big job of maintaining EU borders," in which a voice-over reminded participants about the "huge and important job requiring seamless operation between large and complex infrastructures involving IT systems across many European countries."[29]

Events put infrastructure "on stage" and allow eu-LISA to articulate infrastructural power through performance. They portray the creation and management of the digital border infrastructure as the site of Europe's materialization. This must be achieved through two main acts of frontstaging. First, infrastructural events foreground the supposed presence of a unified political community that, in reality, consists of highly diverse audiences, actor groups, and professional communities. In this way, experts and representatives of smaller and less powerful nation-states are integrated into the agency's terrain, which is presented as European. The simple recognition that one is invited to active and mediated participation in a ritualized performance (much like the rotating EU presidency) creates a certain sense of membership or belonging necessary for the construction of any collective political identity.[30]

Second, infrastructural events seem able to synthesize and, at the same time, conceal differing interests and interpretations; they perform semantic *coherence* despite there being multiple meanings attached to infrastructural configurations. While eu-LISA (and other institutional actors of the EU) emphasizes *European collectivity* at its events, the inauguration ceremony for the new HQ also displayed partially competing—or ambiguous—interpretations.

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[29] The video is available on eu-LISA's YouTube channel. See https://www.youtube.com/watch?v=F50ecVl8Chw, Min. 00:13–00:24, accessed April 5, 2022.

[30] This is an opportunity for smaller states to appear and act alongside more powerful states, such as Germany and France, as well as alongside big industry players who manufacture the devices and systems of digital bordering.

eu-LISA's significance as an institution that controls transnational databases was mobilized by Estonian officials to foreground *national* interests and nurture Estonia's national image as a digital state or "e-society." Even more obvious were Estonian efforts to bring the agency to Tallinn upon its creation. At that time, a representative of the Estonian Ministry of the Interior argued that "[w]e are not interested in bringing just any kind of agency to Estonia. 'IT' is what we, Estonians, all understand and what we appreciate. It is part of our national image" (Estonian World, April 23, 2013).[31] At events, such divergent and contradictory implications can either be made invisible or easily conjoined to suit multiple interests and purposes. More simply, an (infrastructural) event creates unity out of multiplicity.[32]

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[31] See https://estonianworld.com/technology/eus-it-agency-sets-up-in-estonia/, last accessed April 5, 2022. As reported by the online magazine *Estonian World*, the state had promoted its candidacy for the agency seat long before a draft EU regulation for eu-LISA was presented in 2011. Another magazine called *The Baltic Course* quoted a former Minister of the Interior on the "symbolic significance" of building the agency's headquarters in Tallinn: "This reinforces the image of Estonia as [an] IT capable state […] It is no less important that the strategic planning team will be located here who will handle the IT systems development work" (The Baltic Course, December 11, 2014). See http://www.baltic-course.com/eng/real_estate/?doc=100028&ins_print&output=d, last accessed April 5, 2022.

[32] Miriam Fraser (2009) effectively summarizes this principle in her discussion of Whitehead's concept of the event (and in conversation with Latour, Stengers, and Deleuze). She notes that "the singularity of an entity is derived from a multiplicity of diverse elements that are inextricably conjoined […] by way of prehensive relations grasped in the unity of an event" (p. 66).

Figure 5. One of the screens at the annual conference of eu-LISA, showing eu-LISA's executive director delivering a livestreamed speech, with the flags of Estonia, EU, and eu-LISA in the back. © Paul Trauttmansdorff 2019

4.2.2 Wrestling with the installed base

In the previous section, I illustrated how digital border infrastructure is performed by frontstaging. Events allow actors to engage in the symbolic or mythical construction of European collectivity, mediating what infrastructure is supposed to represent. By necessity, however, this requires relegating any ambiguities, contradictions, or contentions about infrastructure's *socio-material* construction and institutional histories to the background. What is presented as a single European character actually relies on a heterogeneous and collective construct upheld by the distributed existence of material and organizational structures that are closely related to what has been described as the *installed base* from which any infrastructure's "strengths and limitations" are inherited (Star 1999, 382). In eu-LISA's case, the ability to attain the position of spokesperson requires not only entering the stage with a coherent and seemingly

unified voice but also backstaging other elements. Both can be seen as techniques that "hold the history of spaces and places at a distance but in reserve, at once acknowledging their presence and not allowing them into the narrative" (Badenoch 2010, 56).[33]

eu-LISA's geographical dispersion across the continent—its headquarters in Tallinn, its operational data center in Strasbourg, France, its backup site in Austria's Pongau region—is a telling example. This constellation emerged from past organizational trajectories, political arrangements, and compromises. Estonian authorities were initially disappointed that not a single database was physically located in Tallinn (a detail very consciously excluded from the speeches at the cornerstone laying ceremony). When eu-LISA was created in 2011, it was supposed to take over the management of existing systems, such as the SIS and Eurodac, both previously based in different locations and operated by different actors. Once the agency was launched, however, French officials ultimately refused to move the SIS from their national territory. Maintaining command of this transnational database of migration control and border security—i.e., not putting it into the hands of a new member state—was meant to send a political message and underscore France's geopolitical importance (Interview 24 with member state representative, 2019). Unlike Tallinn, Strasbourg was perceived as a secure NATO-surveilled airspace that provided a critical security infrastructure and was far enough from Tallinn's neighbor and geopolitical adversary, the Russian Federation.

Since eu-LISA's inception, the growing digital border infrastructure has been a subject of political negotiations and power struggles between states, ultimately resulting in the division

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[33] To shed light on both the materiality and movability of borders, Dijstelbloem (2021) mobilizes the notion of *infrastructural compromise*, stressing that they emerge from all kinds of *sociotechnical mediations* in the context of border security. He likewise holds that compromises concern the "transformation of conflicting requirements and opposing views into a workable composition by adding new elements, foregrounding certain aspects, and backgrounding others" (p. 32).

of the agency's seat into an operational center (Strasbourg) and an official headquarters (Tallinn). eu-LISA's operations had to remain in Strasbourg, the city where the SIS was administered by French authorities. IT systems such as the Visa Information System and Eurodac were either created in or transferred to Strasbourg. Moreover, former (French) personnel who oversaw the SIS could easily be integrated into the new administration, now formally under the umbrella of a European agency.[34]

Similarly, member states negotiated the location of the backup site for eu-LISA's databases. They decided to establish the site one kilometer into a mountain near Sankt Johann in Austria, a former bunker facility secured by the Austrian military that was left over from the Cold War. The site had already been chosen as the backup location for the new generation of the SIS (SIS II). When the EU was considering locations for a backup site for eu-LISA's databases, Austrian authorities competed with a proposal from officials in Finland, who proposed a site near the Arctic Circle. Ultimately, the Austrian mountain was selected due to its geographical distance to Strasbourg and its preexisting military infrastructure (Interview 7 with member state representative, 2019).[35]

Such examples illustrate the contingent interconnection of geographical, historical, and organizational arrangements and configurations that have shaped eu-LISA and the governance of its digital border infrastructure. They also illustrate that infrastructural Europeanization seldom occurs as a smooth integration process created by a united political community of people. Instead, it is a complex process characterized by multiple material, social, and political

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[34] Accordingly, the first official to lead eu-LISA's operational center was a member of the French police.

[35] This "magic mountain," as one interviewee called it, had previously housed a secret war room called *Einsatzzentrale Basisraum*, designed in the 1970s after the experiences of the Prague Spring when Soviet troops occupied the Czechoslovak Socialist Republic. Feeling threatened by a potential Soviet attack from the east, Austria's political leaders decided to set up an emergency government room in the event that Vienna, the capital, was overrun by Soviet troops.

factors, such as competition between Schengen states and those who want to become members, national and geopolitical interests, organizational and material structures, and compromises between all these elements. We may call this the *preinstalled base*, which has been subject to national competition and controversy and constitutes its inherited weaknesses. Splitting the agency into three geographical sites, for example, has had considerable logistical and budgetary implications for both eu-LISA and its member states.

To summarize, events appear as opportunities and tools of communication that reassemble materiality, values, meaning, and identity. Through the mediation and coordination of these elements, Europe is *put on stage*. Therefore, Europe is here not articulated as it exists but instead form part of "the mythical construction of the mediated centre (Europe) at its most intense" (Badenoch and Fickers 2010a, 14). Events thus stage digital border infrastructures *as if* grown de novo, backstaging their negotiated material character and compromises and shaking off the inertia of their installed base. Front- and backstaging before various audiences appear as the means through which the digital border infrastructure must become visible as European.

4.3 Infrastructural breakdown and failure: conjuring organic visions

In the following vignette, I introduce eu-LISA's data center in Strasbourg's Neuhof district. The scene is no longer one of events or eventization but of mundane, technical, everyday work with IT systems, carried out by eu-LISA staff. Nonetheless, as I will later argue, agency officials and experts engage in back- and frontstaging in the particular performance of infrastructure and thus also in the creation of (non-)audiences.

Vignette 3: A visit to eu-LISA's data center

To visit the agency's operational site in Strasbourg, I arranged a meeting with an eu-LISA officer whom I will call Richard. I first met Richard during an industry roundtable event in spring 2019. Shortly thereafter, I took a bus to eu-LISA's operational site in a calm suburb called Neuhof, located about thirty minutes from Strasbourg's historical center. On the sidelines of the roundtable, Richard praised Strasbourg—the "real capital of Europe," he claimed—as the right place for eu-LISA. He appreciated Strasbourg's historical reformist values and spirit as well as its geographic location bordering two European powers and past rivals, Germany and France, that today form the "motor" of the entire continent. Walking through Neuhof's petit-bourgeois row houses, I found it difficult to imagine an IT center here that would contain the massive European collection of data, pieces of biographic and document information, biometric fingerprints, and facial images of travelers and asylum and visa applicants. Neuhof's streets are named for local artists and writers, but one street sign provides a link to the EU's migration and border regime: Rue de Schengen, which is the street at the back of the eu-LISA data center. I approached the data center from the front, on Rue de la Faisanderie, where I first spotted a transmission tower as well as barbed wire with signs indicating that this was an "area protégée."

Two fences and multiple cameras protected an area with a few buildings and parking lots. At the entrance gate, a guard announced my arrival with a walkie-talkie. Richard came outside to pick me up because the center had failed to register my name and identification (I had to send a copy of my passport prior to my visit). We proceeded together to an entrance hall that resembled an airport security area. After I received my visitor badge, my fingerprints also needed to be taken. With a smile, a woman behind a counter offered me a small black fingerprinting device. Richard and the woman both instructed me on where and how to place my index finger on the device. Three attempts later, Richard joked, "Well, in terms of your 'fingerprintability,' you have at least fulfilled one criterion to become eu-LISA staff." We proceeded through automated security gates, which were more protective than the rectangular frames found at airports. He explained, "We do this because you could throw your badge over the fence into the grass any time and someone could pick it up. But, with your finger, we have your unique identity now."

In one of the data center's meeting rooms, I interviewed both Richard and his supervisor (whom I will refer to as Christopher). We had talked for about one and a half hours when I asked to see the actual data center. My request surprised them at first, but Christopher then tasked Richard with allowing me a brief glimpse. Richard agreed, shrugging; he was on his way home anyway. He walked me across the compound until we entered another building. Moving from room to room, every door we passed through needed to close again so that we could advance through the next. We descended some stairs and rounded several corners until Richard opened the last door, which led to a larger basement—an air-

conditioned room with rows of black and white racks, each approximately half a meter apart, most of them blinking. Richard explained that the black racks were older and mostly belonged to the SIS and Eurodac. Part of their job was to maintain the systems and turn them into white racks—i.e., updated racks. Over time, the room would become filled with racks from future systems, such as the Entry/Exit System, the European Travel Information and Authorization System, and the European Criminal Records Information System for Third-Country Nationals. Richard would not allow me to take a picture, arguing, "but I mean you could take any random picture found on the internet when searching Google images of 'data center.'" This is certainly true, as the newspaper article in the German daily Süddeutsche Zeitung proves. The article contains a photo of the racks (see below) and accurately describes its environment: a somewhat unspectacular basement filled with equipment, the constant hum of air conditioners to maintain the correct temperature, nearly identical racks flashing repeatedly. "Eurodac here, the Visa Information System there, the Schengen Information System over there," Richard pointed out to me prosaically. The newspaper article asked a question that left the reader—and myself, standing in eu-LISA's basement—wondering, "Who gets in, who gets out […] decisions all supposedly made just on the basis of these black and white racks?"[36]

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[36] My own translation, quoted again from Jannis Brühl's article "Neue Macht für die obskurste Behörde der EU." https://www.sueddeutsche.de/digital/fluechtlinge-eurodac-eu-datenbanken-migration-ueberwachung-kriminalitaet-1.4219070. Last accessed online, April 5, 2022.

Figure 6. "Rue de Schengen" in Strasbourg, the street behind eu-LISA data center.
© Paul Trauttmansdorff 2019

Figure 7. The eu-LISA data center in Strasbourg. © Süddeutsche Zeitung GmbH, München. Courtesy of Süddeutsche Zeitung Content.

4.3.1 Confronting the inherent unreliability of infrastructure

[F]ailure is key. That said, disconnection is only possible if connection, or the possibility of connection, is present, if a system of forces can be formed.

(Graham and Thrift 2007, 7)

[Y]ou know, it sounds so, it sounds so clean and easy, but, you know, rarely in reality are things that clean and easy.

(Interview 23 with member of the European Parliament, 2019)

Unspectacular, yet highly secured and impossible to access without authorization, no events are organized at the operational center in Strasbourg. Here, technicians, experts, and engineers work with the transnational, centralized systems of digital borders, work that is so routinized that it can be, at times, challenging to describe. Unlike in Tallinn, there is no theatrics when these workers emphasize the technological detail and professional routine needed to fulfill the requirements of their tasks: much is learned on the job, and knowledge comes with experience. Activities sometimes appear mundane and uninteresting, but they involve a detailed understanding of information technology and databases.

One representative, describing these operational and backup centers, said, "It is very difficult to describe because there is no particular scheme to follow, but […] well, as mentioned, it is such a broad- or multifaceted work […] every day is different, okay?" (Interview 7 with member state representative, 2019). Agency staff drew attention to the hectic *infrastructural life* of IT systems that requires ongoing reconstruction and renewal to enable digital borders to operate on a daily basis. Infrastructural life, in other words, demands constant and proactive maintenance, a 24/7 service that includes monitoring network connections to anticipate often

enigmatic system behaviors. An Application Management Unit must ensure first-level support, check the electronic operations of the systems, and resolve problems with various applications that block the flow of data: "you create volumes not to have queuing data, you watch the screens so the searches […] can take place, the transaction […] can take place as well. […] You ensure that everything is as it ought to be" (Interview 27 with EU official, 2019).

By describing it as *iterative repair,* Glouftsios (2021) accurately depicts eu-LISA's infrastructural work. From the perspective of eu-LISA engineers, repair is an integral part of their everyday tasks, a prerequisite for dealing with the continuous disruptions, and their interconnections, in different parts of the systems. Another key group of activities relates to these reactive measures on breakdown and failure, which are almost ordinary infrastructural features that technicians are trained to handle. It has produced an entire set of technical terms that describes the engineers' multifaceted work: changing configurations, changing firewalls, modifying the status of communication networks, exchanging hard disks, and complicated and resource-intensive practices like troubleshooting, bug fixing, and incident handling.

> We have network engineers, system engineers on site that take care of troubleshooting. I don't know, the network is down, it doesn't function anymore, or, I don't know, some server is down, and they need to repair. You know, if one server is down, that means that the other three, if there are four in a cluster, the other three will take the load, but not forever. I mean, it can't work forever, so you need to, to repair the server that is done. So, this is what we are doing […], in [the] case of troubleshooting an incident.
>
> (Interview 27 with EU official, 2019)

Maintenance and repair work must also include severe incidents and scenarios that occur less frequently but are more problematic to resolve. Christopher at eu-LISA, for example, imagined a range of scenarios: hard disks and power adapters that need to be exchanged but are missing or defective, or novel components that must be inserted but require switching off entire applications.

In the backup bunker in the Pongau region of Austria, an almost identical systems duplication is on so-called warm standby. In problematic cases that would severely impact Strasbourg's active site, operations must be switched to the backup within approximately twenty minutes, following a detailed procedure, to enable the continued processing of data between border passage points across Europe: "whenever there is a failure, there is a failure on the system, so the system is down, you need to switch to the other site manually, or, to take over manually from the other site, from St. Johann, okay?" (Interview 27 with EU official, 2019).[37] Sankt Johann's bunker also serves to ensure that the EU border regime's digital operations will continue to function in the event of a more severe disaster like long-lasting regional power cuts or, as Christopher imagined, an explosion at the Fessenheim nuclear plant eighty kilometers from Strasbourg.

From these depictions of technicians and engineers at eu-LISA's data center, it is clear that managing the digital infrastructure of borders primarily involves monitoring and responding to tracking incidents, bugs, breakdowns, and failures. We can also refer to this as the necessary backstaging work that maintains the computational power derived from the basement racks described above and their interconnecting capacity to process data across the

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[37] Usually, only individual components or applications have to be switched to the Austrian site and operated remotely from Strasbourg. It is not clear how often these scenarios take place. According to one of my contacts, they occur frequently and, at times, for longer periods (Interview 7 with member state representative, 2019).

continent. *Correction* and *adaptation*, as Glouftsios (2021) calls them, are essential modes of backstaging that are ensured by the continued administration of digital border infrastructures.

Another important backstaging mode is *standardization*. For eu-LISA, data must be stored and processed according to a certain uniform procedure. As Barry (2006) once argued, only connection and data practice *standards* allow the establishment of infrastructural zones where transnational governance of mobility is enabled across far-reaching geographical locations and through the hands of multiple actors and institutions. Thus, the goal of monitoring systems is not only to detect potential bugs or failures but also to control aberrant behavior in member states' practices and operations. In this sense, eu-LISA governs partly through identifying, and acting upon, dysfunctional national networks, as Christopher explained,

> [W]e pursue [...] active monitoring of the network connection, active monitoring of the behavior of systems to intervene [...] [in a] timely [manner] and to recognize in case of malfunction: something is fishy. We observe here also—if visible, and to a certain degree, this is the case—whether there is obvious malfunctioning on behalf of member states.
>
> (Interview 14 with EU officials, 2019)

In this instance, standardization is a process that is primarily achieved by detecting and investigating aberrations or otherwise malfunctions that are visible on the screen in Strasbourg. These indicate that the malfunctions occurred at the local level of a member state:

[I]n the case of interruptions […] or obvious deviations from the standard behavior of the local system, [we] get in contact with the colleagues and say: we note here that you are no longer receiving reports from us. […] [On our end], data is queuing more and more—check out what's happening on your side!

(Interview 14 with EU officials, 2019)

Furthermore, copies of the systems are designed to simulate network breakdowns in joint exercises. These scenarios are designed to train and discipline member states to coordinate and follow standard protocols.

The agency's attempts to monitor, trace, and standardize operational procedures also point to a more pressing concern in the management of the digital infrastructure of borders: *poor data quality* is viewed as a core impediment to uniform standards. Data quality depends, to a large degree, on the local conditions, environments, and actors through which people are registered, identified, and inputted into the systems. Data quality amplifies technicians and engineers' sense of having to contend with the inherent unreliability of the digital border infrastructure. eu-LISA workers and engineers have only limited space for action because standardization efforts rely solely on giving "feedback about issues that may not be apparent to them [national authorities], but through centralized monitoring, we can indicate to them what the potential issue might be before it [be]comes a significant issue" (Interview 4 with EU official, 2018).

Nonetheless, data quality is mostly imported into the systems, and data clearing has a notoriously bad reputation in existing IT systems (FRA 2018; field note, eu-LISA Industry

Roundtable, November 3–5, 2020).[38] Another representative working at the backup site argued that while eu-LISA may claim that it has improved data quality, it has, in fact, only limited possibilities. What counts in the end, he stressed, is the principle "garbage in, garbage out—if you enter bad data, you [eu-LISA] have to work with them!" (Interview 7 with member state representative, 2019)[39]

4.3.2 *Le cœur numérique*: How backstaging work must keep the body alive

eu-LISA's work is dominated by the inherent unreliability of infrastructural networks and the fragility of data flows that must be continuously confronted by mobilizing massive financial, technical, and human resources. This is one reason why infrastructure produces entire *cultures of repair*, in which maintainers and responders are urgently needed, for example, to sustain the transnational apparatus of border security (Bellanova and Glouftsios 2022; Glouftsios 2021; Graham and Thrift 2007).

Accordingly, a central concern for eu-LISA is not only traditional budgetary gains (in the competitive arena of EU agencies) but also the difficulty in recruiting technicians and engineers as well as training them to become maintenance and repair workers. One official in Tallinn explained that most challenges are "resource based, maybe budget based, and when I say resource, [I mean] also expertise. If we can attract enough expertise as to have enough resources to work into the same direction, that would be good" (Interview 27 with EU official, 2019). Another official was pessimistic about these prospects: "I can only hope that they [eu-

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[38] As scholars have argued, clearing data in the bordering process not only involves complex chains of actions that can incrementally improve data quality but also means sorting out different approaches to what data quality should actually mean (Pelizza 2016b; Pollozek 2020).

[39] This is my suggested translation of the interviewee's German expression: "Wer schlechte Daten in das System eingibt, muss mit ihnen rechnen."

LISA] do not only get new tasks but that they get sufficient money, and they can recruit technicians, good technicians" (Interview 9 with EU official, 2019).[40]

The everyday conditions and practices at Strasbourg's data center create what Karin Knorr Cetina (2009) characterizes as *synthetic situations*. Synthetic situations are defined by *response presences* that require continuous monitoring, intensity, and preparedness, and they are a direct result of infrastructural unreliability. These responses can be viewed as *multiple acts of backstaging* that repeatedly push back at the recurring interruptions, incidents, deviations, and breakdowns. They are not only epiphenomena of the agency's work but constitute its position in the border regime: "[I]t makes plain our position as [an] agency," Christopher argued in our interview, "and why Europe invests in these huge efforts" (Interview 14 with EU officials, 2019). At the same time, backstaging work by technicians and engineers at the agency could also be called *(non-)audience work*. It relegates unreliability to a position behind the scenes and creates a *non-audience*: the professionals, border guards, and end users who must not be affected or disturbed by the inherent unreliability of the digital border infrastructure.

The engineers and experts' involvement in backstaging provides them with a sense of natural responsibility for maintaining order: order must be preserved and made visible as a result of their tedious and behind-the-scenes work of ensuring network connectivity and linking bordering spaces through data. To illustrate, Richard poignantly metaphorized the data center as the place where the "living organism" is sustained:

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[40] This is also one of the reasons why a significant amount of repair work must be outsourced to external contractors: "You know, if you need to fix a bug, then already we would ask the contractor to do it. If it's more coordination, you know, some issue which is not a technical problem, […] there can be many questions that a help desk needs to reply [to] from member states, too. So, the bulk of the work is for us, but if there are some technical, real technical details, then we again involve the industry. But these are the same contracts, so it's not only for building the system but also for maintaining it and fixing it" (Interview 27 with EU official, 2019).

If you like, you can imagine an operating data center of this size, of this order, in principle, like a living organism. There, the body constantly exchanges […] cells, but nevertheless, it is the same human being. But all micro-components of such a system are subjected to a permanent exchange of renewal, either technical renewal or pure replacement of what has already been there before.

(Interview 14 with EU officials, 2019)

Comparing their work to the exchange of somatic cells and, as Christopher added, a "permanent process of renewal and renovation," eu-LISA engineers and experts invoke a utopian quality and broader sociopolitical significance of infrastructure.

Elsewhere, similar corporal analogies are used by eu-LISA representatives to describe the data center as "le cœur numérique de l'espace Schengen" (the digital heart of the Schengen space).[41] These corporal analogies and organic or biological metaphors seem to render visible what is incomprehensible or seemingly invisible—i.e., the relationship between data flows and (the stabilization of) social order, between material infrastructure and the polity, between technologies and the formation of the Schengen market and movement within the European space. These metaphors are not simply decorative elements of speech; they articulate "fundamental linguistic and cognitive tools or thinking about the world and acting on the world" (McLeod and Nerlich 2017, 2).

However, these metaphors are also ready-made tools to *invisibilize* what would usually come to the fore: interruptions, breakdowns, and irregularities in network connectivity. These

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[41] For example, see this radio interview with an agency representative from October 10, 2020, entitled "Eu-LISA: Strasbourg, le cœur numérique de l'espace Schengen." Available at https://rcf.fr/actualite/le-grand-invite-alsace?episode=51744, last accessed April 5, 2022.

organic visions operate in contrast to the mundane environment and daily grind of Strasbourg's data center and its operations. Instead, they conjure up a seemingly vibrant and stable European connectivity, shielded from unreliable technology and the patchwork of local practices that relegate supply chains and data streams to the background. They portray the agency's infrastructuring work, material networks, and technical connectivity in ways that directly relate them to the imagination of a European community and a collective (naturalized) order.

Using biological analogies or metaphors for infrastructures has a long history, as Richard Sennett's account of emerging modern city spaces illustrates. Here, new urban infrastructures, such as Hausmann's street maps of Paris or the construction of the London Underground, are depicted as veins and arteries that provide the modern city with healthy life and order (Sennett 1996, 401–14; van Laak 2001).

In similar ways, eu-LISA's infrastructuring work, like a biological organism, is not characterized by stasis but by movement and flux. As Richard from eu-LISA claimed, "There is never a status quo, where [you] would simply [… wrap] your arms around and hold tight— there is a permanent process of renewal, exactly like our living organism" (Interview 14 with EU officials, 2019). Yet while Sennett's analogies involve the movement of people as the underlying driver and characteristic of the city and its rising modern order, eu-LISA's organism invokes the circulation of data to order—or of data doubles that facilitate, accelerate, regulate, or interrupt the movement of groups of people.

Ultimately, front- and backstaging work seeks to achieve a specific "presence–absence" of digital infrastructure, according to which infrastructural operations must reside in the naturalized invisible background (Edwards 2003, 185), wrestling with unreliabilities and carrying out monitoring, standardization, response, and repair. The eu-LISA agency's vision of a functioning relationship between its infrastructure and the European governance of mobility is driven by the illusive goal of complete transparency in its operations. Despite the strikingly

erratic and incoherent character of infrastructuring—defined by backstaging a series of incidents, interrupting events, and imperfect operations—collective order is imagined here as organic, stable, seamless, and coherent—much like a human organism.

4.4 Discussion: a case of fractional Europe

This chapter has explored different forms of infrastructuring as a particular means of frontstaging and backstaging work. In ethnographic vignettes, I introduced two main eu-LISA sites where this work is taking place. I first investigated how events perform, frontstage, and visualize the ideas of Europeanhood and European community that are associated with building and managing the digital border infrastructure. Second, I described the monitoring, maintenance, repair, and standardization practices at the eu-LISA data center that backstaged and invisibilized infrastructural failures, disruptions, and tensions in the systems.

A significant part of eu-LISA's infrastructural work, therefore, is to promote the normalized and uninterrupted use of IT systems and their communication networks, which, ideally, must result in a "deep taken-for-grantedness" of their digital infrastructure (Graham and Thrift 2007, 8). This is not beyond dispute, as one official explains: "[B]ecause we do this work in the background, lots of people forget. So, this is the main problem, the lack of visibility that we have on the daily work […]." In a way, official events must supplement this image and seek "to pass the message, to say what […] the implications are [of the agency's work]" (Interview 12 with EU official, 2019).

I would like to conclude this chapter by briefly reflecting on these findings in relation to what the literature has called the infrastructural making of Europe. The metaphor of the organism is a striking example of not only how eu-LISA technicians, officers, and engineers make sense of their own work but also how they use this imagery as a tool for thinking and

acting on the digital border regime in Europe. Border infrastructure is presented as enabling the vibrant life of a larger collective, supplying it with material connectivity and digital flows. Like our own bodies, it ensures our existence, but we cannot be permanently aware of its never-ending organic processes—the exchange of cells, the continuous flow of blood through our veins.

As the agency employee, Christopher, argued, the result of eu-LISA's backstaging work is that its operations are "in principle unapparent. Well, obviously, you can maybe see that there is dandruff on the jacket, but otherwise you don't recognize it" (Interview 14 with EU officials, 2019). But what else should not be seen? The biological metaphors of a single unifying whole must not only visualize a seemingly natural collective body that is maintained through the permanent circulation and exchange of data. They must also conceal from where, and from whom, data flows and circulation are extracted and generated.

Other scholars of border and migration technologies have closely documented how data circulation is inextricably intertwined with the (racialized) techniques of rendering populations visible (Amelung, Granja, and Machado 2020; M'charek, Schramm, and Skinner 2014; Pelizza 2020). Bordering encompasses a range of practices, such as digital registration, identification, virtualization, and classification, that enact migrants as others. These are also integral parts of the infrastructural arrangements that simultaneously constitute and enact a contested entity called Europe (Dijstelbloem 2021; Pollozek and Passoth 2019; van Reekum 2019). Pelizza (2020) demonstrates perhaps most explicitly that this enactment of Europe is necessarily multiple and becomes possible only because mobile people are transformed into *European-legible* populations who remain others—i.e., non-Europeans. eu-LISA's living organism and vision of a collective body thus conceals but also relies upon what Pelizza calls the processing of *alterity*, the translation and enactment of migrants as data object others.

The results of this chapter also attune us to the imaginative capacities that are involved in the project of creating populations as legible objects of government, once referred to by James Scott as one of the "central problem[s] of statecraft" (Scott 1998, 2; see also Scheel 2020). We can thus contextualize eu-LISA and its infrastructuring practices within the processes of European integration and infrastructural Europeanism—processes that are equally shaped through the sociotechnical practices of bio-bordering, as Amelung and colleagues (2020) have shown. European integration is far from a clean, linear political process; it is rather an "emergent outcome of a process of linking and delinking of infrastructures, as well as the circulation and appropriation of artefacts, systems and knowledge" (Misa and Schot 2005, 1).[42]

Our case of eu-LISA and its front- and backstaging work have shown that both imagination and materiality are needed in the "laboratory of infrastructural collectivity" (Opitz and Tellmann 2015a, 172). Europe must be imagined, staged, and represented as coherent, unified, and singular precisely because infrastructure, like borders, is always an unreliable patchwork, partial and multiple. Events must bind together a dispersed set of agents, instruments, and technologies in order to stage Europe as a coherent entity; organic visions of collectivity are staged against the unpredictable, complex, and technical work of maintenance and repair.

John Law (2002) offers us a useful metaphor for capturing this entanglement of both the imaginative and the material. He argues that *fractional coherence* articulates how an object (in Law's case, an aircraft) "comes in different versions […] And yet these various versions also

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[42] A range of contributions has prominently studied the infrastructural making of Europe (Badenoch and Fickers 2010b; Kaiser and Schot 2014; Misa and Schot 2005; Schipper and Schot 2011). At the same time, contrary to Scott's hegemonic role of the state, these works have made clear that this process has been shaped by a multiplicity of both state and non-state actors and that "several co-existing Europe-oriented forms of governance overlapped, competed, or sometimes reinforced each other" (Schipper and Schot 2011, 252).

interfere with one another and shuffle themselves together to make a single aircraft" (pp. 2–3). In other words, unity and coherence cannot exist without fractionality. In this sense, the chapter has attempted to showcase the making of a *fractional Europe*—assembled and disconnected by continuous acts of front- and backstaging multiple elements of digital border infrastructure. Moreover, as the institutional history and trajectories of eu-LISA have proven, the agency itself remains fractional. Its power to repeatedly act as a European spokesperson is based on its capacity to shuffle, as Law says, and create unity, coherence, and order out of multiplicity, chaos, and disarray. As we have seen, any success here can only be partial. Coherence can never be a stable phenomenon. The boundary between the front- and backstage, audience and non-audience, and order and chaos must be continuously redrawn. Europe remains fractional.

PART III

SITES OF INFRASTRUCTURAL EXPERIMENTATION: ENACTING DIGITAL SOLUTIONISM

This section explores two key sites of infrastructural experimentation in the border regime: the making of smart borders and interoperability. The section's two empirical chapters will explore the diverse enactments of the digital solutionism in the border regime. eu-LISA serves here as a prism through which I can analyze the assembling of actors, visions, narratives, practices, and (future) databases. Chapter 5 analyzes the project of *border smartification* and its social and epistemological conditions. Chapter 6 investigates the *policy of interoperability* and how it must enact solutionist ways of seeing and speaking about borders and migration.

5 Crafting the Epistemology of Digital Borders: The Case of Smartification

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5.1 Introduction

Introductory Vignette: the setting for the making of smart borders

The evening reception on the sidelines of "The New Information Architecture as a Driver for Efficiency and Effectiveness in Internal Security" conference took place at the Seaplane Harbour Museum in Tallinn. Three buses took participants from the Hilton Hotel, the conference venue, to the museum located next to eu-LISA's headquarters at Lennusadam. A younger businessman sat down next to me on the bus and started to chat. During our conversation, he introduced his company's products: automated borders, smart corridors, facial recognition technology, and special fingerprint reading systems. His products could perform the necessary background checks "in only a few seconds," he proudly claimed, promising smooth and speedy bordering processes. His company's portfolio did not differ much from other vendors at the conference; in fact, it contained many of the products offered by the industrial community players in attendance who overwhelmingly focused their marketing on potential "paperless strategies" and "seamless traveling." We exited the bus and walked up to the museum. Businesspeople and other participants engaged in conversations about "identity programs," the "identity management business," or the "border continuum."

A former military hangar, the Seaplane Harbour Museum is a permanent feature on any Tallinn tourist guide. It hosts a World War I exhibition centered on submarines, naval artillery, and sea mines. During the event, I wondered who at the agency had chosen the location and why. Was it chosen because of its proximity to the headquarters? Did the agency want to offer international guests the chance to visit a tourist attraction? Before the reception started, attendees were guided through the exhibition, up and along the deck of the enormous submarines exhibited in the hangar. James, a national delegate and one of the official speakers at the conference, explained some of the weaponry, its historical background, and the deployments of these massive old submarines. In his previous career, James had served in the

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military in his country. He later became a border guard and began working for the interior ministry.

The agency had arranged a buffet and hired a band for the reception. It also announced that the welcome speech by its executive director Krum Garkov had to be canceled at the last minute due to "other important obligations." James, with whom I was standing at the buffet, was upset about this undiplomatic gesture. In general, he was fairly critical of EU agencies and their management of European digital borders. James also had strong doubts about the prospects for the new centralized databases, known by everyone at the conference as smart borders. Sarcastically, he described the conference as very effective at providing visitors with good food and posh hotels. Such events, he suggested, serve the agendas of senior officials and their agencies in the EU and truly express the bureaucratic character of the European Union. The sarcastic attitude he displayed with me about these policy meetings and the smart borders project in general was a demonstration of his capacity for individual thought, of what he really thinks. I was reminded of remarks by anthropologist Gregory Feldman who observed that such policy environments are far removed from many of the participants' work realities, their national bureaucracies, and the local, everyday challenges they face. Delegates participate in these international policy meetings but also complain about the impersonal air and the predetermined outcomes. As Feldman (2014) explains, participants "may creatively do their jobs, but they are not present as particular speaking subjects" (p. 49). Similarly, during our conversation, James' sarcasm struck me as a reaction to the loss of individual agency. James was clearly enjoying my presence as an outsider, one to whom he could reveal something "beneath the surface." He pointed to several interrelated aspects of the meetings and events we were attending. Next, he introduced me to a compatriot from a business consultancy who had joined us at the buffet. James alluded to the massive financial investments in IT for bordering purposes: "Well, in general, for us border guards and for you, consultancies, it's the golden age."

This vignette recounts my attendance at a symbolic event organized by eu-LISA. It was held on the sidelines of two larger events where ideas and concepts for digital borders and their interoperability were presented, discussed, and negotiated: the annual conference that announced "the new information architecture" and an ensuing industry roundtable. I use this vignette and observations from the two events as points of departure for the chapter's empirical and analytical interest in the project of "smartening" borders in Europe.

Two characteristics are usually associated with smart borders. The first one is conceptual: smart borders have often been said to exemplify how digitally mediated bordering

processes have become increasingly fluid and dispersed. Dijstelbloem and Broeders (2015) describe this as a proliferation of procedures and practices that produce a *network of relations* between "databases, fingerprints, migrants' bodies, directives, policy documents, European and national bureaucracies, and so forth" (p. 27). The smart border is now typically seen as "a diffuse one physically extending both beyond and inside its geopolitical location, and involving a multiplicity of sites for the surveillance of movement" (Amoore, Marmura, and Salter 2008, 99; see also Côté-Boucher 2008). The second is more empirical: both the designs and operations of smart borders typically involve an array of stakeholders (beyond the state), first and foremost from industrial sectors, who are also interested in smartening the border. For example, an eu-LISA representative called this a "modern way of operating," adding that "I don't even know […] how many hundreds of persons we are cooperating [with] in the industry" (Interview 28 with EU official, 2019).[43] Most scholars draw on these two characteristics when analyzing the various roles, functionalities, rationalities, and problematizations of smart borders as part of the broader digitization of border and migration regimes and the changing character of borders.[44]

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[43] For information on the role of private actors working with eu-LISA, see the exceptional report on the agency's network of lobbying and industrial groups by Lemberg-Pedersen, Hansen, and Halpern (2020).

[44] I have discussed this in chapter 2 under the heading of the biopolitical turn (see section 1.1.2). A broad range of contributions has been made to the smart border literature. See, for example, Amoore, Marmura, and Salter (2008); Côté-Boucher (2008); Leese (2016); Vukov and Sheller (2013); Sparke (2006); and Bigo (2011), among others. On Europe specifically, Tsianos and Kuster (2016) describe the smart border as an "instrument that enables the deterritorialization of the external European border and potentially extending it to the whole Schengen area" (p. 236). Jeandesboz (2016b) argues that smart borders enhance the mass dataveillance of mobility while promoting the reconcilement between intensified securitization (mobility control) and the increasing imperatives of the global economy (mobility facilitation) (see also Leese 2016). In similar terms, Bigo (2011) contends that smart borders officially foster speed of movement, mobilized as an important economic resource, while at the same time reinforcing control and the banishment of those classified as risky subjects. Finally, Sontowski (2018) identifies this dilemma as one of the reasons smart borders re-problematize "cross-border movements and their control on the level of [… their] various temporalities" (p. 2734).

In this chapter, I am less interested in a diagnostic assessment or critique of the smart border project. Instead, I analyze the necessary and painstakingly laborious social and epistemic work of making smart borders that is regularly performed at conferences, meetings, roundtables, and events such as the one described in the vignette. Smart borders emerge here as an epistemological project that shapes how bordering processes can be known, represented, and discussed. I use the notion of epistemology in reference to Jasanoff's (2005) concept of *civic epistemologies*, which describes how culturally specific ways of knowing science and technology play out in technological debates and political decision-making. Civic epistemology denotes a political culture of "how political communities know things in common" (p. 250) and is a composite of "institutionalized practices by which members of a given society test and deploy knowledge claims used as a basis for making collective choices" (p. 255). Unlike Jasanoff's concept (which is primarily recommended for comparative studies), I do not imply that a national or even European citizenry must be invoked, usually one on whose behalf public knowledge is performed and authorized as a response to technoscientific developments. However, as already elaborated in chapter 4, I consider eu-LISA's conferences and roundtables as arenas or theaters in which "knowledge is presented, tested, verified, and put to use" (p. 258). At these sites of infrastructural experimentation, a particular epistemology establishes the credibility and legitimacy of the ways in which digital borders should be developed and deployed. This epistemology and its attributes are articulated and maintained less through formal rules and more through a specific *political culture and practice*, marked by an institutionalized set of conditions, specific modes of interaction, and collective ways of testing, envisioning, and performing knowledge and representations of smart borders. Analyzing these epistemological conditions can illustrate how smart borders are naturalized or made real and how digital solutionism is thereby sustained.

To see how this epistemology is crafted, I describe the standardized conditions of these arenas that create a ritualized setting of gathering, a sort of *clubbability*, and favor the specific epistemic orientations of the actors. I then elaborate on how smart borders operate as a *boundary object* that allows heterogeneous actors to articulate incommensurable but coexisting visions and interests in the same smart border project. After this, I explore the repertoire of logistical language around smart borders, which frames how borders and border crossings must be problematized and how challenges must be solved. In the final section of this chapter, I elaborate on some of the conclusions and consequences of this epistemology of digital borders. I argue that it nurtures forms of knowing, representing, and speaking about borders and migration that are not only solutionist but also *technostrategic* (Cohn 1987a): it signals a mastery over technical complexity and provides epistemic keys to a world in which borders and migration can be *managed* at a distance, thereby evading the multiple realities and violence of border control in Europe.

Before delving into the analysis, however, I first clarify the relationship between the smart borders initiative and the new databases currently under development at eu-LISA.

5.2 A digital embracement: new databases for "smartening" the border

The notion of "smartness" has generally served as a repository of multiple meanings, emerging as a ubiquitous, variable term in all sorts of innovation-driven projects and policies, from smart cities and smart homes to smart health and smart borders. Within the EU border regime, Jeandesboz (2016) correctly argues that smartening is a process of "multiple translations and enrolments through which the technical side of dataveillance – platforms, automated gates, matching systems, and so forth – has become associated with the processes of policymaking" (p. 292). Nevertheless, there are two large-scale systems that will form the backbone of smart

borders and promise to generate new knowledge on travelers and their movements: the Entry/Exit System (EES) and the European Travel Information and Authorization System (ETIAS).[45]

The first system, the EES, will require every short-stay traveler to register their identity, irrespective of their visa requirements. Third-country nationals and travelers from outside the EU will have to provide five fingerprints and a facial image in addition to biographical data and travel information. Moreover, the system will store data about the duration of a stay in any Schengen member state and automatically alert national authorities once an authorized stay of 90 days is exceeded and no exit registration has been recorded. Data in this system are intended to be compared with data in the Visa Information System to detect so-called visa overstayers. The EES thus addresses a long-standing concern of Schengen member states, who have incrementally aligned and tightened their visa policies over the years: third-country nationals find themselves in an increasingly restrictive legal environment that leaves them with no options for legally remaining in the EU. The result is that they arrive in Europe with a granted visa, exceed their authorized stay, and become so-called irregular or illegal migrants.[46]

The second envisioned database is the ETIAS, which will store data on persons who are usually exempt from visa requirements. This system aims to ensure that travelers obtain authorization before entering a Schengen state on regular terms—i.e., before they embark on their journey. A central purpose of ETIAS is to support state authorities in denying transit or entry to a person whose travel could pose "a security, illegal immigration or high epidemic risk"

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[45] See Appendix A for additional details about these systems.

[46] On this point, see, for instance, Scheel (2017) who notes that most illegalized migrants in the EU arrive by legal means on a Schengen visa and subsequently become "illegal" upon its expiration.

(EU 2018, L236/1).[47] It will require travelers to complete an online application that includes identity-related information, such as travel documents, residence information, and contact details. A significant part of the ETIAS regulatory framework concerns the potential creation of a watchlist that filters out those classified as a risk—in other words, it will identify a potential "connection between data in an application file and information related to individuals" (L236/5). The system's goal, therefore, is to preemptively screen travelers to Europe. It closely resembles the United States' ESTA–Electronic System for Travel Authority or Australia's ETA–Electronic Travel Authority. Both the EES and ETIAS are planned to be implemented in 2023.

As these databases provide member state authorities with the tools to further digitize mobility control, they continue to enhance what Torpey (1998) calls the *embracement* of mobile populations moving across or within the borders of Schengen states.[48] This (digital) embracement is perhaps most visibly articulated in the elimination of the manual stamping of passports and its replacement with the electronic registration of travelers' entry and exit points, which should provide border and visa authorities with additional information about an individual's travel history. It can also be seen within the wider restrictions that the respective legal regulations pursue, namely the establishment (and prevention) of what counts as "irregular migration and to facilitate the management of migration flows" (EU 2017, 327/22). Take, for instance, the remarks of an EU official who reflected on the benefits of these new systems for creating personal travel histories:

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[47] Notably, the phrase *high epidemic risk* entered the legal regulation before the outbreak of the global COVID-19 crisis.

[48] According to Torpey (1998; 1999), embracement encompasses the various means used by modern states to *expropriate* legitimate means of movement, most notably the invention of the passport. Expropriation (used in reference to Marx and Weber) describes the historical practice of modern states gradually appropriating the right to move from individuals and private entities, particularly across international boundaries.

[I]t [… is] a very important component. If you can make sure that a visa applicant

has had [a] couple of Schengen visas in the past years, it's a signal that he is

trustworthy, and he is reliable, and he didn't overstay […]. Of course, on the other

hand, if you can see that there were previous refusals, that's also an indication that

the application should be thoroughly checked. So, this database helps a lot, because

what happened, what we had before [with] the Visa Information System, the consular

officers relied on indications on the passport as such. Of course, you can visually see

that there were Schengen visas issued beforehand; before, a visa sticker is in the

passport. But what if the applicant had a new passport? Then you lose this

information.

(Interview 9 with EU official, 2019)

In sum, the EES and ETIAS seek to create new forms of information through bordering

procedures at various sites, connecting them with data in other systems and attempting to

eliminate possibilities for migrants to *(re)appropriate* mobility (Scheel 2017). These databases

therefore seek to allow mobility control to become further detached from (Schengen's)

territorial boundaries and borders while increasing its remote operations (Salter 2006b; Zolberg

2003). Peter Adey (2012) aptly expresses the rationale of dataveillance that informs smart

borders and their underlying systems, the EES and ETIAS: it "[draws] upon the resources of

information networks between states. It pushes and pulls at these flows just as it modulates the

mixtures of people and things. Some are sent packing and others eased through" (p. 20).

5.3 The ritualistic conditions for imagining smart futures

Although the smartification of borders is closely tied to the development of the EES and ETIAS, its promise tends to be fairly detached from the systems' technical functionalities—as many promises of emerging infrastructure projects are (Larkin 2013). Smartness invokes a more general "wager on the future—a strategic belief that smartness will operate" (Sadowski and Bendor 2019, 548). As Sadowski and Bendor argue, such a wager is encouraged by the strategic belief that smartness can respond "to present conditions and entrenched existing political economies while also paving the way to a thriving, prosperous future" (pp. 547–48). The smart borders project thus not only rehearses the wider imaginary of digital transformation but also builds on multiple tropes and narratives of *smart futures*, which are constant and recurrent products of the presentations and discussions that take place at conferences, industry roundtables, and policy meetings within the border regime. As we have previously seen, this is where politics, security, technology, and business encounter each other most publicly.

Annelise Riles (2000), drawing on her ethnographic work at UN conferences, finds that (transnational) meetings operate as particular "forums[;] they 'mobilize,' they '[set] in motion a process,' they generate publicity, and most of all they draw in a wide variety of participants. Yet the purpose of this flurry of rather processual oriented activity is always described in wider instrumental terms" (p. 13). Likewise, the various events within border regimes punctuate a network of actors and participants and link their activities and interests against the backdrop of a seemingly wider "problem" that discursively connects migration, security, and technology. These elements are connected by the participants' virtues, behaviors, visions, and narratives that create the conditions for making both smart futures and the digital borders that must realize them. In these settings, "[p]eople and their virtues *matter,*" as Steven Shapin (2008) notes elsewhere, "and that mattering is absolutely central to the rationally calculative worlds where

late modern finance meets technoscience" (p. 270; italics in the original). In a similar vein, we draw our attention to the ritualized forms of collective behaviors, values, and interactions of conference and roundtable participants that shed a light on the inner workings of the EU border regime.

5.3.1 Formality and clubbability

In a comprehensive study report, Lemberg-Pederson and colleagues describe one of the important functions of eu-LISA events:

> At the Roundtables, it [is] possible for industrial actors to liaise with government representatives and communicate their preferences and suggested solutions to the development of IT systems. Roundtables, as well as conferences, are important sites for the industry in order to influence the policies and choices of technological solutions underpinning the large-scale information systems.
>
> (Lemberg-Pedersen, Hansen, and Halpern 2020, 66)

Since eu-LISA's creation in 2012, the agency has established itself as an indispensable member of a broader network that gathers regularly, not only at eu-LISA meetings but also at international conferences, business sites, and promotional events. Part of the agency's agenda is to develop a knowledge hub, not simply to create a gateway for the industry but also to participate in various policy meetings where one can interact with "external parties to build up knowledge and exchange that knowledge," as a representative stated (Interview 4 with EU official, 2018). "External parties" describes the heterogeneous actors in a network that tour the continent (and also, partly, the globe), consisting of both governmental and industrial representatives, financiers, brokers, and enterprises: companies like Secunet, IDEMIA,

InGROUP, Jenetric, Gemalto, and Gatekeeper Security, IT enterprises, implementers, transport companies such as Lufthansa and SITA, security professionals, and border guards from nation-states.[49] These events serve to bring these actors together and play a fundamental role in the global factoring, legitimization, and proliferation of security in today's world.

A remarkable characteristic of these events is their standardized settings and environments. If we remember James' sarcastic comment in the vignette above, meetings seem repetitive if one attends them frequently (as delegates usually do), and they produce thin and more than predictable outcomes with little consequence for operational activities on the ground. Formalistic procedures at these events are performed in different ways—for instance, in the almost interchangeable lists of opening and closing speakers, arranged according to hierarchical bureaucratic ranks; and the repetitive speeches by government officials who read talking points with feigned excitement, highlighting the solemn environment, the "excellent organization," the "huge significance" of the meeting, and the "historical" crossroads at which everyone must come together. These procedures also produce a repetitive framing for connecting migration, security, and technology. Often, the events have a moderator, with little to no knowledge of the conference themes, who tries to connect some familiar dots from the speeches and discussions and guides the audience through the day.[50] The formality of the setting is a result of vast social

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[49] In addition, there is usually a speaker from the US, Canada, or Australia at eu-LISA roundtables. They also serve as an important gateway to the digital border market for transatlantic stakeholders. Generally, there is a long list of examples of conferences and policy meetings at which eu-LISA itself is listed as a speaker and/or participant. This includes, for example, the "Border Security 2021" summit, a conference in the framework of an EU-funded project on facial recognition called the "European Security Summit." The agency's participation in these events is usually listed in its digital newsletter under the rubric "Happenings," available at https://eulisa.europa.eu/SiteAssets/Bits-and-Bytes/002.aspx, accessed April 5, 2022.

[50] For example, at an online conference during the COVID-19 pandemic, eu-LISA hired BBC World moderator Joe Lynam for welcome remarks and moderation. This may seem like an attempt to break with routine by employing the services of a professional event moderator, but, in fact, it reinforces this formality, giving a strong impression that the content of the speeches and discourse is less important than its form.

and financial efforts to establish a recurring standardized framework to which participants can collectively refer. This relates not only to the repetitive speeches and similar agendas but also to the choice of high-end, internationally recognizable locations, such as the Hilton Hotel in Tallinn or the Radisson Blu Hotel in Bucharest (where eu-LISA has hosted events and provided accommodation for participants).

At the same time, these events create what Steven Shapin (2008) calls a sense of "clubbability" (p. 270). Clubbability makes the virtues of familiar people recognizable and is therefore important for orientation and judgment in the worlds of technoscience, finance, and security. At different sites and in different locations, participants recognize each other, encounters become familiar, and greetings are routinely exchanged. Participants' behavior and communication become more casual, and a discussion can easily be continued from a previous conversation. An example of this is the "ID@Borders and the Future of Travel" conference hosted by the OSCE and a UK-based non-governmental organization called the Biometrics Institute that was held at the prestigious Hofburg Palace in Vienna in 2019. eu-LISA was featured prominently alongside the European Commission on the main panel where it presented the wider policy framework and expectations for the development of new smart borders. The sessions offered "Platinum" and "Gold" sponsorship opportunities, where organizations could secure their seats next to high-level speakers from governmental agencies such as INTERPOL and eu-LISA. This was an event that allowed companies to introduce and promote their products as well as cultivate relationships with delegates of nation-states and regional organizations.

These meetings consciously reflect bourgeois manners and present a male-dominated environment and the typical Silicon Valley-style culture of the security industry, in which

management skills are considered as important as security technology expertise.[51] Ultimately, clubbability, in combination with the contrasting formalistic frame, often leads to seemingly ritualistic environments at these events, whereby some rituals are also ironically appropriated. Rituality, in other words, is a convenient way to display the clubbability of different participants. For example, at the "ID@Borders" conference at the Hofburg in Vienna, participants engaged in a competition of exchanging as many business cards as possible for "proper networking" and to fulfill the "real" purpose of the event (field note, OSCE Conference, April 10–11, 2019). The exchange of business cards, an almost universal ritual in the business world, became an ironic attempt to imitate familiar patterns of behavior, evoking the participants' sense of belonging to the same "club."[52]

Ritual behaviors and proceedings, in other words, communicate familiarity with form (Berezin 1997, 250). They create specific standardized communication patterns and lead participants to jointly "confer and negotiate the meaning of a significant event" (Feldman 2014, 49). They define the point of association between participants and create an environment of familiarity in which clubbability can be displayed. The disadvantage of producing such homogenized collective behavior and discourse is occasional boredom and monotony for the participants (like James in our vignette). As Feldman (2014) observes, "communicative standards get institutionalized and rituals take on, if not affective powers, then at least the hegemony of bourgeois manners. […] It [the ritual] yields a homogenizing effect so often seen

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[51] To further illustrate this point, we can refer to an online interview with eu-LISA's executive director, conducted by eu-LISA and published on its website, entitled "A Leader of a Successful Organization Knows that Progress Never Stops." Here, the director emphasizes the importance of managerial skills and discusses his management background. Available at https://www.eulisa.europa.eu/Newsroom/News/Pages/Leader-Successful-Organisation-Progress-Never-Stops.aspx, accessed April 4, 2022.

[52] The business card competition also reminds one of Feldman's observations (2014) at a policy meeting, at which a teddy bear was presented to the host of the upcoming conference meeting. For Feldman, these acts essentially conceal the general lack of "Olympic team spirit" (p. 49).

in bourgeois politesse that tends to bore those consumed by it more so than animate them as unique individuals" (p. 49).

Conferences and events in the EU border regime are formalized sites of border policymaking. They evoke a recognizable entrepreneurial world in which rituals and clubbability conceal the lack of (social or cultural) associations between heterogeneous participants. Instead, these events interrupt the temporal rhythms and spatial conditions in which the messier forms of everyday (bordering) work conducted by national authorities would take place. The events invite these authorities to forget the local and complex realities of migration and mobility and focus on what might be *technoscientifically* achievable in the future. It is in this sense that such meetings become powerful tools of political communication and imagination because they provide the epistemological conditions for collectively envisioning future borders. Thus, we now turn to the dominant *epistemic orientation* at these meetings: it is not collective *reflection*—understood as a meaningful way to share, understand, and learn from experience to develop further practice—but rather *anticipation*.

5.3.2 The urge to anticipate

Anticipation, according to Adams, Murphy, and Clarke (2009) can be understood as "an epistemic orientation toward the future" and a "moral imperative, a will to anticipate" (p. 254). As such, it opens a space—in the name of the future—for acting in the present. As a way of orienting oneself temporally (p. 247), it both directs and shapes knowledge toward speculative forecast and prediction, permanently acting on the present as a space of opportunity, of mobilizing the possible.

Ostentatious anticipation of the (smart) future of borders appears to be a core virtue at these conferences. At the "ID@Borders" conference or eu-LISA industry roundtables, this

epistemic orientation is a frequently displayed theme in presentations, more so than detailed depictions of specific technologies or explanations of bordering devices and products. Presentations generally tend to foster broader projections about how global mobility and tourism *will* evolve and what their crucial economic benefits *could* be. These are the backgrounds against which commercial technological products must be promoted and appear credible. The urge to anticipate also conveys a sense of competitiveness and creativity. This is invoked, for instance, by simple proverbs that are prominently placed on PowerPoint slides: "Technology, like art, is a soaring exercise of the human imagination" or "The only constant in the technology industry is change" (field note, OSCE Conference, April 10–11, 2019).[53] These superficial statements are accompanied by buzzwords like "cloud technology," "artificial intelligence," and "data analytics," and participants engage in an almost mythical sort of storytelling in which their innovative products conjure up "borders without boundaries," or a fantastic "digital future [where] there is a role for everyone to play." Participants generally seem to be privileged actors in an "amazing momentum in our history, in how we can make these sustainable paths in the future" (field note, OSCE Conference, April 10–11, 2019).

At times, however, even policy officials feel that this seemingly Silicon Valley-inspired urge for anticipation must be curbed. At an industry roundtable organized by eu-LISA and the Romanian EU presidency, a high-ranking agency representative reminded the audience that, in fact, "the time for theoretical debate is over." He worried that such exaggerated techno-idealism would divert attention away from critical, practical questions "on the ground" which would urgently require an "align[ment of] technology for the practices at borders" and "find[ing] practical and pragmatic solutions" (field note, eu-LISA Industry Roundtable, April 24, 2019).

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[53] The first statement was originally written by the sociologist Daniel Bell. The second was taken from Marc Benioff, US investor and owner of the cloud computing company Salesforce.

Despite these moments, we find that this *urge to anticipate* is a dominant sentiment at meetings that discuss the smart future of borders. As an epistemic orientation, anticipation seems to exploit what Adams and colleagues call the "'sense' of the simultaneous uncertainty and inevitability of the future, usually manifest as entanglements of fear and hope" (2009, 249).[54] Foreseeing, predicting, and preparing for a technoscientific future emerges as a core feature that ties these stakeholders—industry people, delegates, implementers, governmental experts, officials, border guards, brokers, and financiers—to a *joint epistemic community*. A summary of eu-LISA's 2018 annual conference entitled "EU Borders – Getting Smarter Through Technology" echoed the importance of this imperative for the stakeholder community:

> Engagement with the border guard community to enable their anticipation of future developments and their input during their development process will be key. The main conclusion drawn from the conference is that the future is already underway – the challenging digital journey that will completely change the outlook of the information architecture in the Justice and Home Affairs domain has already started. The goals can't be reached in isolation based on work by EU Agencies or Member States alone. We need to engage all the stakeholders including carriers, airports as well as land and sea border operators.

> (eu-LISA 2019c, 60)

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[54] On the general relationship between politics and the desire to govern the future through science in modernity, see also Wenger, Jasper, and Cavelty (2020): "With the dawn of modernity, foreseeing and preparing for possible future developments became a key task for policy-makers, bureaucrats and scholars alike" (p. 3).
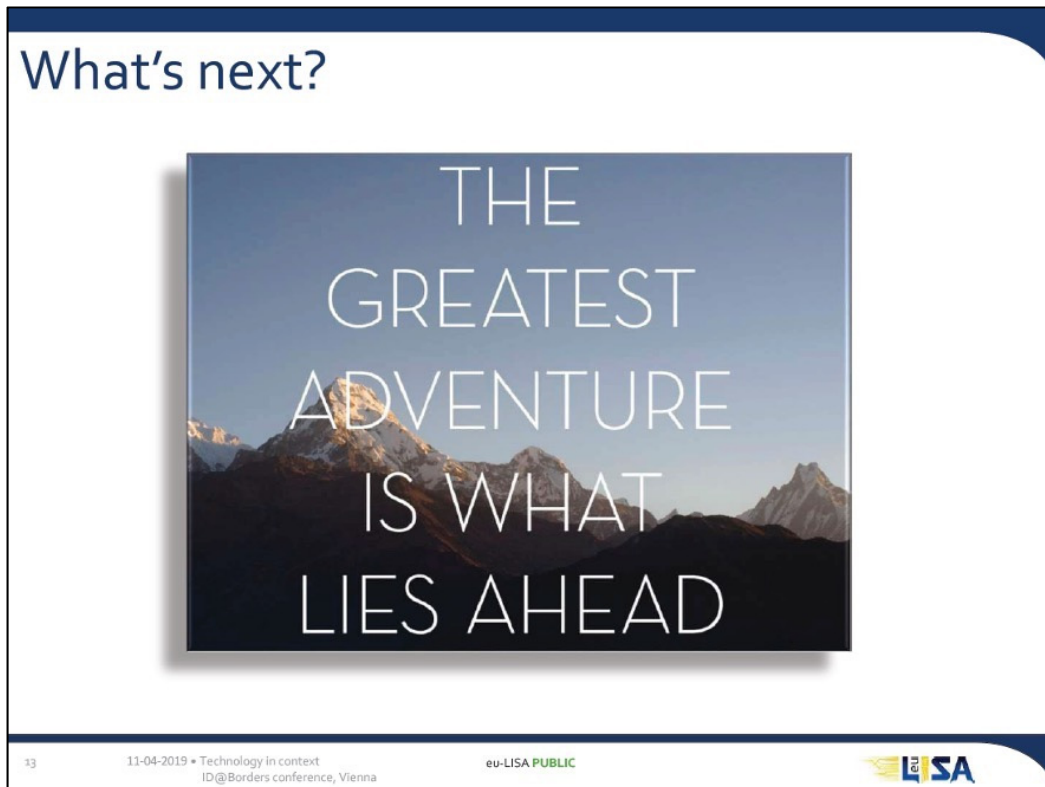
Figure 8. "What's next?" A PowerPoint slide presented by the eu-LISA agency at the OSCE conference "ID@Borders," April 10–11, 2019. It features mountains in the background, probably as a visual metaphor for the necessary entrepreneurial anticipation of "what lies ahead." Courtesy of eu-LISA.

5.4 Smart borders: A boundary object

> So, imagine how many procurement processes will be ongoing. It is maybe a thousand, because there are different systems, different member states. Also there are the four [Schengen] associated countries, different levers and levels of technologies and there are national[ly] definitely different topics.
>
> (Interview 28 with member state representative, 2019)

As this quote suggests, smartening borders in the European border regime is expressed on multiple scales and levels. It is a testimony to the growth of what observers have called a

security or border industrial complex (Cooperate Europe Observatory 2021; Jones 2017; Smith 2019). Smart borders are often portrayed as an industrial product *par excellence*, a result of marketization strategies by private actors and consultancies that have continuously sought to create greater demand for border technologies and molded the border regime to their profit-driven interests.[55] Such diagnoses, however, run the risk of portraying this border industrial complex as a composite of two relatively stable camps of interest: private (market-driven) actors on the one hand and state actors on the other.

Instead, as we have seen, we are faced with a multiplicity of actors, practices, and interests that intersect at eu-LISA meetings. The challenge is how to reconcile the different meanings of smart futures and future borders while working together on the digital transformation of the border regime. Smart borders should therefore not simply be viewed as a product of industrial security companies but as a *boundary object* that allows different communities of practice to craft their epistemology of digital borders because they can constantly "translate, negotiate, debate, triangulate, and simplify in order to work together" (Star and Griesemer 1989, 389). Smartness, with its imperative to anticipate the future, its loose foundation in the buildup of two large-scale IT systems, and the invocation of the automatization and platforming of borders, invites actors to perform *joint epistemic labor* that reconciles coexisting meanings and interests. In the words of Star and Griesemer, smart borders could be described as

> plastic enough to adapt to local needs and the constraints of the several parties
> employing them, yet robust enough to maintain a common identity across sites. […]
> They have different meanings in different social worlds but their structure is

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[55] On the privatization processes in border regimes, see Lemberg-Pedersen (2013; 2018); Lemberg-Pedersen, Hansen, and Halpern (2020); Baird (2018); or Binder (2020).

> common enough to more than one world to make them recognizable, a means of
> translation. The creation and management of boundary objects is a key process in
> developing and maintaining coherence across intersecting social worlds.
>
> (Star and Griesemer 1989, 394)

This does not mean that the different groups and actors in the border industrial complex are working toward a consensus (see also Star 2010); rather, they perform what Niewöhner (2015) describes as an experimental form of *co-laboration*, "transient, non-teleological joint epistemic work without the commitment to a shared outcome" (p. 236). Smart borders allow for the coexistence of (sometimes incommensurable) interventions, interests, and goals and are thus a particularly useful object for co-laboration on the digital border transformation (without necessary consensus). As I illustrate in the following, we can reconstruct (at least) three different meanings of how European smart borders should be enacted—i.e., displayed at conferences and meetings or emerging in the narratives of experts and officials: as a project of *networking* European-wide borders, as a site where a multifaceted European digital security market must manifest itself, and as instruments to reconfigure state border control in the context of the global economy.

5.4.1 Networking European borders

First, smart borders are perceived as a means to realize the idea of fully networked European borders.[56] While prominent among, for example, EC and agency officials, this is a vision only occasionally articulated by national delegates or experts. A national expert who coordinates the

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[56] In this instance, the term *European* is used as a casual way to describe the borders of the Schengen space, which are repeatedly used metaphorically to invoke the greater political project of a united Europe. See also footnote 2, p. 10.

development of the new databases in his country explains that "from a European perspective, the management of EU external borders as an interconnected one is still in its infancy. [...] [T]he way it is planned now, to my knowledge, has never existed before in the European area" (Interview 2 with member state representative, 2018). Smart borders then typically represent a central site for materializing what Jensen and Richardson (2004) have called the *European monotopia*, a unified vision of European spatial development and integration.

This distinct spatial rationale persists in the ongoing endeavor by the EU and its institutions to produce and sustain Europe as an "organized, ordered and totalized space of zero-friction and seamless logistic flows" (Jensen and Richardson 2004, 3). Therefore, smartening borders is primarily imagined as a specific way to organize, and thus *harmonize,* control. This was underscored by a high-ranking official in the European Commission's unit for information systems for borders and security who claimed, "What we do is not technical at all. It's deeply political because it's really about how you organize your external borders, [and] why you organize them in such a way" (Interview 13 with EU official, 2019). EU officials and agency representatives repeatedly emphasize that border management should be reorganized and become a wider, harmonized network of actors and practices beyond single nation-states. For example, in an article in the quarterly journal *Border Management Today*, eu-LISA's executive director Krum Garkov stated, "Today border management is no longer a business only for government and border agencies. In the digital age, cooperation and information exchange is vital for efficient border management since the challenges and threats are beyond capacity of a single governmental agency or country to resolve them" (Garkov 2020, 29).

Molding the formation of Europe, as Andrew Barry observes (2001, 74), entails not only the construction of common European laws and markets but also the formation of European objects and artifacts. In this example, smart borders are conceived as a hybrid bundle of transnational databases, bordering devices, and practices that have the capacity to reorder and

standardize bordering procedures across nations and their authorities (field note, OSCE Conference, April 10–11, 2019). This transnational "business," as Garkov calls it, further pushes the spatial rationale of a European monotopia—a fully networked space that appears to be simultaneously under permanent uncertainty and contested, not least because it is disjointed by deep-seated power struggles (Jensen and Richardson 2004, 69ff.). In its most visible forms, the argument for and against European monotopia, with its implicit assumption that single European states can no longer protect their own borders, is articulated in the frictions between EU institutions and member state authorities (or their border guards on the ground) and their dispute about sovereignty. For example, a national delegate at a conference in Tallinn suggested, somewhat annoyed,

> They want to harmonize border control. They want, I think, to make sure that border control through the whole of Europe is done in exactly the same way. […] I understand that for somebody whose job is to sit behind a desk in Brussels and not work with—let's say—these kinds of people and processes on [… a] daily basis, it looks strange that in Slovenia they are doing things differently than in Finland.
>
> (Interview 26 with member state representative, 2019)

In this case, enacting smart borders emerges as a project of networking European borders. It represents an agenda that is often at odds with the daily operational concerns of national border authorities. Instead, it promotes a *monotopic vision* of Europe as a logistical, seamless space, realizable through fully networked borders. At the same time, this vision can lay bare the conflicts of sovereignty and power that permeate the interactions (and competition) between European institutions on the one hand and national authorities on the other.

5.4.2 Creating a digital border security market

During a break between sessions at the "ID@Borders" conference, a salesman from a private security company in Eastern Europe told me, "It's up to me to build a market!" (field note, OSCE Conference, April 10–11, 2019). He considered the making of smart borders as the site of a growing, multifaceted European market of digital border security. The creation of smart borders appeared to him as a longer term lucrative development in which, through a wide array of negotiations, translations, research activities, and adaptations, one can intervene to turn borders and control technologies into commodities and customer design objects (see also Schwertl 2018). Indeed, smart borders are visible signs of how companies and consultancies have increasingly gained legitimization and influenced re-bordering activities across and beyond the European border regime. However, private security companies and their business representatives are not the only actors embracing this vision of a transnational security market for borders. eu-LISA officials occasionally describe the creation of this market as a "spillover effect" (Interview 28 with EU official, 2019; field note, eu-LISA Conference, October 16, 2019). The spillover effect would ingrain border management with market ideals and values, such as competition, public–private partnership, and innovation. Accordingly, one of my agency contacts emphasized that "for those systems, we want to be, you know, let's say, new and innovative. […] So, this spillover goes to the need to be technologically up to date. It goes to the private sector companies and to the academia" (Interview 28 with EU official, 2019).

Smartening borders amplifies both market supply and demand. The databases of border dataveillance, such as the EES and ETIAS, attract extensive budgeting activities on behalf of the EU that not only benefit member states *as customers* searching for appropriate devices and infrastructure but also serve the entire spectrum of *suppliers*, such as security enterprises and the "wide range of European IT companies who are providing different level[s of] hardware and software and who are providing services linked to them" (Interview 28 with EU official,

2019). Lemberg-Pedersen and colleagues document in detail how the EU nurtures what they call a "border control market," which is "in fact extremely multifaceted, and operates across a wide range of sectors" (Lemberg-Pedersen, Hansen, and Halpern 2020, 16). This includes not only the contracting of businesses in aerospace, defense, and biometric security but also the mobilization of "a plethora of small and medium-sized businesses […] who also reap smaller contracts concerning IT, housing, interpretation, health, cleaning, layout/design, software, conference and meetings, consultancies, maritime or aviation services, office supplies or transportation" (p. 16).

Accordingly, at roundtable events, conferences, and policy meetings, one can observe the presentation and visualization of a wide array of devices, artifacts, and services: flexible suitcases with portable fingerprint machines, portable cameras, screening and surveillance devices. The EES, in particular, produces a massive demand for what is promoted as necessary "mobile borders," which must biometrically capture movement and verify individuals while adhering to European standards for biometric quality and storage capacities (field note, eu-LISA Conference, October 16, 2019). Smart borders are envisioned as a means to expand the "multiplicity of sites where detectors and effectors interact with flows of people and goods" (Broeders and Hampshire 2013, 1207) and make every potential *detector and effector* an object of marketing, adaptation, and customer design. Smart borders, in other words, represent a testbed for creating a European-wide, multisectoral market for digital border security. A national delegate commented, with a sense of astonishment, on the scales on which the smartening of borders takes place:

> These are super expensive systems, you know, the European procurement. It's always the best price [*laughing*]; these are ridiculous numbers, you know, if you

compare them to national-level ICT projects. Add one or two zeros to them, so somebody is making lots of money with this.

(Interview 26 with member state representative, 2019)

5.4.3 Re-configuring control at the borders of the state

Furthermore, the smart borders initiative reveals how the formation of state borders is constantly bound to its relationship with global security and the economy. Member state authorities appear to be particularly interested in smart borders because the *timing of control* has become a pivotal factor for "[transforming] the relationship between economy and security at the border from a contradictory one into a productive one" (Leese 2016, 418).[57] Mobility in this instance is primarily framed as a potential source of capital: during the COVID-19 pandemic, an eu-LISA representative argued that "fifty million plus […] third-country nationals crossing borders contributed to the EU GDP with 300 billion Euros." Any successful implementation of smart borders would therefore have to reflect "how Europe will look from the eyes of the rest of the world, whether people will wait a long time at the border, whether there will be lots of travelers, and whether they will contribute to the economy" (field note, Visionbox online event, September 30, 2020). Here, smartening borders primarily pursues states' economic interests, fueled by the promise of optimizing the temporal management of control and speeding up business flows through infrastructural setups such as automated

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[57] A widespread assumption at all roundtables and conferences—notably before the outbreak of the pandemic—was that global flows of mobility will inevitably increase. Unsurprisingly, the tourism sector was predicted to become one of the fastest growing sectors of state economies. Seen as a highly profitable but relatively "unproblematic" category of mobility, it would thereafter demand speedier and simplified border checks. Compare this to the argument of an agency representative who claimed, "[Y]ou cannot […] separate it [anymore …]. You always will have to look to the needs of border management and security. There [are] always going to be different business needs for each one […] because one without the other, it doesn't exist anymore" (Interview 12 with EU official, 2019).

identification and e-gates. Smart borders are presented as a *reaction* to the pressures of the global economy—and subsequently as effective keys to turn mobility into differentiated, profitable, and frictionless flows.

Such visions and demands, as scholars have repeatedly pointed out, do not lead to the abolition of borders but to their *delocalization* (Salter 2016). Border control is translated into different spatial and temporal regimes, speeds, waiting periods, and deportation practices (Murphy and Maguire 2015, 172). The traveler must be enrolled and ideally verified and cleared before they arrive at the territorial boundary of the state. This principle of preclearance is reflected in the objectives of the ETIAS regulation that enables authorities to prescreen identities and match information with profiles on a watchlist. Control procedures are also temporally expanded *after* a Schengen border is crossed—as foreseen by the EES. Traveler entries and exits should not only be registered; they should be automatically relayed to authorities who are then alerted to unregistered exits, a sign of a potential "overstayer."

In conversations, debates, and presentations, the idea of delocalization of the *extended border* or *multifaceted border* appears again and again. Such terms embody an abstract and logistical idea of optimizing circulation by stretching control across time and space. Bordering, as one official foresaw, "doesn't all happen at a border checkpoint. In fact, in many cases, I think […] they will be declaring information in advance, registering things on smartphones, et cetera, that then will be detected as they cross the border area." The interviewee also wondered about future border controls, asking, "[D]o you have a follow-up when you cross the border? Where does the story end?" (Interview 4 with EU official, 2018).

Ultimately, smartening implicates the enrollment of a myriad of carriers and transport companies as co-bordering actors in what is called the *ecosystem* of border management.[58] With

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[58] On the term *ecosystem*, see further below, p. 178.

the EES and ETIAS as the underlying backbone of smart borders, transport companies will be confronted with a number of legal, technical, and financial obligations—e.g., the need to incorporate technical specifications such as a "web service" that verifies "whether third-country nationals holding a Schengen short-stay visa issued for one or two entries have already used the number of entries authorized by their visa" (EU 2017, 3). ETIAS obliges air, sea, train, and bus carriers to query the database via a "carrier gateway" that "provide[s] the carriers with an 'OK/NOT OK' answer" (EU 2018b, Article 45). Thus, smart borders envision multiple sites at which all types of private stakeholders can become incorporated into the practices of remote control (Zolberg 2006).

Here, making smart borders does not mean materializing networked European borders nor reinvigorating a multisectoral market for digital border security. Instead, smart borders must represent refined instruments of remote control that make "each member country the beneficiary of police screening efforts of the others" (Guiraudon and Lahav 2000, 185). Moreover, transport companies and carriers are envisioned to be mobilized at the behest of states—and turned into what Zolberg (2006) would term ancillary border police.[59] The scale of these enrollments is perceived as problematic only in terms of their complicated logistical implementation and challenges, as explained by this official: "I find it very hard to be fulfilled by this transport sector. […] It's a heavy area because we are placing […] duties to have the software to check fingerprints, for example, and all the software to see the identity of the person" (Interview 28 with EU official, 2019).[60] By dislocating the border and enrolling private

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[59] Similarly, Torpey (1998) uses the term *sheriff's deputies* to describe private entities' participation in controlling movement.

[60] These enrollment processes are not simple. The overall initiative of smart borders depends, to a certain degree, on the private actors that are part of this infrastructural experimentation. One eu-LISA official argued that the "implementation [of smart borders] is not only in the hands of the agency but requires [a] joint effort, […] the integration of all those stakeholders" (field note, Visionbox online event, September 30, 2020). Another

entities, smart borders are envisioned as tools that allow the reconfiguration of mobility control, structured around the twin imperatives of security and economy.

5.5 The logistical language of smart borders

Understanding smart borders as a boundary object aids in the understanding of how different actors in the border regime perform joint epistemic work and maintain coherence while pursuing diverse goals and visions; these actors perceive smartness differently in the digital transformation of the border regime. Generating boundary objects is thus a crucial method of communication across dispersed groups. We now turn to the abstract, rationalized linguistic repertoire that also spans different goals and visions of smart borders. This specialized language is a vehicle for what some scholars have labeled the logistification of migration and borders (Altenried et al. 2017; 2018; Bojadžijev 2019; Mezzadra 2017). It reflects and shapes how border management and cross-border movement can be known, articulated, and communicated. Moreover, as we will observe, this language operates in what Carol Cohn (1987a, 1987b) calls *technostrategic* terms because it aims to foster a techno-solutionist way of thinking and viewing problems, strategically framed through the lens of logistical rationality. Therefore, crafting the epistemology of digital borders is also a transformative process at the language level, assembled and forged by officials, delegates, experts, and specialists in migration and border management.

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representative even admitted that "to be honest, I don't know how it's going to work […]. I have some doubts that any train—you know—manager [conductor] is able to check a third-country national. I mean, I hope it will work, but it will be definitely very hard in the beginning" (Interview 28 with EU official, 2019).

5.5.1 Acronyms: Learning the language of migration and border management

One of the most striking aspects of the migration and border management language is the omnipresent use of acronyms. Digital borders, without exception, are known by and discussed using their acronyms. Acronyms dominate speech at every meeting and have infiltrated policy documents, statements, and reports. Jeandesboz (2016b) has commented on their ubiquity and highlighted this peculiarity: "SIS. SIS II. EURODAC. VIS. PNR. EES. RTP. Each of these acronyms stands for a computerized system for the collection, exchange and analysis of data related to persons crossing the external borders of the EU. These acronyms have colonized EU policy documents, public statements of European officials and politicians, and increasingly scholarship on EU border security" (p. 292). EES and ETIAS are only two of the most prominent acronyms used to identify the leading smart borders dataveillance systems.

Universally known among those who attend conferences and other events, acronyms have an obvious advantage: they form linguistic entities that can be spoken and written quickly, they shorten discourse, and they deflect questions about their often complicated, bureaucratic titles. However, as Cohn (1987a) remarks, we should question their potential purposes beyond the sheer principle of utilitarianism.[61] By reducing speech to a seemingly "necessary level," she argues that acronyms limit "the communication to the initiated, leaving the rest both uncomprehending and voiceless in the debate" (p. 20). The use of acronyms in the border regime's IT systems signals a form of belonging to an inner circle that possesses insider knowledge, for whom there is no need to articulate the overwhelmingly complex technological architecture, bureaucratic chasms, and legal specificities of systems. Acronyms, and the language in which they are embedded, should instead be perceived as a means of "act[ing] as a

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[61] In her article on nuclear language, Cohn raises an important point about how abstractions and sexual imagery can fashion a language of nuclear power that disguises the messy, uncontrollable, and destructive reality of nuclear weapons.

form of abstraction, removing you from the reality behind the words" (p. 20). Like abstracted facts, acronyms no longer question their (future) use and purpose and leave behind their politically contested pasts. They are also elements of a discourse nurtured by the epistemic mode of anticipation present at the border regime's events, as they invoke mastery over technical complexity and provide linguistic keys to a world in which borders and migration can be managed abstractly at a distance.

It is therefore unwise to reduce smart borders to a euphemism born of a creative mind in a security company's marketing department. Like all digital border terminology, including acronyms, smart borders are a *sanitized form of framing and speaking about borders*. This terminology provides linguistic access to the visions and narratives of the heterogeneous groups of policymakers, delegates, experts, and representatives and contributes to the creation of common sense and discursive sovereignty over digital borders. By acquiring this linguistic repertoire, one is gradually allowed to avert from the messy, ambiguous, and deeply technopolitical realities in which human mobility must be digitized, classified, and sorted. Sanitized abstraction thus embodies a particular governmental perspective: it helps to disassociate border management from the sociotechnical practices of bordering and excludes those who are subjected to its violent forms and consequences from the discourse.

5.5.2 The proliferation of logistical terminology

Another component of this language is the recent proliferation of notions in the smart borders initiative that are anchored in the rhetoric of logistics.[62] Reinhardt Jünemann, a leading figure

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[62] For a discussion on the increasing logistification of migration and border regimes, see, for example, Moritz Altenried and colleagues (2017; 2018), who see the emergence of this rationality as a new attempt at governing migration that seeks to resolve a central contradiction between states' economic need for (migrant) labor and the politico-cultural logic of shielding nation-states from foreigners. Accordingly, theories and practices of managing

in industrial logistics in Germany, defines logistics as the task of allocating "the right amount of accurate materials as logistical objects at the right place, of the right quality, at the right time, at the right cost" (in Altenried et al. 2017, 45; own translation). This expresses a distinct institutional fantasy that can also be found in the narratives of smart borders, where borders are increasingly described in terms of *platforms* and *ecosystems*. These notions invoke an ideal allocation of tasks and information between stakeholders in a process that neatly sorts and categorizes mobility: tracking a migrant's journey from beginning to end, organizing their profitable integration into economic sectors, and monitoring their return or potential deportation. Data, as one of the participants at "ID@Borders" claimed, promise the realization of the fantasies of "extending" the border control process: "[S]o how do you create that rich picture of what the border looks like[?]" (field note, OSCE Conference, April 10–11, 2019).

Terms like platform and ecosystem do not drop from the sky.[63] Instead, *platform* articulates a certain rationality that demands new informational channels and the convergence of a hitherto fragmented architecture. Traveler identity must now be provided *just-in-time* or *to-the-point*. Legally separated databases become semantically treated as "one single platform, one single picture" (field note, eu-LISA Industry Roundtable, April 24, 2019). A delegate from the European Commission likewise presented smart borders as "a platform for border management […]; it is one unique system at the end of the day […] for border guards to help and provide them with information" (field note, eu-LISA Industry Roundtable, April 24, 2019). The idea of this "IT platform," as another official suggested, must "facilitate and ensure the

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migration would be increasingly plagued by a "delivery rationality" and the fantasy of a "just-in-time" and "to-the-point" migration that promotes the integration of labor mobility into national capitalist economies (2018, 299).

[63] On the notion of platformization as an attractive way to signal state-of-the-art thinking in infrastructural and economic terms and as an increasingly dominant model in media and data environments, see Helmond (2015) and Srnicek (2017).

smooth operation of the Schengen Area" (Interview 9 with EU official, 2019). This logistics approach aspires to manage human mobility like the circulation of economic goods and capital and imagines its realization through the optimization of data streams.

A similar frequently mobilized notion is the *ecosystem* (of border and migration management).[64] For example, a high-ranking eu-LISA representative described the EES and ETIAS as "the heart or nucleus of the new 'ecosystem' for border management that we are building, which includes equipment and solutions for data and access of information" (field note, Visionbox online event, September 30, 2020). The digitization of mobility is again linked to a logistical fantasy, according to which human mobility can be managed like the circulation of commodities and goods through a virtually interconnected community of stakeholders. In the *Border Management Today* article cited above, eu-LISA's director Krum Garkov also presented the "digital challenge at the borders" as something that is solvable by the ever-growing "eco system of devices and solutions."

> [O]nce [the new large-scale IT systems are] deployed, the ability of this new information architecture to deliver its anticipated policy objectives and operational benefits will depend largely on the quality of the data fed into it; and timely and efficient access to the information extracted from that data. For this reason, alongside it Europe has started the deployment of a **new eco system** of devices and solutions for acquisition of raw data and access to information for the purposes of border management.
>
> (Garkov 2020, 27; emphasis in the original)

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[64] In addition to its connotations in biology, the notion of ecosystems has previously been applied to corporate strategies. See, for example, James F. Moore's (1998) early article on the rise of a *new corporate form*: ecosystems are defined here as "communities of customers, suppliers, lead producers, and other stakeholders interacting with one another to produce goods and services and coevolving capabilities" (p. 168).

In sum, the emergence of notions such as platform and ecosystem epitomize the logistical fantasies that are expressed in the language of managing digital borders. Databases, and digital technologies in general, play central, promissory roles and must produce "timely and efficient access to information extracted from that data," as Garkov argued. They may open up a broader imaginative horizon that resembles digital Taylorism, a rationalized "system of real-time control, feedback and correction" (Altenried 2019, 122). Logistical notions seek to invoke rationalization, standardization, and recomposition through digital means. The fantasy they promote is one of Taylorist division and control of information through which migration can ideally be managed *just-in-time* and *to-the-point*.

5.5.3 Logistical challenges: human elements

A third dimension in this paradigm relates to the logistical framing of how the challenges of smart borders are perceived and described in their presentations and discussions, at the 2019 industry roundtable in Bucharest, for example. The roundtable explored the ways in which smart borders could most effectively be rolled out—i.e., how the EES and ETIAS would be implemented in all member states. The discussions centered, among other topics, on this undertaking's complex challenges. One EU official concluded his opening remarks with a question that explicitly addressed the industry and demanded its alignment with and support of the smart borders initiative: "Can [the] industry deliver towards member states and become part of [the] success story?" (field note, eu-LISA Industry Roundtable, April 24, 2019). The meeting continued with company presentations on several technological devices that would redesign border procedures for a fully operationalized EES, for example. Devices were typically imagined to be deployed in paradigmatic logistical spaces where smart borders would have to

materialize: airports, seaports, bus and train stations.[65] These spaces also represent the most relevant challenges to the uninterrupted operation or successful acceleration of the circulation of goods and people. The meeting centered on the management of these spaces, as circulation in this example could be curbed or prevented altogether: flows and streams must be acted upon and rendered seamless. The spaces were portrayed as *intermediaries* that would either realize or thwart a logistical fantasy.

Thus, two recurrent challenges arose at the meeting. One was identified as the necessary complex infrastructural environment and the limited amount of time available to transform these spaces into proper logistical zones. In such a fantasy, borders must be configured into a "liminal zone between inside and outside space," as the geographer Deborah Cowen reminds us (2014, 82). National delegates occasionally directed their complaints toward the security and IT companies: "[T]he real problem is the time. We have one year, only one year to acquire such devices […]. You say we have to specify processes […]. I don't see solutions here. […] We need clear answers from the industry because we don't have time" (field note, eu-LISA Industry Roundtable, April 24, 2019). The delegates' criticism also reflected their frustration for having to adhere to a flawed schedule for the databases' implementation.[66] It highlighted the arduous long-term investments required for redesigning borders and their infrastructural environments. The port, for instance, was mentioned as a specifically difficult case, as a document prepared for the meeting by eu-LISA's Working Group on ICT Solutions for External Borders illustrates:

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[65] For the meeting, eu-LISA also drafted a report by the joint advisory group on the EES that depicted various scenarios at these different locations and how borders were to be crossed there (eu-LISA 2019d).

[66] The practice of *timeboxing* in the implementation of new, large-scale IT systems is a widely recognized, problematic practice in the EU that has led to wholly unrealistic timelines for these implementation plans.

In many of these ports there is no physical infrastructure/buildings, no fixed control booths or equipment. In some instances, border guards/police have to drive several hours from the nearest police district location/station to reach the port. Sometimes the vessel does not come into port at the scheduled time, making planning for border authorities difficult. Border checks, as well as vessel and crew list controls, are often carried out on the ship or in the port, outside the physical facilities.

Member States and Associated Countries have different weather conditions: in the north, temperatures can fall to below minus -30 degrees Celsius, and in the far north the days in the winter season have only few hours of daylight. In southern countries on the other hand, the heat and sunlight pose other challenges.

(eu-LISA 2019d, 13)

It is clear that borders are here complex and hybrid assemblages of technological devices, data practices, physical spaces, transport artifacts, natural environments, and weather and temperature conditions—in short, they are *infrastructures* (see Dijstelbloem 2021). Roundtable participants emphasized the complex spectrum of material needs and challenges in reorganizing borders—i.e., introducing biometric identifiers to register entries and exits—and transforming them into these imagined spaces of zero-friction and seamless logistic flows.

Another recurrent challenge was referred to as the *human element*. From a logistical perspective, humans are perceived as the core operational concern, both in terms of their agency as *subjects* operating technologies and databases and as *objects* being targeted by bordering procedures. These challenges are operational, not primarily technological, because "the human element is always going to be there, and [it has] got to be taken care of, of course" (Interview 4 with EU official, 2018). Officials repeatedly claimed that "it is not only about IT," or that "technology is not the bottleneck." Instead, the human element was perceived as an inherently unstable and unruly category. For example, the end user (i.e., police or border guards) would

have to learn to accommodate and adapt to new technological procedures and environments. Smartening the border is thus associated with a high demand for border staff training that is designed to change staff members' "mentality" and habits in operating borders (Interview 27 with EU official, 2019). *Change management*, a concern repeatedly expressed in managerial idiom, must be pursued if police and border authorities are to align themselves with new smart procedures. A similar sentiment was expressed, in perhaps less managerial terms, by a national delegate who is a regular participant in eu-LISA's roundtables:

> [T]here's a huge, huge [amount of] work from our side to get the data transformed into useful information for the end user. This is not old. For eu-LISA, this is just a technical project, but with border and police officers, it's not. It's not just technical, it's [a] social and even organizational project. You have to make them integrate this information […] with the tools that they are already familiar with, you have to give them the right information at the right time, you have to talk with them. We have to involve them in several interactions, and all this takes time.
>
> (Interview 17 with member state representative, 2019)

Humans represent here a central operational challenge in the project of smartening borders. In her article on industrial representations of borders, Maria Schwertl (2018) accurately suggests that borders have become *dehumanized* (entmenschlicht) in a double sense: they invisibilize the human objects of border technologies (i.e., border crossers) but also make the human subjects (i.e., border guards operating bordering devices) disappear. Consequently, humans are not present in the idealized representations of smart borders. Notions such as ecosystems and platforms are also paradigmatic expressions of this world, in which experts and specialists want to turn borders into nodes or chokepoints of logistical procedures and circulation. According to

the logistical logic, these nodes must have an *extensive* and *intensive* dimension (Altenried et al. 2017, 23): smartification must *extend* the border by integrating a larger number of stakeholders into its operations, but it must also *intensify* the border by deploying additional techniques of sensing and monitoring to optimize measurement and calibration of movement.

The language of smart borders can thus be seen as both a product and a vehicle of a logistical logic that transforms how we speak and think about borders and cross-border movement. It conveys highly abstract and rationalized notions of how borders should ideally operate, in which human beings are invisible at best. Migrant subjects completely vanish from discourse, and border guards play a role as recalcitrant elements that challenge the realization of this logistical fantasy. The consequence of such abstraction is, of course, that human mobility should not be treated differently than the circulation of other objects and goods. This raises the suspicion that it mainly serves as an "ideological patina" that does not inform and shape political decision-making but rather hides the complex political reasons for developing smart borders (Cohn 1987a, 24). Far more often, logistical language seems to strategically disguise the sociopolitical nature and consequences of (cross-border) mobilities, effectively functioning as a legitimization of smart borders as purely techno-operational solutions.

Figure 9. A flyer for eu-LISA's Industry Roundtable in 2019 (organized in conjunction with the Romanian EU presidency in Bucharest) depicts two parallel bridges crossing the sea. This picture was not chosen arbitrarily; it consciously displays bridges as exemplary infrastructural devices of logistics. Note how humans are absent from this image and how the bridges serve as enablers of circulation. Courtesy of eu-LISA.

5.6 Discussion

This chapter explored the creation of smart borders at policy conferences, meetings, and roundtables as a site of infrastructural experimentation in the EU border regime. It conceptualized the initiative as an *epistemological project*. Although connected to the material construction of two large-scale IT systems, smart borders also seek to transform the knowledge and representation of borders, born of a particular *culture* where different communities and actors in the border regime can interact. I have attempted to articulate the specific epistemological conditions of policy conferences as sites that foster an entrepreneurial environment with loose but ritualized interactions between actors as well as a strong anticipatory mode of orientation toward (smart) futures. I also defined smart borders as a boundary object that can "mean different things in different worlds" (Star and Griesemer 1989,

388), allowing actors to work together experimentally while pursuing individual goals. The final element that characterized the process of crafting this epistemology was the logistical language or idiom that clouds smart borders.

To summarize, there are two main takeaways from understanding smart borders as an epistemological project. The first is that it creates something akin to ideological coherence in the decentralized regime of border and migration management. Clearly, coherence among heterogeneous actors is performed rather than actualized. However, not least by disrupting the daily habits and rhythms of security professionals and border guards, coherence must be created by the permanent *self-referentiality* displayed at these meetings. As we saw in the Vignette with James, occasional boredom and monotony may be a drawback, but these feelings manage to keep the policy world firmly detached from the messier and ambiguous empirical worlds.

The second takeaway is the technostrategic effect that we have observed in relation to the language of logistics. According to Cohn, the effect is one of a sense of control and mastery over complex digital systems but also one that offers *distance* and *escape*: this is not about individual consciousness but about "the structural position the speakers of the language occupy and the perspective they get from that position [… that] puts them in the position of the planner, the user, the actor" (1987b, 706). The reality becomes "itself a world of abstractions" (1987a, 22). This also applies to conferences where participants employ the logistical language of smart borders that is supposed to manage mobility, in terms of flows and streams, at a distance—by the neat allocation of data across multiple stakeholders. This enacts migration as a calculative, abstract reality that sees only *logistical populations*—i.e., "[connected] bodies, objects, affects, information, without subjects, without the formality of subjects" (Harney and Moten 2013, 92).

Crafting the epistemology of digital borders illustrates how digital solutionism offers an escape from reality, which will never be fully successful nor fully established because reality, as Latour (1987) reminds us, "is what resists" (p. 94). However, this solutionist desire to escape

is alarming given the daily violence and human deaths that occur where migrants seek to overcome the border regime to reach Europe. The epistemology of digital borders, crafted at policy conferences and meetings, is an epistemology of strategic distance that does not let these concerns become visible because they would immediately raise questions about the responsibility and accountability for these deaths.

In the next chapter, we will turn to another site of infrastructural experimentation to observe how digital solutionism is further articulated and enacted in policymaking. We will explore how the policy of interoperability represents the latest attempt to construct and frame particular bordering "problems" and fix them, yet again, by digital means—thereby mobilizing the powerful imaginative repertoire for fabricating *the necessary fiction of interoperability*.

6   Fabricating a Necessary Policy Fiction, Making Digital Borders Interoperable

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6.1 Introduction[67]

Interoperability has emerged as a prominent buzzword in various arenas of digitization, particularly where multiple information systems have been constructed in parallel and where an increasing number of users have interest of accessing their respective data collections. However, the notion of interoperability also appears sometimes as exceptionally vague, if not obscure, and it can imply very different practices, such as infrastructural configurations, standardization procedures, or institutional reordering (Pelizza 2016a). In chapter 3, we cited an official who described interoperability as a "big test," emerging as a site of infrastructural experimentation that embeds and stabilizes the imaginary of digital transformation. In this chapter, I analyze interoperability as the creation of a solutionist policy in the EU border regime.

Interoperability was recently announced in the EU's "Strategy Towards a Fully Functioning and Resilient Schengen Area" under the header of "one of the world's most technologically advanced border management systems" (EC 2021, 7). The "Strategy" serves as a typical example for how interoperability is promoted as a building block in digitally

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[67] This chapter is a modified version of an article submitted to *Critical Policy Studies*, "Digital Solutionism and the Fabrication of a Necessary Fiction: Making Biometric Borders Interoperable" (under review).

infrastructuring European borders and as a silver bullet to the challenges posed by mobility through generating "complete, reliable and accurate information" (p. 8).[68]

Officials and experts in the EU present the push for interoperability as a major paradigm shift for the digital transformation—one that the wider European public has yet to recognize. A national expert claimed, "it is the biggest undertaking in the European Union that has ever taken place […] but it will take a little while […] until it also hits the public as what it is" (Interview 18 with member state representative, 2019). Planned to be completed in 2023, interoperability must introduce a kind of "technological momentum" (Hughes 1994) that creates *a point of no return* in how state authorities handle and access personal biometric data of mobile individuals.[69] While interoperability's main technological components are currently under development by eu-LISA, its concrete implementation (on national level particularly) has been regularly called into question, partly because of the complex, heterogenous landscape of digital borders in Europe.

This chapter analyzes interoperability by exploring its various policy articulations and performances, which transformed it from an initially obscure and technical concept into something recognized, and ultimately accepted, as a powerful solutionist paradigm for digitally infrastructuring borders. Interoperability is thereby understood as a *policy on the move* (Clarke et al. 2015), i.e., it has travelled through the hands of different actors and across different arenas—gradually shaping how interoperable biometric borders came to be imagined as a (future) technological solution to sociotechnical problems. Interoperability is also an exemplary site of policymaking in what I called infrastructural experimentation because it

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[68] See Appendix A for a detailed description of interoperability.

[69] See also the analysis of Statewatch: "The 'Point of No Return.' Interoperability morphs into the creation of a Big Brother," available at https://www.statewatch.org/media/documents/analyses/no-332-eu-interop-morphs-into-central-database-revised.pdf, accessed April 5, 2022.

allows us to unpack how digital solutionism is sustained. To this end, the chapter will first contextualize interoperability in the transforming landscape of biometric borders in Europe and propose a framework for understanding *policy solutionism*. I then analyze three types of enactment of this solutionism: the ideal of simplification, the promise of certainty, and expert authority. In conclusion, I elaborate on how these types of enactment fabricate together what I call, along with Yaron Ezrahi (2012), a necessary policy fiction; something that steers imagination, discourse, and behavior of heterogeneous actors in the border regime and determines how, and for what, future border databases should be designed, managed, and made accessible.

6.2 Situating interoperability

Interoperability is supposed to become part of a what scholars characterize as a growing "network of information technology to collect, store, check, compare and exchange all kinds of data and profiles extracted from migrants, travelers and their social and professional context" (Dijstelbloem and Broeders 2015, 22). Scholarship in the intersection of border and migration studies on the one hand, and science and technology studies on the other, has been scrutinizing the role of data practices in rendering mobilities into actionable objects of governance (Amelung et al. 2020; Bellanova and Glouftsios 2022; Leese, Noori, and Scheel 2022; Pelizza 2020; Pollozek and Passoth 2019; Scheel, Ruppert, and Ustek-Spilda 2019). The growing digital infrastructure of borders moreover exemplifies the increasingly "digitally mediated coordination of controls [that] are conducted at varying sites and temporal registers" (Bellanova and Glouftsios 2022, 8). Not only does it contribute to "hardwiring" supranational cooperation between states, organizations, and agencies involved in bordering processes (Andersson 2016),

but it also constitute the multiplicity of (physical and virtual) sites at which, simultaneously, "technology work and border practices [are] taking place" (Tsianos and Kuster 2016, 245).

Making biometric borders interoperable is part of the efforts to extend the "traceability" of travelers in migration and border control (Bonditti 2004). Existing databases like Eurodac or the SIS have already been expanded in their scope and purposes, most notably by collecting additional categories of data and widening their access to authorities. By interconnecting existing and future large-scale systems administered by eu-LISA, e.g., the Schengen-wide EES or the ETIAS, interoperability feeds into the logic of creating multipurpose use and flexible access to border, migration and visa systems (Brouwer 2019).[70]

Scholars have pointed to the significance of interoperability for contemporary dynamics of securitization and the transformation of state power. Bigo (2020), for instance, discards the view of interoperability components as "neutral" technologies, but perceives them as instruments that "implement the political technology for the datafication of internal security" (p. 510). Leese (2022) shows how interoperability has put the production and management of *individual identity* at the core of the EU border regime's attempts to control and steer the mobility of populations. Interoperability's rationale is to *fix state vision* (Leese 2022), i.e., to

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[70] Ultimately, interoperability should encompass Eurodac, the Visa Information System, the Schengen Information System II, the future Entry/Exit System, the European Travel Information and Authorisation System (ETIAS), and the European Criminal Record System for Third Country Nationals (ECRIS-TCN). Interoperability's main components currently developed under eu-LISA's supervision are 1) the shared Biometric Matching Service (sBMS) that underlies all systems as a joint "engine" and through which data querying and cross-matching based on biometric templates should be operated; 2) the Common Identity Repository (CIR) that creates and stores individual files (of extracted data) for every person that is registered in at least one of the systems; 3) the Multiple Identity Detector (MID) as the instrument that queries identities automatically against other systems—for instance, whether a screened fingerprint can be linked to multiple names in systems; 4) the European Search Portal that envisions a standardized search interface to harmonize national access points to databases. For more comprehensive overviews, see Appendix A in this thesis, Bigo (2020), Blasi Casagran (2021), or Leese (2022).

implement a set of digital tools that render migrants more legible and classifiable, and thus sort migration more efficiently into different categories of risk.

Legal scholars have equally highlighted the political, legal and ethical repercussions of this so-called "new approach to the management of data for borders, security and migration" (EU 2019a, 1)—especially on privacy and fundamental rights (Aden 2020; Blasi Casagran 2021; Brouwer 2019; 2020; Valoula 2020). As De Hert and Gutwirth (2007) point out, it is precisely the impermeability of *separate* databases that "has probably served data protection better than many legal rules with the same goal" (p. 32). By contrary, the now foreseen "Common Identity Repository" (CIR), one of interoperability's central components, creates instead individual data files of a person registered in at least one of the databases, and has accordingly been criticized as a "deathblow" to data protection and privacy rights (Valoula 2020). Furthermore, Curtin and Bastos (2021) predict that interoperability might provide "one of the battlegrounds for many contemporary ethical issues that the deployment of technologies raises in the exercise of public power" (p. 69).

In addition to these important problematizations of interoperability and its legal architecture and consequences, this chapter adopts a complementary perspective by trying to understand how interoperability was assembled as a policy. It explores how interoperability was imagined, staged and performed, and ultimately translated into a powerful policy solution for contemporary problems of (digital) bordering. Contrary to other existing contributions in the literature, this chapter investigates interoperability as a site of policy formation in the current transformation of the border regime and how this formation has sustained digital solutionism.

6.3 Policies and policy formation in the border regime

6.3.1 Policies on the move

Policies in the EU border regime can be understood in terms of what De Genova (2017) calls "reaction formations," i.e., the mechanisms and tactics of (re)bordering that respond to the "volume and velocity of human mobility" (p. 13), and particularly in the course of the so-called summer of migration in 2015 (see also Hess and Kasparek 2017a). Such an understanding considers policymaking as part of the border regime's "continuous repair work" to govern mobility (Sciortino 2004, 32). Additionally, and in accordance with critical studies of policy, policymaking should be seen as non-linear and procedural. As Clarke and colleagues (2015) argue, policies always emerge, and are made meaningful, *in process*; they are sites and instruments of meaning-making that form "mutable assemblages of keywords, technologies, things, action and passions [that] create potentialities for action" (Nielsen 2011, 83). In other words, policies are the products of the laborious work of *assemblage and translation*, which can make "power and policy operative within the dynamics of societal transformation" (Clarke et al. 2015, 53). Policies, and their imagined problems and solutions, are showcased and performed in the process of their formation. To translate the issue of database interoperability into a seemingly intelligible and coherent program of border policy, it required its repeated articulation to "real and imagined audiences, attempting to make specific proposals or projects appear as if they were logical, innovative, necessary, obvious and so on" (p. 31).

In other words, performances of policies create a quasi-common social and semantic terrain, which fosters certain ways of seeing and renders certain narratives taken-for-granted (Shore and Wright 2011, 13). Collective imagination supports this translation of policies into politically powerful instruments that stabilize technopolitical order (Jasanoff and Kim 2015). Policies are here repeatedly conjured alongside the wider policy worlds and their dominant

imaginaries—which is why interoperability, as I elaborated in chapter 3, has been mobilized to support the broader imaginary of the digital transformation of borders.

Policy formation becomes a crucial field of inquiry, as Feldman (2005) suggests, because it "expresses in condensed terms the hegemonic forms of social order and reiterates […] legitimizing narratives": it reveals how "elites interpret what they see below as a particular policy problem" (p. 678). However, officials, experts, agency representatives, national delegates, and industry actors not only interpret and define policy problems but also offer their exclusive and instrumental solutions. As Oliviera Martins and Jumbert (2020) suggest in their account on the introduction of drones at the border, what is framed as a "problem" of migration management and control, simultaneously becomes "amenable to a technological solution" (p. 11). Hence, as in so many social and political domains, policies often promote and introduce large-scale technological innovations that must serve as a "panacea" to social challenges and realize seemingly progressivist visions of the future (Pfotenhauer and Jasanoff 2017; Pfotenhauer, Juhl, and Aarden 2019).

6.3.2 Policy (as) solutionism

Evgeny Morozov's (2013) well-known definition of solutionism captures how actors construct the world's problems in ways that make them amendable to technological fix. But how are problem-solution constructions inscribed into policies more specifically? Drawing on Law and Singleton (2014), I suggest that, first, solutionism invokes a perception of policy that must act upon the assumption of a *single reality*—one that changes, and can be changed, only in singular and linear ways, and is accordingly manipulatable. Law and Singleton propose the notion of *ontological singularity* to grasp this (policy) assumption, according to which reality must be framed as inhibiting a clearly defined problem calling for a singular solution. As Law puts it

elsewhere, this assumption of a "one-world world" (2015) must fail in accounting for the multiple realities in which humans (and non-humans) encounter the world. Ontological singularity thus necessarily requires *simplification* in form of abstract, epistemic conditions that also provide the ground for the violent and dehumanizing practices of bordering in the EU. Feldman (2011a), for instance, illustrates how migration management confronts mobility with such policy strategy, transmuting mobile individuals "from three-dimensional human subjects into two-dimensional policy objects […] through textual practices of policy representation, policy making and policy implementation" (p. 44).

Furthermore, focusing on solutionism brings to the fore the actors' claims for being eligible to formulate, perform, and implement a policy and responsible for its solutions. Solutionism thus "tends to draw on technical languages, visionary promises, and other forms of exclusive expertise to assert causal relationships and credibility" (Pfotenhauer et al. 2022, 15). Problems often become cut into "smaller, discrete pieces that warrant ready-made solutions, which are in turn owned or controlled by specialized organizations or individuals" (p. 15). In other words, solutionism also relies on the creation of *expert authority*, which can stabilize particular meanings and promises to secure consensus on initially complex and contested issues. Exploring the formations of solutionist policies is thus a convenient way to observe how expertise and authority must always be brought into being anew. As Miller (2017) points out, expertise is never a stable category. Instead, it begs the questions of "how the making of knowledge is organized; who participates, in what ways […] and] who has rights and responsibilities to speak authoritatively about knowledge" (p. 912). In other words, the enactments of solutionism are crucial techniques to perform authority over political issues, reframe infrastructural innovations as coherent and necessary, and legitimize specific groups of actors as those who are responsible over policy design and implementation. Thus, solutionism tends to obscure why, as STS scholars have recurrently called out, "something is seen as a

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problem worth fixing in the first place" (Klimburg-Witjes and Wentland 2021, 1322). The authority of expertise can hamper and distract from alternative framings of issues and problems and routinely marginalize dissent.

In sum, this understanding of policy sensitizes us to attend to the specific ways in which the making of interoperability enacts and reinforces digital solutionism in the border regime. Only when perceived as as a policy product, it creates, and diffuses, solutionist ways of seeing and speaking that constitute what I call a *necessary policy fiction*. In the words expressed by an interlocutor, "from the onset, the term interoperability in technical terms is something completely different […]. Our interoperability as such has nothing to do with it" (Interview 21 with EU official, 2019). In the remainder of this chapter, I will respond to the question of why interoperability has become "something completely different" in the first place and reconstruct three core solutionist promises of interoperability. First, interoperability enforces *simplification* to solve the complexity and fragmentation in the digital border regime; second, it promises *certainty* to solve the ambiguity in the regime of identification and verification at borders; third, it reestablishes *expert authority* in the EU's migration management to solve what has been only ambiguously identified as the so-called "migration and refugee crisis."

6.4 A brief note on method

My analysis of how the policy of interoperability was assembled draws again on my three main sites of empirical investigation: participant observations at conferences and eu-LISA roundtables, semi-structured interviews with officials from EU institutions and experts from national member state organizations, and a corpus of documents that was specifically composed for this chapter. For instance, I chose to analyze several communications released by the EC and reports such as the one created by the so-called High-level Group of Experts on Information

Systems and Interoperability. These three empirical sites enabled me to reconstruct policy formation and exposed how policy travels through knowledges, performances, organizational forms, and regulatory environments. Recognizing the multiplicity of these sites allowed my analysis to trace how policy emerges *in process*. Interoperability, in other words, has found "expression through sequences of events; it create[ed] new social and semantic spaces, new sets of relations, new political subjects and new webs of meaning" (Shore and Wright 2011, 1). Clarke and colleagues' account of situational analysis (2018) and its tools for mapping helped me to carve out the relations between various policy elements, problems, and solutionist promises. These relations, and their dynamic formations, were particularly crucial for what Jenkins calls the business of the "production and reproduction of meanings" (Jenkins, quoted in Clarke et al. 2015, 17). They have revealed how a policy emerges as a contingent process of assemblage and translation.

6.5 Simplification

> [T]o break the silos, it's really to break also your way of thinking about it.
>
> (Interview 27 with EU official, 2019)

In various conversations with interlocutors, interoperability was repeatedly introduced by providing a kind of negative definition, for instance, by saying that it would mean "significantly more than one would think of it by name" (Interview 17 with member state representative, 2019). Interoperability, I was told, became the "talk in town" among officials, delegates, and experts, despite a notorious difficulty to define it. On the upper echelons of political representation, as another interviewee recounted, "all ministers were all of a sudden talking about interoperability, [but] no one had a clue what it was" (Interview 13 with EU official,

2019). Another delegate argued, "one might simply explain it in a way, that […] there are many systems on EU level, which—I know […] you have the crux of the whole matter now. It is extremely difficult to explain" (Interview 27 with EU official, 2019). And a senior expert from the European Commission wondered how often he would "always mess up totally in explaining it" (Interview 21 with EU official, 2019). Yet another one complained that it was almost impossible to comprehend interoperability in all its technical facets—in stark contrast to its broad and seemingly obvious political objectives. These objectives disguise the fact that interoperability would be extremely difficult to explain to "average voters," he argued: "I would say, silently or quietly, that not so many people understand fully what we are currently doing" (Interview 9 with EU official, 2019).

6.5.1 Talking to each other

Such difficulties have led officials to develop and routinely follow a script that provided a metaphoric and committing rhetoric—one that I suggest calling *the discourse of simplification*. It allowed officials to neglect giving a proper explanation, or even demonstrating understanding, of interoperability's full scope or details in interviews. To the contrary, this script dominated policy talk and policy performance by relegating the techno-legal intricacies and complexities to the back (that one might find in regulatory texts, for example). Interoperability became rather associated with a desire to overcome a static data architecture which had been inherited from an outdated past. Databases such as Eurodac or the VIS— designed to operate in categorically separated ways and with limited purposes—were now portrayed as "isolated silos" to be teared down.[71] A conference report likewise argues that we

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[71] See for example the "Breaking Down the Silos for Improved Efficiency" panel at eu-LISA's annual conference in 2017 (eu-LISA 2017b).

are entering the "interoperability era," which will "bring down the silos and change the ways of cooperation" (eu-LISA 2019f). Similarly, proponents of interoperability routinely singled out the old-fashioned view that had been failing to recognize silos as pillars of a fragmented architecture that kept data in "cages." Doing things in interoperable ways would instead overcome the "siloed view," adopt one's "mind-set," and release potentialities for "a new way of thinking" (eu-LISA 2019f; field note, eu-LISA conference, October 16, 2019).

This new way of thinking must furthermore acknowledge the urgency of having systems "talking to each other." Communication is here proposed as a positive and quasi-natural value that is associated with interoperability and its technological components. The value of communication becomes an almost omnipresent (and unquestioned) feature in the celebrations and explanations of interoperability: "So, interoperability, fundamentally, what you see written on paper, [and] what is introduced, is the ability of systems to speak to each other" (Interview 4 with EU official, 2018). Another official claimed, "the concept of interoperability means creating a new environment where systems talk to each other, and then we just need to see what they need to do" (Interview 25 with EU official, 2019).

6.5.2 Tidy up, create order

Such portrayals of interoperability mediate seemingly simple virtues held high in the management of migration. They enable authorities working with existing and future databases "simply at once" (i.e., simultaneously), instead of having to "deal with six individual systems" (Interview 21 with EU official, 2019). The discourse of simplification conveys quasi-natural impulses that are required for policymaking(—and that can sideline the complex technical or regulatory implications at the same time). At a conference, a representative presented interoperability to a broader audience of industry actors, policymakers, national delegates, and

agency representatives by inviting them to "look at the real world" (field note, eu-LISA conference, October 16, 2019). He thereby compared interoperability with the habits and challenges of daily life and order, like misplacing socks and keys, and further developed the analogy by listing some basic principles for tiding up a house and keeping things in order (i.e., those made famous by the popular consultant Marie Kondo). Member states had put their belongings, "like socks," all over the place and it was now time to put things together where they really belonged. Information systems for migration management, he insisted, were like the "children" of the EU that spoke different languages. Interoperability would simply be a devotion to the task of order and realignment that corresponded to "common sense"—i.e., making data available where they are needed. In the same vein, other interlocutors argued that interoperability expressed the imperative of "having the information where it's needed at the right time" (Interview 12 and 21 with EU officials, 2019).

There is a persuasive and performative power of such discourse lying in its seemingly innocent simplicity. The solution offered is a trade of complexity for simple order—hence the official's analogy to Marie Kondo's bestselling motto of "Tidy your Space, Transform your Life." Policy officials feed into an appealing and self-reassuring discourse of *migration management facilitation*, following an impulse to neatly sort and order migration as continuous source of ambiguity and complexity.[72] Constructing and interlinking biometric databases are promoted as useful approaches through which "the EU is putting its own house in order," as one high-level delegate stated (field note, OSCE Conference, April 10–11, 2019). These performances also tend to portray the "problem" of migration anew: it becomes framed as the

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[72] Feldman (2012) similarly describes this urge of policy officials as *making things simple*: "[M]igration officials and policymakers must sort a bewildering array of travelers into a classificatory scheme to facilitate migration management. The chaos must be categorized, organized, and distributed on a curve from normal to abnormal, legal to illegal, desirable to undesirable, and productive to subversive" (pp. 56–57).

result of "information gaps" that are at risk of becoming abused by migrant and as an outdated data architecture that is no longer up to the task of responding to today's complex patterns of mobility. The EU, as another official claimed, would now be "lagging behind with filling up the gaps in the information architecture" (Interview 1 with EU official, 2018).

Simplification enacts solutionism by removing from discourse the legal and regulatory intricacies, and their rhetorical obstacles, the various infrastructural complexities, and, more generally, the patchy character of digital bordering in the EU. Interoperability is vested, and naturalized, with plain metaphors of transformation, for instance, by being propagated as a "change in mentality" or "a new way of thinking" (Interview 6 and 27 with EU officials, 2019). Interoperability appears as a sort of common-sense policy solution and quasi-progressivist action on behalf of state officials: "catching up," "entering a new era," or overcoming "static mentalities." Such repetitive performances portray previously upheld safeguards for data protection, purpose limitation, or the proportionality of databases as outdated and artificial principles—encouraging (rather than preventing) law enforcement authorities to access sensible asylum and visa-related data. Subjected to the promise of simplification, these principles now appear non-compliant with the language and actions of a seemingly necessary, up to date policy measure.

6.6 The promise of certainty

> And this [… is] essentially about being more certain about the identity of the person that you are investigating. That is the big, the big chunk of interoperability.
>
> (Interview 13 with EU official, 2019)

This quote introduces the second solutionist promise, which closely relates to what officials frequently call interoperability's *identity management*. Identity management can be best described as the construction and standardization of authentic digital identity from the complex environments and ambiguous patterns of mobility—attainable through new processes of data matching and verification.

6.6.1 Matching identities

Interoperability has been introduced as an innovation that can facilitate the grip of authorities on personal identity, notably, via expanded access to databases and guaranteeing "comprehensive," "proper," or "correct" identification (Interview 15 and 18 with member state representatives, 2019).[73] Therefore, the policy presupposes a particular *problem* that has informed the design of two core interoperability components—the Multiple Identity Detector (MID) and the Common Identity Repository (CIR): the existence of multiple identities in different databases that would indicate identity fraud. Multiple identities are assumed as a *strategic unknown* (McGoey 2012), as one interviewee explained, "there was no possibility to actually verify that we knew already this person [or] this person is committing identity fraud" (Interview 23 with member of the European Parliament, 2019). Once biometric borders operate in interoperable ways, however, new forms of reading, matching, and authenticating the digitized fragments of migrants' identity *across* all databases are expected to reveal the extent of fraudulent identity. In this sense, interoperability appears as a promise, made in the present about the future: it is supposed to make it "finally possible […] to verify identity with almost certainty" (Interview 15 with member state representative, 2019).

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[73] The construction of an overarching repository of identities is considered an essential tool for police authorities to access and match data against systems such as Eurodac and VIS. Access is conditioned and regulated in Articles 20–22 of interoperability's legal framework (EU 2019a).

This second enactment of solutionism rests upon, and nurtures, an underlying suspicion particularly connected to asylum applicants; it reinforces the nexus of criminality and asylum (Amelung 2021). Accordingly, officials repeatedly located the problem of multiple identities in the specific context of asylum, for example, when explaining that "somebody could just fraudulently apply for asylum, then ask for a visa, and with a different identity just to try to come to Schengen by different means" (Interview 25 with EU official, 2019). Another one argued, "it is first of all good to know who is standing [… in front of] you, in what context, and if that is really a refugee" (Interview 27 with EU official, 2019). Asylum spurs the official imagination of identity as a source of deceit, mutability, and uncertainty, which is why policy officials call for its appropriate governance by stabilizing and fixing it through additional biometric means. In sum, interoperability must therefore represent a new *regime of evidence* (Maguire, Rao, and Nils 2018) that targets bodies as a source of evidence-based and verified knowledge in the fundamentally uncertain management of identification. The policy's new practices of data matching and data verification are almost always assumed to function against the backdrop of the continued *biometrization* of border control and the production of the traveler's biometric representation as the "allegedly infallible proof of identity" (Leese, Noori, and Scheel 2022, 13).[74]

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[74] Matching and verifying can here be seen as what Schinkel (2020) calls a series of *testing procedures* through which "true" identity must be constructed. According to him, testing is an indispensable component of the state's double construction of "a body assembled from attributes inferred from the passport" (or other identifiers) and a "body made up of observed attributes from the person 'at' the border" (p. 560). Identification is thus always a practice based on the "comparison of one body with a multitude of bodies, since this is the only way to individuate attributes to a body" (p. 560).

6.6.2 "The whole center part of all the shit": reproducing (un)certainty

Within the proposed new regime of evidence, the two core components deserve further attention. First, the CIR creates *identity files* by using fingerprint templates, facial images, and biographical information retrieved from any one of the databases, thereby standardizing the biometric markers for testing and verifying identity across databases. Such a single confirmation file must represent the "verified and cross-validated baseline truth as the basis for knowledge production and government" (Leese 2022, 122). Second, the MID then automatically creates *identity links*, which indicate whether individual data is present in more than one database. White, green, yellow, and red links are part of what interviewees occasionally called the "traffic light system" that signals authorities whether claims of identity are authentic or unauthentic. The "ideal" result, as interlocutors argued, is a *red link* that must confirm a mismatch of data in different systems, e.g., between the biometric features of a person and their biographic data or identity presented in documents at the border. A red link, in other words, confirms the suspicion:

> In case there is an identity difference for the same person where it shouldn't be, we create this famous red link—that's the whole center part of all the shit we are proposing here. [… I]f you have a red link, all the purpose limitations and access control rights are void! We are going to tell everybody this person is known under a different identity in an illegal way.
>
> (Interview 21 with EU official, 2019)

In this case, a red link fulfills the *promise of certainty* that is so crucial for the formation of this policy. However, it is instructive to elaborate on also the elements left out in this official narrative, which would jeopardize this promise. One missing piece is the fact that digital

identification, which relies on algorithmic matching and verification, is an essentially comparative and translational procedure that is always prone to degrees of uncertainty (see Groebner 2007; Schinkel 2020). The attachment of biometric markers to bodies can be potentially detached: Migrant bodies escape biometric practices at the border; color links produce information that is not immediately actionable. In short, as Schinkel (2020) emphasizes, "deceptability governs the border […]. Deceptive mimicry, deceit, camouflage, must of necessity be possible" (p. 561). Moreover, comparing identity to biometric templates is an inherently probabilistic undertaking that relies heavily on accuracy and the minimization of error rates, which, in turn, are likely to increase with the growth of data or templates in IT systems. A report by the Civil Liberty and Justice Committee (LIBE) remarks that "the more databases there are, the more potential risks [of misidentification] there may be" (LIBE 2018, 41).[75]

Another missing piece lies in the design of the MID component itself. Through the automated detection of multiple identities, the MID's creation of *red links* should eradicate uncertainty and ambiguity qua confirming fraud identity. However, once interoperability enters into operation, the MID is expected to create a plethora of yellow links, indicating data files for which the "manual verification of different identities has not yet taken place" (EU 2017, Article 30). Most cases are thus expected to require first *manual clearance* by state authorities: the automated matching of travel documents and biometric templates cannot yet be performed in completely unambiguous terms to either confirm or reject the suspicion of multiple identity. The MID, designed to serve as an *inscription device* (Latour 1987) that accredits the validity of

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[75] The report also underscores the problem of data quality—another source of uncertainty largely ignored in the official performances of interoperability: the problem of "insufficient data and poor data quality," the report goes on, are common features of existing databases and will remain, because "interoperability *in itself* does not lead to improvement in the completeness, accuracy and reliability of data" (LIBE 2018, 51; emphasis added).

new knowledge on migrant identity, will ultimately fall back on a single decision of an officer (determined by a situation of uncertainty). For example, a border guard "sees a yellow link; so, there is a link, and you have to take a decision. You cannot measure [it otherwise]" (Interview 6 with EU official, 2019). Interoperability's performed promises of certainty frequently ignore the multiple contingences of the MID's operations in practice and on the ground:

> [I]f the guy [the border guard] is afraid that, maybe, we will let someone pass [… who] should not, he is not sure, and, by default, he will always put a red link. […] Or it's the other way around. He doesn't want any trouble, he says: "Okay anyway, there are many mistakes in the systems. [It is] probably a mistake, the guy seems honest. I trust my gut feeling. I put a green link."
>
> (Interview 6 with EU official, 2019)

In this individual story, therefore, the verification of identity is far from automatically accredited, but remains dependent on data quality, the various border environments, the technological devices and artifacts, as well as on the potentially arbitrary evaluation of a border guard.[76]

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[76] To support this evidence, see also the statement made by a national expert, who claimed that color links are far from unambiguous results when it is not known what action should be taken by authorities: "[T]here is no clarity, for instance, if you read the report [the interoperability legislation], or what happens in each situation, when you have a red link […]. It's going to be a mess and it's going to [produce] differences, maybe [the] complete opposite actions in every member state" (Interview 17 with member state representative, 2019).

6.7 Expert authority

6.7.1 Taking it out of the archives again

In earlier policy documents on border and migration management, the idea of interoperability had only been hypothetically and rather imprecisely sketched out (EC 2003; 2005). Ocasionally, interoperability was also described as too operationally vague and politically risky, especially due to its problematic implications for data protection. In 2010, the EC warned that "an overarching EU information system with multiple purposes would […] constitute a gross and illegitimate restriction of individuals' right to privacy and data protection and pose huge challenges in terms of development and operation" (EC 2010, 3).[77] However, after the so-called "migration and refugee crisis" in 2015, interoperability was taken "out of the archives again" (Interviews 21 and 13 with EU officials, 2019). A communication on "Stronger and Smarter Information Systems for Borders and Security" in 2016 furthermore set the tone by invoking the "European citizens" that would "expect external border controls on persons to be effective, to allow effective management of migration and to contribute to internal security" (EC 2016a, 2). Interoperability was then repeatedly brought up in relation with the notion of "crisis"—one that could invoke both the chaotic movements of migrants and terrorist attacks in Europe and causally relate both to a set of technical shortcomings of IT systems, so-called gaps in the data architecture of borders, the fragmentation of the technology landscape, or the uncertainties in identifying mobile individuals.[78]

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[77] Subsequent documents up until 2015 have only few notable references to interoperability, such as a brief mentioning in relation to a future Entry/Exit Program. See, for example, the official communication on "Preparing the Next Steps in Border Management" (EC 2008); or "Smart Borders Options and the Way Ahead" (EC 2011a).

[78] Besides the communication on "Stronger and Smarter Information Systems for Borders and Security" (EC 2016a), another document that strategically paved the way was called "Enhancing Security in a World of Mobility: Improved Information Exchange in the Fight Against Terrorism and Stronger External Borders" (EC 2016b).

The EC thereby paved the way for presenting interoperability as a particular *expert response* to "crisis." As one official claimed, interoperability had to appear as the result of "some deep thinking around the use of all kinds of data, captured and processed for different purposes, different reasons, by different systems, coming from different authorities" (Interview 21 with EU official, 2019). Values sensible to data protection were now reconsidered as "mistakes" or "misbelieves", that were no longer adequate in the light of the urgent challenges to the EU. Simultaneously, the conservative European People's Party (EPP) pressured the EC for concrete proposals to demonstrate to the electorate that "the European Union can deliver on these things in a speedy manner" (Interview 22 with member of the European Parliament, 2019). Consequently, the policy of interoperability had to become the "flagship file" for security policy in the upcoming European parliamentary elections.

6.7.2 Making issue experts

Another crucial tool for translating interoperability from an opaque idea into an expert-driven solution was the so-called High-level Expert Group on Information Systems and Interoperability (HLEG). The group was partly created to support what one interviewee called "consultation from below" or a (somewhat paradoxically termed) "evangelization process" that had to convince skeptical stakeholders in the EU. As the official explained,

> The [European] Commission worked in an atypical way, not in the sense that we proposed something and then just [… saw] what [would] happen. No, we turned it around. So, we went to the member states, we organized a whole big consultation process, we spoke to the practitioners, we said: "what do you really, really need?"
>
> (Interview 21 with EU official, 2019)

The group was important to appease, and enroll, national authorities that were less receptive to new "policy activism" in Brussels. The group was thus more carefully composed of selected mid-level representatives of member states that were known for being positively minded toward interoperability. These group members did not have to come up with their own ideas: "there was a lot of preparation […] and a lot of consultation, but they knew [already] where they were heading" (Interview 6 with EU official, 2019).

Ultimately, this informal group of actors established what Asdal (2015) calls *issue-experts*. Issue-experts claim to be defined not by (political) interest but to appear "as actors with knowledge on the relevant issue" (p. 83). The group members thus acted both as pioneers and practitioners that were knowledgeable about the real-world problems in the domains of border control and security. As such, they framed interoperability as an *issue* that called for technological fix and that should no longer be contested on a principled political basis.[79] In a series of documents, most notably in the so-called "Final report" (HLEG 2017), the group reports on its informal meetings and characterizes itself as a "platform for exchange of experience and knowledge between peers," which could provide "a bridge between technical expert level and the policy discussion at senior official level" (p. 6). As issue-experts, they also claimed responsibility for holding authoritative knowledge about interoperability, which was rearticulated as a collective and fairly consensual endeavor. Here, interoperability would represent a "shared European vision on the ways ahead" (HLEG 2017, 6).

The HLEG further determined a set of tools and components that were deemed both acceptable and necessary for creating interoperability. These components did not simply emerge out of the group's fruitful debates (—although often presented in this way). Instead,

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[79] The HLEG had also included critically minded representatives of FRA or EDPS and enabled them to comment on fundamental rights or data protection aspects. In retrospect, however, it is difficult to reconstruct the exact impact of these representatives on the HLEG's discussions and outcomes.

they mirrored precisely what the European Commission had previously suggested (see EC 2016a). The HLEG thus vested interoperability with expert authority and leveraged its components to enter smoothly into the drafting processes of subsequent policy documents and regulations—the latter explicitly referring to the HLEG as evidence that "it was necessary and technically feasible to work towards practical solutions for interoperability" (EU 2019a, 3).

6.7.3 Keeping it together

Expert authority turned out to be crucial to overcome the repeated obstacles on interoperability's path towrad the passage of law. Political parties such as the European Greens feared the creation of a "super database" (that would mix all sorts of sensitive data) and a dangerous precedent for data protection and fundamental rights.[80] The social democratic S&D Group criticized interoperability for intending to introduce a centralized pool underlying all IT systems for border and migration control. According to their view, the component of an overarching repository, the CIR, represented a new standalone database that could store and link biometric templates to each other across all IT systems—overriding fundamental principles of purpose limitation and data minimization. Although they accepted interoperability's core political objectives, i.e, "improv[ing] the effectiveness and efficiency of border checks" and "contribut[ing] to the prevention and the combating of illegal immigration" (EC 2019a, Article 2), the S&D Group opposed the CIR as an entirely disproportionate technological component of the policy.

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[80] Cornelia Ernst, representative of the European Greens, argued, "There evolves a huge, super database with data of third-country nationals, which can be practically searched by any identification whatsoever, also without having committed a crime […]. Welcome to the brave new world!" My own translation, available at https://www.europarl.europa.eu/doceo/document/CRE-8-2019-03-27-ITM-024_EN.html?redirect, accessed April 5, 2022.

In these instances, proponents of the interoperability policy could mobilize HLEG's exclusive form of expertise and counter various forms of opposition. For example, the EC, the conservative EPP, or eu-LISA argued that the CIR did not legally constitute a standalone database as it would not have to collect new data. Instead, the so-called CIR files would only draw on existing identity information (or biometric templates) already stored in various systems. In other words, the CIR files would still keep the databases *virtually* separated (Interview 23 with member of the European Parliament, 2019).[81] Furthermore, they argued that interoperability would only function if all of its technological components were kept together. Frequently referring to the HLEG, they claimed that the CIR technically constituted the central pillar of the policy—explained as a single, coherent, and intertwined puzzle only complete with all its parts. The HLEG's authority was, for instance, used to undermine the S&D Group's political position. In this way, as one of my interlocutors described it, the opposition successively lost the "battle of arguments":

> [T]he argument got quite technical and at some point, if you're not an IT expert, […] you have nothing beneath your feet anymore. So, it's very hard to sustain the argument, you know. [… A]s I said, there is a line between policy and information technology, and, at some point, you know, the [European] Commission were very strong in their argument that this was required in order for the systems work properly. And in the end that was determined to be the right course.
>
> (Interview 23 with member of the European Parliament, 2019)

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[81] This way of reasoning was arguably a sort of "legal trick," as one of the interlocutors admitted. She ironically remarked, "Yeah sure, they [IT systems] are separated, but they are still together in a big box. To me, it's a database […] but that's something you are not supposed to talk about—okay [*laughing*]?" (Interview 6 with EU official, 2019).

Facing the authority of experts, political opposition seemed incapable to reject the policy for its own sake: "[I]f you're trying to sell a message […], if you're trying to explain your policies to the outside world, you can't vote against interoperability because the Common Identity Repository is there. It's just not something that anybody will understand" (Interview 23). By producing expert authority, interoperability was translated into a unique, convoluted, and above all *technical* policy. Expertise determined what had to be considered as the relevant policy knowledge and the necessary technical components. Expertise performed interoperability as a *consensual issue*, first, through the specific interpretation of what counted as a "crisis" in the EU and its solution through expertise; and second, by overcoming the prevalent political opposition to the policy of interoperability.[82]

6.8 Conclusion: the resistible rise of a necessary policy fiction

Carefully tracing the performances and articulations of interoperability as the most recent efforts to digitally infrastructure borders in Europe allowed me to analyze a *policy on the move*. I explored the dynamic process through which actors, imaginations, promises, knowledges, and technological components became assembled to form this policy. My approach illustrated how digital solutionism has been enacted and sustained by translating interoperability into a set of promises: simplification, certainty, and expert authority in border and migration management. In each of these examples, interoperability in the border regime has been performed as a set of problem-diagnosis and technological fix; in other words, "crises [… were] tailored to justify the solutions" (Sadowski and Bendor 2019, 554).

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[82] The votes of the S&D Group, and those of conservative EPP, ultimately provided a comfortable majority to pass interoperability as an EU regulation in May 2019.

The case of making biometric borders interoperable also demonstrated, once again, the power of imagination in the infrastructural formation of the border regime. Interoperability may still be far from being implemented (—an undertaking about which interviewees repeatedly expressed doubts), but it has emerged as a *necessary policy fiction*. Adopting this term from Ezrahi (2012), I intend to emphasize how collective imaginations lead to "deliberate performance[s] of illusions or fictions" (p. 40), which, in turn, create the discursive conditions to commit to, and realize, technopolitical orders. Presented as necessary, policy fictions outplay or delegitimize contesting voices and political dissent; they can operate "as a gloss over criticism of the present order" (Ezrahi 2012, 40).

Interoperability has fostered solutionist modes of speaking and thinking which present interoperable biometric databases as the ultimate form of "truth-telling through data" (Leese, Noori, and Scheel 2022, 13) and as an inevitable technology for tomorrow's management of migration. As a necessary policy fiction, interoperability has assembled and transformed an opaque technical concept into a *powerful ideograph* that steers and supports the narratives, orientations, attitudes, and rhetoric of EU officials, agency and industry representatives, and national delegates in EU migration and border management. For them, it is not only important what interoperability exactly means or whether all the open questions of policy implementation can be explained. Instead, interoperability can unfold a promissory horizon precisely because it deviates from most of the practical problems of borders and the troubled realities of migration. The policy of interoperability and its digital solutionism creates the air of paradigm change, technological irreversibility, and even redemption. It introduces the now unchallenged ideals and values of this necessary fiction—i.e., perfectly aligned data streams, facilitated access and interconnectedness, the seamless processing of biometric data, which seem to strategically close the door for principles that had initially governed the creation of IT systems in the EU. Against the background of the necessary fiction of interoperability, the important principles of purpose

limitation, data minimization, personal privacy, or the protection of fundamental rights must now appear outdated and superfluous.

PART IV

FURTHER REFLECTIONS AND CONCLUSIONS

This final section contains two chapters. Chapter 7 analyzes how future digital borders are *justified*. It draws on the literature of valuation studies to explore the new digital borders' underlying repertoires of justification that provide actors with distinct sets of values and principles of worthiness that must legitimize digital solutionism. Chapter 8 summarizes the core arguments of this thesis and reflects on implications.

7 On the Importance of Being Justifiable: The Repertoires of Digital Solutionism

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7.1 Introduction

In previous chapters, I traced the extension and transformation of large-scale IT systems as core tenets in the contemporary processes of infrastructuring European border control and security. The systems evolved in this way because they are imagined and enacted as powerful solutions to the governance of mobility and migration. As one interviewee succinctly remarked, "[U]sually, if there's a problem, the [European] Commission will say, let's develop a new ICT system!" (Interview 26 with member state representative, 2019).

This chapter presents a reflection on the underlying *repertoires of justification* that continuously feed and bolster digital solutionism. Justifications, as Boltanski and Thévenot (2006) outline in their influential interpretive framework, are essential modes of legitimization through which actors are able to refer to higher generalizable principles or visions of worth. Actors "typically do not invent false pretexts to explain their actions, […] but rather try to act in ways that can withstand the test of justification" (Sharon 2018, 4). Justifications are thus linked to *valuations* that stem from different or competing understandings of what counts as a commonly shared, greater good. Justificatory claims and arguments are thereby conceived of as *situated practices*—i.e., actors find themselves in situations in which they "are driven to explain their judgement and to support it by drawing from the resources of the present situation" (Boltanski and Thévenot 2000, 216).

Scholars of *(e)valuation* have correctly argued that the study of justifications contributes to a better understanding of contemporary transformations, such as digitization, quantification, or neoliberalization (Lamont 2012; Mau 2019; Stark 2009). A justification can be, in John Law's (1994) terminology, a *mode of ordering*. It is an (e)valuative practice because it "[conveys] value-laden judgements about elements we want, or do not want, to build into social order" (Jasanoff 2011, 622). By *(e)valuation*, we refer both to the active ascription of value or worth (valuation) as well as the assessment of whether and how an entity is valuable (evaluation) (Lamont 2012, 205).

The manifold performances of imaginaries and future visions of digital borders explored in previous chapters thereby appear as situations that must always build upon and enact distinct sets of values, moral standards, principles of evaluations, and grammars of worth. They must form parts of larger repertoires of justification that legitimize these performative claims and render them acceptable. In other words, the sensitizing framework of justification allows us to extract the implicit *(e)valuative undercurrents* in the digital transformation of the border regime. Justification questions the ways in which digital solutionism has become continuously enacted as a consistent and durable destination for its various actors.

Similarly, Julien Jeandesboz (2016a) explains why the work of justification must be understood as a crucial part of the routine practices in the European border regime:

> It draws attention to the efforts put into building equivalence between a specific measure and broader practical repertoires of justification. [… It] highlights the ways in which EU border control is not only about adopting the "right" measure—the

efficient, proportionate or acceptable measure—but also involves shifting the boundaries of what is considered justifiable. [83]

(Jeandesboz 2016a, 222)

Justifications also shed light on how the making of a digital border infrastructure becomes part of what Aradau and McCluskey term "the politics of acceptability of certain arguments" (2021, 7). New border databases and the attempts to interconnect them may appear to be natural and convenient IT solutions; however, this is only because they are continuously linked to overarching sets of higher principles of (e)valuation that render them acceptable (or unacceptable). Such politics are thus equally about the many *disputes* through which actors must defend themselves against legitimate forms of *criticism*. Criticism also draws upon justificatory repertoires (and different visions of what counts as worthy) in order to become accepted, heard, and considered valuable, effectively delegitimizing other claims and arguments.

In short, this chapter proposes a *valuography* (Dussauge, Helgesson, and Lee 2015) of the digital border regime that scrutinizes the enactments and orderings of what we have called digital solutionism. A valuography underscores the political nature of valuation, values, and normative assumptions in the ongoing expansion and transformation of its border databases.

In the following sections, I first establish my definition of the repertoires of justification, for which I draw on the literature of valuations studies and highlight the manifold sites and devices of justification in my research. I then outline four distinct *repertoires* to analyze the different registers of value and understandings of worth that underlie the arguments for digital borders: the *security and crisis repertoire*, the *economic and market repertoire*, the *industrial*

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[83] Jeandesboz's contribution examines how justifying control becomes part of professional *security practice* in the EU. However, he does not dwell on the repertoires or value regimes that need to be mobilized for justification.

and expansionist repertoire, and the *project and innovation repertoire*. Lastly, I identify some

of the tensions and inconsistencies that become visible when repertoires clash with or contradict

each other. At the same time, I show how actors—officials, representatives, professionals, and

experts—both mobilize and *compromise* distinct repertoires of justification in order to navigate

the structural tensions and contradictions in the border regime.

7.2 A conceptual note on repertoires

7.2.1 Repertoires

For Boltanski and Thévenot (2000; 2006), justifications are grounded in *orders of worth* that

provide actors with a set of universal grammars of valuation to legitimize or criticize each

other's claims and actions. Generally, a justification is an attempt to "move beyond stating a

particular or personal viewpoint" that yields more than a simple rhetorical effect: it is the

mobilization of a *generalizable* statement invoking recognizable principles, standards, and

evaluations of what is deemed good, worthy, or right (Thévenot, Moody, and Lafaye 2000,

236). In the EU political arena, officials, professionals, experts, and delegates find themselves

in "a discursive forum based on argument and justification" par excellence, as Outhwaite and

Spence observe (2014, 428). Such actors must frequently position themselves (and relate to

each other) in disputes or *valuation constellations* (Waibel, Peetz, and Meier 2021), which

compel them to explain their judgment and engage in (e)valuations of the digital transformation

of borders.

The notion of repertoires of justification aims to pursue two analytical shifts. First, in

lieu of Boltanski and Thévenot's orders of worth, it follows scholars' calls for more flexible

approaches to the empirical analysis of how actors reflect distinct principles of evaluations and

grammars of worth (Fochler, Felt, and Müller 2016; Heuts and Mol 2013; Stark 2009).

Repertoires resemble orders of worth, as they are similarly composed of more than one evaluative principle and suggest a (more or less) coherent whole with internal criteria, vocabularies, and understandings of worthiness. However, instead of being derived from Boltanski and Thévenot's six universally applicable orders of worth, repertoires of justification are *empirically reconstructed* from the actors' situated position and agency in the digitization of borders.[84] In contrast to the static imagery of order, a repertoire must be mobilized to enact values, norms, or qualifications *in practice*; it is a means of describing "the way actors creatively employ certain resources in practice" (Thévenot, Moody, and Lafaye 2000, 238; see also Sharon 2018). A repertoire moreover reflects a dynamic *constellation* of valuators, values, and audiences implicated in valuation processes (Waibel, Peetz, and Meier 2021).

Second, repertoires embody what Waibel and colleagues (2021) describe as *valuation infrastructures*, which "facilitate, transform, stabilize, and distribute valuations" (p. 45). The making of a digital infrastructure, for instance, is a process that equally enables, constrains, or reconfigures (e)valuations: actors do not simply position themselves toward digitization by chance; they obtain their habitual narratives, argumentative logics, and (e)valuation principles from the specific valuation constellation—between the valuator, the (e)valuated entity, and the audiences. As Waibel and colleagues express, "infrastructures affect which identities populate the constellation's positions" (p. 46). The actors' positioning in the making of a digital border

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[84] In their book *On Justification—Economies of Worth*, originally published in 1991, Boltanski and Thévenot (2000; 2006) study how people base their experiences, justify their actions, or appeal to principles of the common good through six distinct orders of worth: the order of the civic, the market, the industrial, the inspiration, the domestic, the fame. Since then, several works have proposed complementary schemes of orders: Boltanski and Chiapello (2018 [1999]) describe the rising "project order" in *The Spirit of Capitalism*. Thévenot and colleagues (2000) identify the "green order" in environmentalist controversies. Tamar Sharon (2018) defines the "vitalist order" in the context of digital health capitalism. As we will see, the repertoires of justification I analyze have many similarities with some of these orders and their values, which is why I used them as inspiration for describing the repertoires.

infrastructure thus affects who perceives the type of problem–solution constructions and how these are mobilized in the justifications of future digital borders. Ultimately, repertoires also establish the criteria for who or what is envisioned to be included or excluded as a worthy or unworthy element in the making of a border infrastructure.

The *imperative to justify* (Boltanski and Thévenot 2006) thus not only pushes actors toward reaching stable social and institutional arrangements that are legitimated on shared normative grounds and publicly justified; this imperative also appears as a permanent valuation of emerging infrastructural configurations through the digitization processes in the border regime.

7.2.2 Sites and devices of justification

A central device of justification is *narratives*, as they give meaning to future digital borders and convince audiences of their role, nature, and function. Narratives are powerful instruments for uniting values and visions of the collective good that legitimize action, policy, technological change, and futures. As previously mentioned (see chapter 2, section 2.3.2), Czarniawska (2004) defines collective narratives as *modes of knowing and communication*. We add to this definition their crucial role as *modes of justification* that render them insightful repositories of values, qualifications, and principles of (e)valuation.

Actors' claims and arguments are largely articulated through narrative devices, which we will briefly revisit here in light of their capacity to mobilize repertoires of justification. One set of justificatory sites is represented by the policy reports, official communications, public statements, legal documents, fact sheets, and brochures broadcasted and distributed by institutional bodies in the EU, including the European Commission, the European Council, the eu-LISA agency, the European Data Protection Supervisor (EDPS), or the Fundamental Rights

Agency (FRA). These are integral parts of the repertoires that ascribe value and judge the making of a digital border infrastructure while also providing legitimate grounds for performing criticism.

Ethnographic settings, conference sites, and public presentations, on the other hand, produce narrative materials that are permeated by the stories and rhetoric of officials, experts, and professionals. Narratives articulate actors' opinions or explain how their views diverge from other convictions; they express their beliefs and promises and stage and perform visions of the future. Additionally, they are occasionally mobilized and shared together with textual or graphic artifacts, documents, tables, graphs, or illustrations. In short, narratives activate several modes of justification, often by telling broader, well-rounded stories of digitization or digital transformation. Here, actors find themselves in situations where they "[seek] a position by relying on a principle that is valid in all generality" (Boltanski and Thévenot 2000, 213).

Yet another site of justification is interviews and conversations in which actors routinely (e)valuate and justify future digital borders by sharing personal accounts of certain events, processes, or activities. These elicited accounts, despite their subjective character, likely "resort to a repertoire of narrative devices [… usual] for his or her practice" (Czarniawska 2004, 50). They make claims and arguments by mobilizing collectively shared repertoires, invoking their distinct value registers and principles of worth.

In sum, the valuography I propose spans the spaces of imagination and sites of experimentation explored in the empirical sections of this thesis. The repertoires of justification inform practices of narration—whether through the collective crafting of the imaginary of digital transformation or the staging of European infrastructure, in the epistemic making of smart borders, or in the conjuring of the necessary fiction of interoperability. Since these new digital borders will necessitate an unprecedented collection of data on mobile people (once the new IT systems are operational), they have sparked dispute and contestation, compelling actors

to engage in justification and explanation of their higher principle of worth, of what is both desirable and legitimate.

Unpacking the repertoires enables one to grasp the *conditions of possibility* that create digital solutionism and render it operative and enduring. These conditions also provide a certain interpretative flexibility with regard to the different elements, tools, and problem–solutions implied in the digitization of the border regime—whether this involves the generation of copious amounts of biometric data, such as fingerprints and facial images in the EES, the replacement of visa stamps in passports, the automated calculation of visa holders' authorized stays, or the digital filtering of application details and automated flagging of "suspects" against a new watchlist in the ETIAS. In short, repertoires of justification perceive and assess the value(s) of digital solutions differently; they promote diverging understandings of worthiness and different propositions of who and what counts as a(n) (un)worthy subject in the digital transformation of borders.

7.3 Four different repertoires of justification

7.3.1 The security and crisis repertoire

> Any technological solutions should keep in mind: security, security, security.
>
> (field note, eu-LISA Industry Roundtable, April 24, 2019)

Securitizing civic worth

The assertion that migration and border control in the EU has been predominantly shaped by processes of securitization is a common thread in critical border and security studies (see also chapter 1). Yet, there is little consensus on how such securitization is accomplished—i.e., in

what forms it takes place (compare, for example, Bello 2020; Bigo 2002; Bourbeau 2011; 2014; Huysmans 2000; van Munster 2009; Ulbricht 2018).

Seen through the lens of justification, however, securitization is not simply a series of (discursive or material) acts that frame migration as a threat; it is also a *justificatory process* that transforms the very character of what is considered and valuated as *civic worth*. In Boltanski and Thévenot (2006), the civic world is characterized as being enshrined in values such as participation, inclusivity, or solidarity, shared between members belonging to one joint community. Related to the EU, as Outhwaite and Spence (2014) claim, the civic world can be said to represent the "conception of a European public interest, based on the value to citizens (not of course classes or other social categories) of the EU's 'four freedoms': free movement of goods, capital, services, and people" (p. 434). In this value register, civic order classifies the public good according to what benefits the European public as a whole; whatever is undertaken must "deliver to the expectations of citizens," as one EU official emphasized at a conference (field note, OSCE Conference, April 10–11, 2019).

In this sense, the European civic body is a regularly invoked figure in justifications that is presented as the main beneficiary of new large-scale dataveillance systems. Databases such as the EES or ETIAS, for instance, must "improve security for EU citizens" and reach the overarching goal of "better protect[ing … Europe's] external borders and enhanc[ing] its internal security, for the *benefit of all citizens*" (EC 2016c; emphasis added). In this repertoire, the abstract value of *security* is chosen to represent the core tenet of the value register, and *insecurity* is presented as the main challenge to national and European citizenry. Officials also mobilize this repertoire to legitimize their own role vis-à-vis the European public, who are presented as their primary audience—e.g., when emphasizing their tasks of building information systems that "materialize the needs of the European citizens" and framing them as

an investment "[n]ot only for Europe, [but] for everybody" (Interview 3 with EU official, 2018; see also chapter 3, p. 105).

Boltanski and Thévenot's (2000) model of civic order establishes "collective welfare as the standard of evaluation" (p. 246). In our case, however, collective welfare is achieved primarily through collective security, inevitably defining it in negative terms—i.e., by invoking the permanent state of insecurity. Securing worth thus takes place against the backdrop of an implicit absence or public deficit of security. The narrative of deficiency is rooted in the creation of the Schengen Area when the first Schengen Information System for the exchange of information between police professionals was planned as a compensatory measure for the dissolution of internal borders (Brouwer 2008; van Munster 2009). It has given rise to the now prominent idea of a Schengen community whose members and values are under threat from various sorts of unworthy (thus potentially risky) subjects crossing its borders: third-country nationals, criminals, migrants, or refugees.

The justifications for systems such as the EES and ETIAS draw on this well-established repertoire when arguing for the reinforcement of borders to tackle irregular migration, overstayers, identity fraud, or terrorism. These systems are viewed primarily "[f]rom a security angle" and must publicly raise concerns with unwanted or unchecked forms of mobility—for instance, problematizing travelers "not requiring a visa [who] are currently not subject to any systematic check for border control purposes before arriving at the border itself" (EC 2008, 4).

This repertoire is also mobilized for the entrenched practice that Jeandesboz and Pallister-Wilkins (2014) call *crisis labeling* in migration management.[85] *Crisis* is a routinely invoked notion for articulating this presumed security deficit and the urgency to confront it in

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[85] This, for instance, is also visible in the sociotechnical imaginary of the digital border transformation I analyzed in chapter 3.

terms of a lack of "sufficient information" or "information gaps": "[I]t was discovered that there are gaps in that architecture. And for that reason, the European Commission introduced a proposal for integrated systems […] in order to fill those information gaps" (Interview 1 with EU official, 2018). Dataveillance is justified as a natural solution to undetected border crossings, to identify "gaps," or to prevent the exploitation of "loopholes": "Where there are gaps in the EU's architecture of data management, they need to be addressed. [… T]he Commission has presented a proposal for an Entry/Exit System which should be adopted as a matter of urgency" (EC 2016a, 20).

According to this repertoire, the notion of crisis invokes a threat to the order that secures the collective good. At the same time, this notion must reassure citizens of the legitimacy of deploying IT systems as well as the role of EU institutions in fighting this threat: "[W]e need to work hard, we need to work smart" (field note, eu-LISA Industry Roundtable, April 24, 2019). The justificatory repertoire of security and crisis legitimizes digital solutions through the securitization of civic worth. The collective state of worth—the core, valid principle invoked by EU officials and delegates—is to establish security primarily through the development and expansion of large-scale IT systems for border control.

Contestation

Despite this seemingly ubiquitous repertoire, the field of civic worth is a controversial battleground for disputes in which processes of securitization and surveillance have been repeatedly called into question. Invoking civic values is indeed an important strategy for actors in formulating legitimate criticism and mobilizing arguments, drawing on principles such as fundamental rights and solidarity to argue against dataveillance systems such as EES and ETIAS.

When the so-called Smart Border Package (including a legislative proposal for the EES) was first introduced by the Commission, it was successfully put on hold by the European Parliament in 2013. The Package's proposal to fingerprint all travelers and store facial images was associated with somber police state techniques, conjuring imagery of the "big brother state." Back then, voices sought to delegitimize the Package by rejecting its solutionist claims. For example, a representative of the European Greens argued, "The far-reaching proposals presented by the Commission today are anything but 'smart' and would create a Big Brother 2.0 at Europe's borders."[86] Moreover, opponents attempted to reject the securitization of worth by claiming that civil liberties and individual rights would be attacked by the disproportionate reach and general unaccountability of dataveillance measures. Furthermore, collecting an unprecedented amount of data (in the form of biographical and biometric information) would severely aggravate the asymmetry between state authorities and data subjects and undermine the principles of data protection—e.g., the purpose limitation principle for databases, privacy rights, and fundamental rights. These legitimate forms of criticism helped to temporarily create an oppositional block that rejected the specific technological future of new border databases that would run counter to certain core tenets of civic worth.[87]

Four years later, however, the EES regulation was adopted. Yet, criticism had not abated. Its proponents, such as the European Commission and member state representatives who fought for it (especially Germany and France), once more emphasized security as a

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[86] Comment by Ska Keller, former Green Party spokesperson, on migration and civil liberties in 2013. Available at https://www.greens-efa.eu/en/article/press/eu-border-control-plans/, last accessed on April 5, 2022. See also the wording of critical non-governmental actors such as Statewatch, available at https://www.statewatch.org/news/2017/may/eu-wastes-no-time-welcoming-prospect-of-big-brother-databases/, accessed on April 5, 2022.

[87] As we will see further below, this was not the only repertoire invoked by the European Parliament for rejecting the Smart Borders Package.

collective worth achievable through the establishment of new border databases. Now, these proponents argued, smart borders (and interoperability) were set against the backdrop of a new security context that had to reflect the influx of migrants and refugees in 2015 and the terrorist attacks of 2016.

Supporters of the EES were eager to mitigate the arguments surrounding mass dataveillance and civic liberties. The smart border proposal was reintroduced "as careful[ly] as possible," as one official in the Parliament's Committee on Civil Liberties, Justice and Home Affairs explained (Interview 19 with EU official, 2019). It was stressed that technologies would not suppress the individual rights of citizens—emphasized as worthy subjects whose rights had to be protected. Instead, EU officials stressed that the system would only affect "third-country nationals": "[T]here will be no effects of the functioning of systems on them [EU citizens]!" (Interview 1 with EU official, 2018). EU officials in favor of the new databases now mobilized established values of the civic repertoire to argue *for*, not against, privacy rights and data regulation: "Compliance with fundamental rights requires well-designed and correctly-used technology and information systems. Technology and information systems can help public authorities to protect the fundamental rights of citizens" (EC 2016a, 4).

Against the backdrop of the previously rejected Smart Border Package, proponents of the new databases now adopted the argumentative rhetoric of previous critics and opponents (as occasionally articulated, for instance, by the EDPS). While security was represented as an insufficiently guaranteed collective principle of worth, proponents mobilized a wider range of other moral and normative qualities. One official, for example, argued that "what we do is critical for Europe, and critical for [… the] implementation of our fundamental rights of EU citizens." New dataveillance systems would, in his view, "guarantee better, better protection of individual rights of the citizens, even […] the citizens of third countries. Because something, which is very important […], is the fact that they will not collect data of EU citizens" (Interview

1 with EU official, 2018). Mobilizing this security and crisis repertoire thus drives the securitization of *civic worth*. This repertoire could also center on other civic values rather than emphasizing security as the primary principle of collective worth. However, it can only do so by instating a boundary between who is worthy (the EU citizen) and who is unworthy (the non-EU citizen) of receiving these formal civic rights.

7.3.2 The economic and market repertoire

The second repertoire is based on economic and market considerations in which actors conceive the EU as situated in the realm of the global economy, upholding the imperative of free and smooth circulation of capital, goods, and persons in terms of economic profit. This repertoire is mobilized most often in the narratives of market and corporate actors and consultancies as well as EU bodies. In this scenario, the EU is primarily perceived as an economic zone in which, potentially, the "deployment of market worth is inscribed in a space that has neither limits nor distance, in which the circulation of goods and persons is free" (Boltanski and Thévenot 2006, 197). Accordingly, new digital borders must reflect the context of economic growth; as boundaries and barriers, they are problematized not because of their potential porousness but because of their actual potential to *curb* mobility and flows.

Facing increased travel, taking (austerity-compliant) measures

According to this repertoire, generalized arguments for building new databases should not primarily concern "irregular" or "illegal" third-country nationals but must first and foremost take into consideration the increased numbers of travelers in a global world. Mobility, in this repertoire, is postulated as an indisputable object of worth.

The 2016 "Communication on Stronger and Smarter Borders" can be cited as an exemplary document that confidently posits global mobility as a matter of fact: "Europe is a mobile society. Millions of EU citizens and third-country nationals cross internal and external borders every day" (EC 2016a, 2). In earlier documents, initiatives concerning border digitization were put forth as instruments that could anticipate increased travel activities and serve as solutions to the challenges of a globalized market. "The EU must prepare itself to meet the challenges of the increasing numbers of travellers in an ever-globalizing world. New technologies could provide new opportunities to meet these challenges" (EC 2011a, 13).

In such a world, airports appear to be prioritized objects of concern—they are "architectural shells" (Salter 2007, 52) through which mobility must be channeled and business and tourism pass through. In 2011, the Commission estimated that in the year 2030, airports would host 720 million travelers: "This major increase cannot be addressed only by hiring additional border guards" (EC 2011a, 3). Another EU official predicted that about 100 million third-country nationals would cross external EU borders in 2025.[88] Such estimates do not necessarily have to conform to reality, but they invoke numbers and statistics as worthy indicators of a steady increase in global travel. Thus, calculation and the economic raison d'être are particularly valuated: "Europe is not isolated from the rest of the world […]. There are more and more people coming here to do business, or to study, or for leisure, which means that we need to find a way to address that increased demand of Europe […]" (Interview 1 with EU official, 2018).

Nonetheless, the problem cannot simply be posed in terms of seizing economic opportunities to channel profitable mobility into the Schengen market. Digitization must also

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[88] Note that at the time of these interviews and documents, no one could foresee the COVID-19 pandemic, which has taken a heavy toll on global tourism. It is unlikely that the tourism sector will have entirely recovered by 2025.

be justified in times of an economically "difficult climate" (Interview 1 with EU official, 2018) that is hostile to public expenditure. Principles of economic austerity must demonstrate to the taxpayer that the costs of public expenditures are proportionate. This is presented as one of the "process-oriented principles" in the early policy documents on border databases, where the EC claims that government must be cost-effective: "[P]ublic services based on information technology should enable the delivery of better services and greater value for taxpayers" (EC 2010, 26). On another occasion, an interviewee pledged that "since we are dealing a lot with taxpayer money, we have to justify, we have to spend properly, [we] have to be accountable" (Interview 3 with EU official, 2018). Even though the amount of capital spent on IT systems in the border regime is at an unprecedented high, investment in digital border infrastructure must be framed as an *affordable* public service: "[W]e have [this] attitude towards the taxpayers. We will [… use] the technology we have at hand in[] a proper way […]; a lot of taxpayer's money will be saved" (Interview 3 with EU official, 2018). Complying with this principle of public austerity and adapting to the seemingly accepted fact of increased global travel (which was shockingly disrupted during the COVID-19 pandemic), national governments must simply "invest in[] hiring more—more people and building more and bigger border crossing points. This is not a realistic option given the economic[] climate in Europe" (Interview 1 with EU official, 2018). The digitization of borders is justified as a solution to neoliberal constraints, demanding a way of spending public resources that will reduce costs in the future, "[w]ith capabilities of technology to enable the border guards and national authorities to do more work with the same or [… fewer] resources" (Interview 1 with EU official, 2018).

Bordering as a matter of time: optimizing the passenger experience

The distinctive evaluative grammar of this justificatory repertoire tends to problematize the border as a *matter of time*.[89] In the economic and market repertoire, time is valued as a critical resource and is prominently featured in the narratives on digitization. Temporality is invoked not only as an *urgency* (as in the security and crisis repertoire) but also in the form of *time gained, spent, or wasted* at the border and its control procedures.

> [If] you look to the figures, how many travelers or people [do] we have arriving […]? How many are expecting to be there by 2030? There's no other way that we can move. We have to facilitate, so it's important, and the step is to be done now to make sure that you can maximize the use of our databases, and we facilitate the traveling. So, this is the time.
>
> (Interview 12 with EU official, 2019)

Digital borders and their underlying IT systems must facilitate travel and accelerate its control. For instance, the Smart Border Package not only proposed the EES (with its plan to biometrically register all entries and exits of third-country nationals); it also proposed a Registered Traveler Programme (RTP) that would process *bona fide travelers* across borders more quickly.[90] Although the detection of overstayers and the fight against illegal migration were officially declared objectives, the Smart Border Package framed the border predominantly as a matter of time and speed.

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[89] For an excellent example, see Sontowski (2018), who analyzes how smart borders have emerged as a contested object of what he calls *tempo-politics*.

[90] The RTP was abandoned in a revised proposal in 2016 because EU member states could not agree on the centralization of such a system. However, the ETIAS regulations have since been adopted, introducing a prescreening mechanism for visa-exempt travelers.

In this case, digital borders are justified by the promise of fewer queues and less waiting time at borders (often by introducing prescreening and preclearance techniques). Officials must frequently point out that border digitization follows an economic imperative: "Because you don't—the last thing you want is queues" (Interview 13 with EU official, 2019). Borders may need to be secure, but "economic considerations are more and more pushing [the idea] that we need as frictionless borders as possible" (Interview 4 with EU official, 2018).[91]

Tech and security companies mobilize this repertoire almost immediately. They routinely emphasize that airports and airline carriers required faster and smoother passenger flows to process more people. The "dream of seamless borders," as Broeders and Hampshire (2013) describe it, must be realized entirely through digital technologies: "For technology should be deployed in a way that it reduces the amount of time that the traveler should spend" (Interview 1 with EU official, 2018). Trusted categories of mobile people—those who may legitimately move in and out of the Schengen space for business and leisure—are framed as worthy (and thus, profitable) subjects by this repertoire. As a participant at an eu-LISA industry roundtable emphatically stated, the passenger must be at the center of all considerations; they should not be forgotten: "Sometimes the passenger side is lost in communication" (field note, eu-LISA Industry Roundtable, October 17, 2019). Or, as the Commission announced with concern, "The long queues, especially at airports, present a poor image to visitors to the European Union" (EC 2011a, 4).

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[91] The unfolding controversy surrounding smart borders also revolved around the various unfulfilled promises and flaws in digital bordering. For instance, it remained unclear whether smart borders would actually save time and maximize the economic benefit of travel. This was another legitimate form of criticism mobilized by the European Parliament in rejecting the EC's first proposal in 2013: the requirement of biometrically enrolling every new passenger at a border was expected to cause excessive waiting time for so-called bona fide travelers (Interview 19 with EU official, 2019).

In this repertoire of justification, migration management is measured against the legitimate proof of the *passenger experience* as well as the liberal fantasy of frictionless controls. Digitization is presented as mediating these two aspects—the personalization of border controls should generate more comfort in travel and is generally linked to consumption, tourism, trade, and investment. Smart borders thus ideally "[l]ook at the person, not their nationality" (Interview 4 with EU official, 2018). Another eu-LISA representative concluded, "[T]ravelers will feel better, they will feel better traveling here, they will invest more, they will feel far, far safer, together with us. So, all these expenses are, in fact, investments for the future of all" (Interview 3 with EU official, 2018).

Travelers—imagined as worthy, wealthy men and women—are subjects who "think big, oversee world markets, and do international deals throughout the world" (Boltanski and Thévenot 2006, 197). In this repertoire, their intention to freely cross national borders is understandable: the passenger's sovereign experience of travel should be, optically and symbolically, facilitated through self-serving kiosks, electronic gates, and automated border crossing gates—always with a view to the "symbolic effect of showing the EU as open to the world" (EC 2008, 6). Once enrolled in databases such as the EES and ETIAS, once the biographical and biometric information are provided, future digital borders can make the "experience of the travelers much more seamless […] and border checks much more transparent" (Interview 1 with EU official, 2018).

In conclusion, this repertoire's principle of worth is dominated by the (neo)liberal imperative of the circulation of capital, goods, and people across the globe: "[P]eople will be traveling borders without speaking to anybody [i.e., border guards]. They will be coming through!" (Interview 1 with EU official, 2018) At an online workshop with industry representatives and eu-LISA, a participant argued, "[T]he border of the future is much more person-centric." Ideally, the design of borders must fade into a virtual and fully transparent

environment, in which control is no longer situated in one particular place, having been extended and become multifaceted. In the economic and market repertoire, new databases are justified as future borders that can mediate and process travelers as potential economic capital. Any success of future borders will be evaluated against the greater good of benefiting the economy. In short, databases are solutions that determine "whether there will be lots of or few travelers and whether they will contribute to [the] economy" (field note, Visionbox online event, September 30, 2020).

7.3.3 The expansionist, industrial repertoire

I call the third repertoire the expansionist, industrial repertoire of justification. Here, the expansion and new buildup of digital borders are legitimized and offered as progressive solutions to problems framed as inefficiency, underdevelopment, or an insufficient degree of normalized control. It corresponds to what Boltanski and Thévenot describe as the *industrial world* that is ordered "based on the *efficiency* of beings, their *performance*, their *productivity* and their *capacity* to ensure *normal operations*" (2006, 204; italics in original). Accordingly, the envisioned state of worth is achieved by *normalizing* the transnationally organized management of European borders. Normalization is another core value for EU officials and is particularly emphasized by representatives of the European Commission.

Maximization and optimization

This repertoire differs from the economic and market repertoire, as it associates the EU's Schengen space with professional planning, infrastructural investment, expertise, standardization, and engineering (Thévenot et al. 2000, 243). At the same time, it finds common ground in the goal of organizing borders most efficiently to maintain Schengen as a smooth

economic space. European integration is often publicly promoted as a desirable common good, representing the values of progress, optimization, and efficiency—again, achievable through digital solutions.

The industrial repertoire is distinguishable from the security and crisis repertoire, but they often appear linked. Documents from the European Commission, for instance, frequently follow a formula that mobilizes one repertoire in the name of the other—i.e., new dataveillance systems become justified as useful instruments for producing more efficient border management and thereby suspending the state of insecurity. However, efficiency in this repertoire is emphasized in terms of normalized procedures and upholds technical standards to respond to the needs of border authorities, policymakers, citizens, and (bona fide) travelers alike. *Standards* are valued, as they can make border management *operational*—a crucial qualifier, for instance, in the legitimization of smart borders: "[C]ommon high standards of border management are essential to prevent cross-border crime and terrorism. It underlines that the revised proposal on Smart Borders will help to increase the efficiency and effectiveness of border management" (EC 2016c).

Operationalization, reliability, and feasibility count here as relevant forms of proof. An early "Communication on Effectiveness, Enhanced Interoperability and Synergies on Databases" from 2005 voiced concerns about the legitimacy of a new EES that must demonstrate proof of *feasibility*: "Although an entry–exit system would enable much more efficient and effective border controls, it would be a huge organisational step and might therefore be risky and costly to implement" (EC 2005, 9).

Industrial justifications are routinely mobilized when officials promise to tackle shortcomings and mistakes, seeking to create an environment of continuous optimization. Again, such modes of reasoning are repeatedly brought in line or coupled with security-focused documents in an attempt to provide more powerful arguments. The agenda-setting document

called "Communication on Stronger and Smarter Information Systems for Borders and Security" argued, "The existing information systems in the EU for border management and internal security cover a wide range of functionalities. However, there are still shortcomings in the systems that need to be addressed in order to optimise their performance" (EC 2016a, 7).

In the industrial repertoire, the digitization of border control procedures and the buildup of new IT systems must demonstrate the EU's ability to reduce organizational inactivity, bureaucratic inefficiency, and technical unreliability. IT systems are only as valuable as their actual ability to deliver information efficiently: "A number of information systems already provide border guards and police officers with relevant information, but these systems are not perfect" (EC 2016a, 19). Maximizing their potential and optimization are therefore crucial in achieving the greater good of *efficiency*, as envisioned in the documents and by EC officials, for whom digitization enables a "service-oriented architecture of European IT systems [that] would help maximise synergies and contain investments at a realistic level" (EC 2005, 10).

Advancing technological modernization

Specialized professionals and experts in this repertoire are usually considered capable of realizing this idea of worth, and their services are in demand by the European Commission and other EU agencies (such as eu-LISA). Expertise is considered a precious commodity; it is indispensable for understanding operational processes and the impacts of digital border management, particularly for guiding legislation and decision-making. As one official argued, today's politicians and parliamentarians "are reliant upon explanations from experts" (Interview 4 with EU official, 2018). Accordingly, EC representatives and agency staff frequently position themselves as responsible for providing policy advice and accurate knowledge for streamlining and synchronizing the handling of migrant data. In short, *technical*

expertise is portrayed as a key to rational policymaking: "So, in fact, our agency's strategy […] that is one of the objectives that we are there to facilitate [… is] the evidence-based policymaking at [the] European level" (Interview 4 with EU official, 2018).

Their purported capabilities in planning and projecting allow these professionals to perceive new digital borders as a wider governmental strategy or proceed in a certain strategic direction. In an interview, an official repeatedly alluded to an apparent "bigger story": "So, really what we try to do, and that's the bigger story, is to modernize police work and modernize border management work as much as we can in a situation, where, I said, we should have started this 20 years ago" (Interview 13 with EU official, 2019). In this example, digitizing the European border regime is presented as a step on the long-overdue trajectory of modernization: "I mean, in a way, as everyone knows, governance is always lagging behind on the real development in society, and, also, technological developments in society. So, what we are doing now is really long, long overdue" (Interview 13 with EU official, 2019). Similarly, a high-level eu-LISA representative stressed the importance of expert knowledge and capabilities for governing the ever-increasing amount of migration and border data—a core feature of what he called "the modern world today" (Interview 1 with EU official, 2018).

In the industrial order of worth, according to Boltanski and Thévenot's framework (2006), technology serves professionals as *worthy people* "who have a *professional qualification* […] related to their capability and their activity" (p. 206; italics in original). Likewise, digitizing, for instance, is seen not simply as a matter of innovation but of "unleashing" the hidden potential of professionalism in trained specialists: "[T]he idea [… is] that by asking a machine to do the donkey work, the professionalism of the border guards would be released, unleashed, to do real human work that is needed" (Interview 13 with EU official, 2019). New digital borders, in this sense, relieve border guards from mundane, mindless tasks and support specialized intervention in migration management; they help authorities cope with

"multiple new challenges" (field note, eu-LISA Industry Roundtable, April 24, 2019). Again, the introduction of digital technologies and databases seemingly corresponds to ordinary operations and modernization: "I mean, our border guards are still equipped with 19th-century equipment: a paper passport and a stamp, and ink. And that's how they do their work" (Interview 13 with EU official, 2019). Ultimately, this repertoire justifies digital solutions as realizing *normalization and efficiency*—solutions that must operationally guarantee governmental adaptation to and modernization of social control over mobile populations.

Expanding the European technological state

A related state of worth is articulated in the wider agenda of European infrastructural integration and expansion. These new IT solutions must reflect the idea of Schengen governance as a "success story" and "a unique, historic accomplishment" (EC 2008, 2). For example, the official quoted above (Interview 13 with EU official, 2019) boasted about how his professional workforce would represent a "small universe" that is "at the center of a lot of things,"—i.e., they would be responsible for technological projects "on such a big scale." The expansion of existing databases, the creation of new ones, and the initiative to build interoperability served, for him, as drivers of supranational sovereignty: "Of course, national databases won't help you very much. And in a way, it is really surprising that today, in 2019, which is 34 years after Schengen started, that we still don't have something simple like an Entry/Exit System" (Interview 13 with EU official, 2019). In these examples, officials tend to merge the vision of European integration with the distinct idea of technological expansion. In this repertoire, the growth of digital borders is legitimized as a tool of gradual integration by expanding the European network that spans the continent (and beyond). Digital borders are perceived as interfaces of global trade and exchanges; *they project global order*: "[W]e don't speak about

borders at [a] European, let's say, geographical level, but here we speak about a global, global impact" (Interview 3 with EU official, 2018).

Appadurai (2013; 2012) identifies expansion as an integral element in the logic and ideology of what he calls *trajectorism* (and which he traditionally connects to Europe's imperial project of world domination). The twin concepts of modernization and technological expansion link European development to a telos toward which both change and stability are directed: "[T]ime's arrow inevitably has a telos, and in that telos are to be found all the significant patterns of change, process and history" (p. 225). This repertoire of justification also frames digitization as a trajectorial undertaking—new digital borders are both corrections to Europe's neglected past and signposts of Europe's future. Europe is simply "lagging behind the experience of others, of other countries" (Interview 1 with EU official, 2018; cf. field note, eu-LISA Industry Roundtable, October 17, 2019). "Being late" or "lagging behind" is often explained as the outcome of Europe's complex political constitution, which tends to curb the speed of progress. However, intergovernmental cooperation also offers opportunities for experts and professionals to demonstrate European progress to the world:

> There's always [a] challenge; what we are doing is very innovative. If you look around, you have it in the United States; in fact, we're late if you compare it to the rest of the world. […] But if you have the opportunity, look to the dimension of their [US'/other countries'] systems […]. We are doing everything at once, and the volume of applications […] that we are […going to] be dealing with from the beginning, you cannot compare.

> (Interview 12 with EU official, 2019)

Trajectorism is a powerful style of thought in the industrial and expansionist repertoire of justification: the development and implementation of new digital borders are opportunities to "catch up" and "make progress" toward the inevitable telos of Europe, pushed forward by this repertoire's worthy people like experts and professionals. At the same time, Europe is presented as a gradually unifying political entity in competition with other large capitalist nation-states of the Global North that have made similar investments in large-scale border dataveillance—e.g., the United States, Australia, or Canada. Thus, mobilizing the industrial and expansionist repertoire not only emphasizes the values of efficiency, maximization, normalization, and optimization but also invokes a sort of European techno-nationalism (Edgerton 2007), showcasing the making of a united political community and its expansionary push to impact global order.

7.3.4 The project and logistics repertoire

The fourth and last repertoire of justification is what I call the project and logistics repertoire. To describe it, I draw on Boltanski and Chiapello's (2005; 2018 [1999]) *The New Spirit of Capitalism*, in which they thoughtfully trace the emergence of *projectivist* narratives, ideologies, and values. In the EU's digital border regime, many of the elements and values of the project and logistics repertoire have become increasingly prominent with the establishment of the eu-LISA agency in 2012, its subsequent rise, and its highly visible interaction with the industry.[92]

The *state of greatness* in this repertoire is evaluated against values such as experimentation, adaptability, flexibility, and connectivity. Sharon (2018) argues that

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[92] Accordingly, these are the actors who mobilize this repertoire most visibly and frequently. It remains less frequently used by actors such as national delegates or operators who are concerned with adapting their practices to new legislation or who must manage IT systems on the ground.

"[m]obilizations of the project repertoire will be at work wherever notions like experimentation, innovation, 'thinking outside the box' and 'shaking things up' are promoted as valuable" (p. 7). Information technologies seem to belong to the *natural directory* of the repertoire's worthy objects, and they are unambiguously celebrated and promoted. Actors must therefore create an environment that allows their full realization, as these technologies are the harbingers of an innovative future. The rhetoric and logic of this repertoire are often dominant at conferences and policy meetings where actors can demonstrate their innovative, anticipatory mindsets (see also chapter 5, section 5.3.2). The development of border databases represents milestones on a "digital journey": "[T]his is [an] ongoing process; it hasn't finished yet" (Interview 1 with EU official, 2018).

Conjuring innovation power

The mobilization of this repertoire alludes to the alleged power of technological and infrastructural *innovation*. Technology must evolve for innovation to flourish; experimental and flexible approaches toward its development and implementation are valuated as essential qualities of governance. At a conference, a policymaker quoted Henry Ford on his PowerPoint slide to invoke the need for the innovative disruption of the status quo: "If you always do what you've always done, you'll always get what you've always got" (field note, eu-LISA Conference, October 16, 2019). Emphasis here is placed on the hidden potentials and synergies of digital solutions for border control. They are not necessarily associated with concrete databases but rather promoted as a broader concept enabling the multiple enactments of technology. For instance, "[T]he smart border is not only one system, it's many systems. It's different obligations and possibilities. We are not blocking the situation, limiting choice, but open[ing] possibilities to different border control" (field note, eu-LISA Industry Roundtable,

April 24, 2019). Digitizing borders, unlike in other justificatory repertoires, articulates a powerful process that evolves quasi-autonomously and creates a technological momentum for societal and political change: "It is simply because technology is evolving!" one conference participant proclaimed (field note, eu-LISA Industry Roundtable, April 24, 2019).

In the *project world*, society naturally adapts to digital innovation, which is repeatedly associated with automation and scalability. Obstacles to development are explained by the unfortunately low levels of public acceptance of non-human labor or automation. In these narratives, members of the public, travelers, or even border guards require a longer learning curve to adjust to the new digital systems that must be taken into consideration. The project of interoperability, for instance, is justified as a gateway to automatization but requires *change management* in the way border operators work. Likewise, smart borders are envisioned as leading to further automatization, potentially steered and driven in the future by applications of artificial intelligence or blockchain technologies (field note, eu-LISA Conference, October 16, 2019).

Actors also mobilize this repertoire of justification for signaling their anticipation of the future as a particularly important epistemic orientation. They can thereby demonstrate *positive thinking* about innovation and articulate their expectations for future success, which are displayed by slogans at conferences, such as "We can and we will succeed" or "We should be able to envision what is possible in [the] future" (field note, eu-LISA Conference, October 16, 2019).

Striving toward logistical networks

The project world conveys a figure of order in which the "world's natural form resembles that of a network" (Boltanski and Chiapello 2005, 169). In this instance, justifications are not simply

attached to the prominent theory of the EU as a network society (cf. Castells 2010); instead, the network should operate as a "functional principle of transnational sovereignty. The figure of a network promises unlimited potential for connectedness" (Papadopoulos, Stephenson, and Tsianos 2008, 30). In this sense, the repertoire promotes values of what is generally considered "good management," dominated by the ideal of perfect calibration or coordination of movement of people and things, expressed in the language of transport, communication, and economic efficiency. Moreover, claims that interoperability can overcome *borders in silos* or *break existing silos* stand as exemplary metaphors for doing things *horizontally* and in a *transversal* manner. In this grammar of worth, collecting and storing data—*connecting the dots*—are inherently positive values, as they solve the "problem" of disconnection and disrupted flows. As one eu-LISA presenter claimed, "nobody lives in silos anymore" (field note, eu-LISA Conference, October 16, 2019).

Networks are also proposed as the most valued form of partnership with the security industry, tech companies, carriers, and state actors alike in order to complete European border dataveillance. Invoking this "connexionist world" (Boltanski and Chiapello 2018, 136), the use of logistical language stands out when describing the benefits of a growing "community of stakeholders" (including both public and private sectors) in joint consultation and cooperation. eu-LISA officials frequently link this creation and management of new digital borders with the project of networking among actors: "So yes, our stakeholder community will grow constantly, and we will have to develop further cooperation with all, all our stakeholders" (Interview 1 with EU official, 2018). In the words of another official,

> Of course, we are in close contact[] to try to listen [… to] our partners everywhere
> [… in] the world. What were the problems, how they dealt with the problems. So,

> we try already to learn from it, try to avoid things. We are in very close contact with
> the industry […].

<div align="right">(Interview 12 with EU official, 2019)</div>

The agency's biannual industry roundtables as well as its annual conferences are therefore considered best practice examples for establishing contacts, exchanging ideas with the industry, brainstorming, and sharing knowledge. In these spaces, *mediation* is presented as a positive value in itself (Boltanski and Chiapello 2018, 207). It enables the creation of networks through which worth is actualized and propels projectivist qualities like adaptability, problem–solution capabilities, anticipation, and flexibility.

Being active, being on a "mission"

As we have seen in previous chapters, events organized by eu-LISA feature presentations and statements that often draw heavily upon the project and logistics repertoire of justification. This corresponds to eu-LISA's renewed 2018 mandate that encourages the agency to carry out pilot projects, proofs of concept, testing, or research in a more independent manner. It also allows the agency's participation in the "EU Framework Programmes for Research and Innovation." eu-LISA frequently employs the notion of *center of excellence* to value itself as a space of evolving expertise, new developments, novel ways of working, and gradually expanding experimental activities. As an experimental site of infrastructuring borders, the eu-LISA agency can strengthen its perception as a vanguard in digitally transforming the border regime (see also chapter 3, section 3.6.2).

Accordingly, eu-LISA representatives present themselves as innovative experts working with experimental modes of research and development. This is an integral element of this justificatory repertoire: making digital borders is part of a broader project with a "mission."

On a PowerPoint slide presented at eu-LISA's annual conference, an eu-LISA representative stated that "[i]t's the act of getting the right information at the right time, to the right person, with the goal of furthering an agency's mission." The quote ended with the phrase "technology simply enables the mission" (field note, eu-LISA Conference, October 16, 2019).[93] Similarly, in his speeches, eu-LISA's executive director invites participants "to join in this broader project" (field note, eu-LISA Industry Roundtable, October 17, 2019). New databases become partly legitimized because of this project's *uniqueness* and the willingness of those involved to "do the impossible"—as another official told me. The extent to which digital borders have been built up and managed today is "something which for many people has been considered […] impossible" (Interview 13 with EU official, 2019).

When the project and logistics repertoire of justification is mobilized, technological innovation is a means to realize worth and can thus drive the conditions of social reality. This means that one must demonstrate *activity* as a paramount condition for establishing value— "what is relevant is to be always pursuing some sort of activity" (Boltanski and Chiapello 2005, 169). The constant need for staying active is promoted here: "We don't have the luxury to sit and enjoy what we have achieved so far, we need to continue" (field note, eu-LISA Conference, October 16, 2019). The agency of worthy subjects in this repertoire must be activated to deploy their "creative potential to solve technical problems and to seek new areas of expansion, while discouraging ethical reflections about their activities" (Feldman 2015, 56).[94] Additionally, building and expanding new databases is ultimately legitimized to expand technological innovation, to remain active, to move in order to not be interrupted—no matter how empty or

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[93] The symbolic background of the slide depicted technologically mediated neural networks. The quote can be seen as a typical motivational statement used to invoke the agency's greater mission.

[94] See Feldman's useful remarks (2015, 53–84) on the relationship between activity and connectivity and the atomization of the individual in neoliberal society.

tautological the value of the activity may appear. The evocation of activity is in any case frequently present as an eu-LISA semiofficial slogan: "We're making it happen."

7.4 Frictions and contradictions: compromised repertoires

In the previous sections, I have identified four distinct repertoires of justification, their valuation principles, and grammars of worth. The explanation and legitimization of the making of a digital border infrastructure rest upon different values and criteria of worthiness. The repertoires of justification demonstrate the multiplicity of this value landscape that (re)produces and sustains digital solutionism.

At the same time, one repertoire seldom appears alone in policies, presentations, or disputes. Far more often, repertoires are mobilized in combination or alongside each other, especially when actors engage in narratives where some of the familiar arguments of one repertoire amplify the values of another. Industrial and expansionist arguments are frequently linked in order to support narratives of (in)security, or they are combined with the values upheld in the economic and market repertoire. Promoting increased efficiency through digital means is easily related to the goal of reinforcing overall security as the main desirable state of order. On other occasions, arguments in the project and logistics repertoire agree with or serve the principle of maximizing efficiency in digital border management. Simply put, justifications can build on multiple values, valuations, and criteria of worthiness drawn from different repertoires.

At times, however, we can also observe *frictions and contradictions* between the repertoires' different values and generalized principles—these are situations in which agreement and consensus are not so easily achieved. When different repertoires are at odds with each other, actors need to find *compromises*. Compromised repertoires, according to Boltanski and Thévenot (2006), "keep present beings relevant in different worlds, without trying to clarify

the principle upon which their agreement is grounded" (p. 347). In other words, they draw on values and elements of different repertoires but do not fully articulate their higher principle or state of worth, as this would render the argument inconsistent and delegitimized. Actors must also find and construct compromises in order to navigate structural frictions and contradictions (Outhwaite and Spence 2014, 430). In the remainder of this chapter, I will reflect on two classic tensions and compromised repertoires that frequently surface in the justifications of new digital borders as solutions.

7.4.1 The security/facilitation dilemma

The promise of speed in digital border control is an important value in the economic and market repertoire of justification. At the same time, the expensive and complex enrollment of an ever-increasing number of travelers in new biometric databases (e.g., the EES) has put this promise to the test, threatening to render it inconsistent with reality. The Commission and the eu-LISA agency have carried out pilot programs and studies to obtain acceptable results that conclude that biometric enrollment can be carried out at borders without creating longer lines for business and *bona fide* travelers (see eu-LISA 2015b). These repeated practices of testing and evaluation had to uphold the assumption that digital solutions *could* align economic worth with the ever-increasing imperative of security. They had to generate a compromise between repertoires that allowed actors to legitimately make a claim for digital borders but also navigate an age-old dilemma: on the one hand, borders need to fulfill the desire for greater security by preventing illegitimate movements, which are classified as risks; on the other, they must be interstices that ensure global circulation (of people, goods, and capital)—the imperative of a liberal economy (Amoore 2006; Broeders and Hampshire 2013; Leese 2016).

Legitimacy can only be achieved through a compromise that ascribes new digital borders to a single goal. As one interviewee told me, "So there are two aspects of the same aim,

I would say, […] that is to have stronger external borders, protecting from threats, open to mak[ing] sure that the bona fide travel[ers] can, in an easy way, enter and travel[] within the European space" (Interview 12 with EU official, 2019). We may also recall the example of the Smart Border Package (2011) that combined the EES with plans for an accompanying RTP. On its own, the EES had been associated with and criticized for introducing "police state techniques" and for being too complicated and costly (Interview 13 with EU official, 2019). However, framed within the language of smart borders and in conjunction with the RTP, borders could now be framed not as "sites of control where unwanted crossing should be prevented but as obstacles to desirable movement themselves" (Sontowski 2018, 2733). Although detecting so-called overstayers remained a core goal of the EES, the European Commission emphasized that border management, in its current state, could *not* exclusively focus on reinforcing security and control. In other words, digital borders are re-problematized, and therefore justified, by introducing a wider range of technological artifacts and elements that would accompany smart borders—e.g., the improved passenger experience, the automated gates, or the time savings that would come with the Smart Border Package.

The dilemma of borders—facilitating movement (important in the economic and market repertoire) vs. securing it (in the security and crisis repertoire)—is apparent and has been frequently addressed by officials (see Figure 10 below). For example, officials speak about the well-known "frictionless border conundrum" (Interview 4 with EU official, 2018) or wonder "exactly how we can escape from that, how can we stay open. So, we don't want to close our borders, […] we simply want better border checks, okay?" (Interview 3 with EU official, 2018).
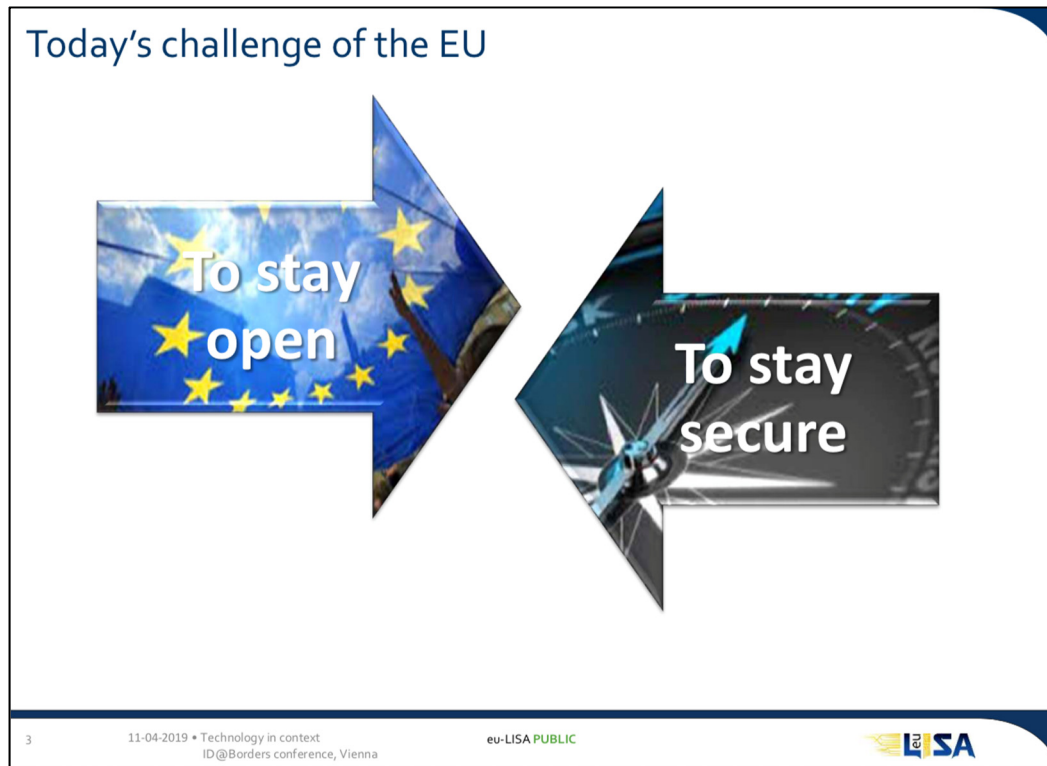
Figure 10. "Stay Open, Stay Secure"—an eu-LISA presentation at the OSCE "ID@Borders" conference, April 10–11, 2019. Courtesy of eu-LISA.

Digital solutionism is offered precisely because a compromise between two dominant repertoires is achieved. Digitization becomes a way to "bridge this gap" and provide a "solution to these contradictory requirements" (staying open vs. staying secure), as a high-ranking EC representative proclaimed at a conference in 2019. This presenter saw the "migration crisis" as a serious challenge to the EU; however, although this crisis is much more "visible" on the surface, it would not change the fact that Europe still needs the "best of both worlds": "[W]e want faster border controls and, at the same time, we want security!" (field note, eu-LISA Conference, October 16, 2019).

Of course, the compromise solution for two repertoires cannot fully resolve their contradictory higher principles of worth. Instead, it revolves around a profound paradox that

Michel Foucault describes as the "game" of freedom and security in his lecture on the governmental reason of liberalism.

> In short, strategies of security, which are, in a way, both liberalism's other face and its very condition, must correspond to all these imperatives concerning the need to ensure that mechanism of interests does not give rise to individual or collective dangers.
>
> (Foucault 2004, 65)

A large part of the strategies of (border) security is based on the expectation that databases, and the associated biometric technologies at the borders, can ultimately render this dilemma invisible if flows of mobility are made fully transparent and detectable. As one official claimed, "ideal border management, for me, is secure and almost *invisible*. So, if it is enhanced security, but we create kilometers of queues at the border, then we are not doing things in a good way" (Interview 9 with EU official, 2019; emphasis added). In turn, this requires making travelers and their bodies maximally visible—i.e., in ways that allow their assessment, categorization, and clearance in terms of risk—ideally, prior to their travel, so their movement can be authorized or arrested. In figurative terms, the digital (or biometric) body must become the border—i.e., once the body remains completely transparent in a database, actionable at all times, control is finally made invisible (Muller 2010a, 95; see also Amoore 2006).

7.4.2 The technology/sovereignty friction

The state's power of decision-making at the border—to allow or refuse entry to a person—is always an articulation of state sovereignty, of retaining control over state territory and the populations who enter it (Torpey 2000). Implementing digital borders and digital procedures at

border checkpoints represent typical sites where the sovereign decision of border control is potentially transformed, negotiated, or contested (Bigo 2014; Johnson et al. 2011). This can also be observed in the automatization procedures highly valued in the project and logistics repertoire. Automatization (i.e., algorithmic screening and decision-making) introduces a "gray area," as one EU official described it. Political entities and national authorities are highly sensitive to automatization potentially affecting their sovereign decision-making power: "And that is why every debate about automatization is immediately a dead end, as it is seen as an equivalent for making final decisions on the European level" (Interview 14 with EU officials, 2019).

A series of slides presented by an eu-LISA representative illustrates how the project and logistics repertoire of justification makes the friction between technology and sovereignty visible (see Figure 11 below). At a conference, one eu-LISA representative mobilized the values and criteria of worthiness in the project and logistics repertoire to legitimize (the need for) further digitizing border policing: "New challenges" (not further specified) would prove the urgent need for law enforcement to "rapidly become a more technology-adept and -driven service." This alarming call was visualized on two PowerPoint slides with concentric circles in different shades of blue, seemingly representing the virtual world of connectedness, numbers, and data points. They followed two earlier slides that contrasted this project and logistics world. The first slide depicted an aging national police officer, wearing glasses and holding a radio device in his hands, standing in front of several German police cars. The officer symbolized the anachronistic past of non-digital, non-automatized police work. The person, the devices, and the cars then faded away on the second slide—having represented "traditional policing" that is no longer capable of coping with the "new challenges" of the virtualized world.

In this short vignette, the project repertoire's state of worth of virtual connectedness is envisioned for the justification of digitalization; its values are presented under the rhetorical

guise of contrasting the old-fashioned, non-digital world with an innovative, alert, digital world to which society must adapt. It reflects the repeatedly articulated visions of officials who "hope that we can largely eliminate the human factor in border control" (Interview 21 with EU official, 2019) or who embrace ideas such as, "We don't need intervention of border guards, we have full automatization. […] If the person is known to EES – no problem!" (field note, eu-LISA Industry Roundtable, April 24, 2019). At the same time, the repertoires' (e)valuative principles and criteria of worth, especially automatization, come into conflict with national authorities' claims for sovereignty at their borders, traditionally embodied by the national police or national border guard. These criteria thus contradict some of the core values upheld in the industrial repertoire, which fosters normalization, optimization, and professionalization through digital solutions that must *increase the abilities* of professionals (such as border guards). Moreover, digitization as automatization may suddenly imply a shift in sovereignty—away from the border guard as the representative of state authority toward the realm of European-driven databases and supranational decision-making. One representative expressed his concern: "[W]e need to really define what are the processes, what are the decision-making lines, and what's the role of member states" (Interview 26 with member state representative, 2019).

Figure 11. "A More Technologically Adept and Driven Service." Two consecutive slides presented by eu-LISA at its annual conference in 2021. Courtesy of eu-LISA.

Sovereignty is, of course, a long-standing contested issue at the heart of European integration, prominent in realms such as security, economy, or health. In the context of making the digital border infrastructure, EU officials must carefully navigate this discord. One option, again, is to forge a fragile compromise between repertoires of justification—i.e., a project–industrial compromise—to make diverging principles of worth temporarily compatible. For instance, Commission and eu-LISA representatives frequently make exaggerated claims that border

guards must not be replaced and will not be made obsolete. Digitization may require an adaptation to information technology, data systems, and new data practices, but it will provide *technological assistance* to national authorities in *making their own decisions*: "It's just to make sure that you facilitate the process. […] But instead of this border guard [… wasting] time to check and mak[ing] a rushed decision, he has all the information […], so you [are] help[ing] him do[] his job. So, we are not replacing him, that's very important!" (Interview 12 with EU official, 2019). The pursuit of compromise serves to overcome the ongoing friction caused by different repertoires of justification and their divergent higher principles of worth. The role of such compromises should therefore not be underestimated: these are core modes in the politics of acceptability and key competencies of transnational bodies and agencies that find themselves under constant scrutiny from member states. Furthermore, by mobilizing several repertoires of justification without fully disclosing their generalized principles of worth, compromises can temporarily legitimize and stabilize the digital solutionism in the border regime.

7.5 Discussion

In this chapter, I conducted a *valuography* of the digital border regime through unpacking the different repertoires of justification, their values, criteria of (e)valuation, and higher visions and principles of worth. These repertoires are collectively shared ways of enacting and justifying solutionist ideas of digitization. They illustrate how solutionism is not based on a single master narrative or overarching rationale. Instead, it must be persistently reenacted through different repertoires of justification, which argue for, assess, valuate, and legitimize new digital borders as solutions.

We have seen the multiplicity of arguments and valuations that are mobilized for justifications and underscore the imaginaries of digital borders today. As perhaps the most

evident form of justification, the *security and crisis repertoire* postulates that the expansion of the digital border infrastructure guarantees security as the core civic principle of worth, drawing a boundary between the subjects of a civic community who are worthy of the realization of its principle and those who are unworthy and a potential threat to it. The *economic and market repertoire* valuates new digital borders as a means to generate its higher principle of worth in terms of profit through exploiting global mobility. In the *industrial and expansionist repertoire*, actors see the state of greatness in the realization of *efficiency*, achieved through valuable processes such as normalization and optimization driven by professional capacities. Lastly, the *project and logistics repertoire* thrives on higher values and practices such as innovation, experimentation, adaptability, and flexibility. We have argued that contemporary solutionism in the digital border regime tends to increasingly rely on invoking the elements and values of this last repertoire, not least by making the eu-LISA agency a central node in orchestrating the network between various governmental actors and the industry. It is also this prominent repertoire that is responsible for the most rigid techno-determinist ideologies in the border regime (see also chapter 8), where digital technologies, databases, and algorithms are part of the repertoire's natural directory and—as unquestioned drivers of innovation—call for social and political actors to adapt to technological developments.

Moreover, the COVID-19 pandemic has been dominating the political discourse for the last two years and across the globe. National health has become a central value in justifying the new construction and closing of borders to ensure security. It would be worthwhile reflecting on whether a new repertoire of justification has emerged centering on health. It is not difficult to imagine how this new repertoire will also become a dominant factor in justifying future digital borders—based on values such as vitality, life, and hygiene (see also Sharon 2018).

The chapter also highlighted how justificatory repertoires reflect the persistent dilemmas and divisions that plague the EU border regime and its buildup of a digital

infrastructure. Justifications lay bare the often incommensurable ways in which the digital transformation of borders is taking place. Actors need to find creative compromises that mobilize diverging criteria of worth without fully articulating their generalized principle. They do so to help temporally stabilize digital solutionism and navigate these divisions, such as the dilemma between security and economic profit or between the introduction of innovative EU technology and the protection of national sovereignty.

Repertoires encapsulate the values, morals, ideas, and problem–solutions that underlie the imaginaries, dreams, and visions of social actors. They shape the speech, text, behavior, and interaction of agents, institutions, and technologies. Justifications are therefore central modes of operations in the complex politics of acceptability through which digital solutionism is enacted in Europe's border regime. This perspective may also sensitize the analytical vocabulary we need to develop our own effective critiques of the border regime's digital solutionism and better understand the conditions of legitimate dispute. It is thereby not only important to formulate *legitimate and acceptable critiques*, based on valuations and value criteria of respective repertoires; we must also devise strategies that can ultimately render the creation of digital borders and their ongoing expansion—as solutions—*unacceptable*.

8   Concluding Discussion: The Problem of Techno-Determinism and the Power of Imagination

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This thesis presented the eu-LISA agency as an empirical laboratory to explore the digitization of borders in Europe. In previous chapters, I analyzed how collective imagination features prominently in the formation of the epistemologies, values, knowledges, and representations that produce and justify the expansion of digital infrastructure and sustain digital solutionism in the EU border regime. This concluding discussion will draw together some key findings and condense them into three main concluding theses. This chapter, therefore, does not provide a detailed summary of every empirical finding presented in the thesis. Instead, the concluding theses allow me to better highlight some of the problematic implications and dangers of Europe's digital border regime. I also intend for them to encourage further reflection on how to counter the worrying trends and practices in contemporary digital bordering.

The first section, which includes Thesis 1, critiques the specific assumptions, underlying techno-determinist rationale, and misleading and problematic aspects of digital solutionism. This section thereby revisits the concept of the inevitability of technological change and the various solutionist promises inscribed into the projects and policies of new digital borders. The second section, which contains concluding Theses 2 and 3, discusses the powerful effects of sociotechnical imagination in the border regime, specifically simplification and abstraction. It problematizes the simplified understandings of digital border and migration management, which discursively place officials in positions of control and authority while allowing them to conveniently distance themselves from the complex and messy realities of cross-border

mobility. This section criticizes the creation of what I call, with reference to Cohn (1987b), *sanitized realities*, which strategically remove the urgent questions of responsibility and accountability from the discourse on the injustice and violence that occur at Europe's borders. On a final note, I briefly reflect on some possible directions for reimagining digital technologies in the border regime, recentering our visions for how to respond to mobility and developing a politics of responsibility.

8.1 Against techno-determinism

Thesis 1: Digital solutionism has emerged as a specific form of techno-determinism and is repeatedly enacted to normalize and justify the construction of digital border infrastructure in Europe. Solutionism has problematic implications because it routinely frames IT systems and border technologies as indispensable requirements for adapting to technological change that comes with its own predetermined moral codes and presumable progress. Moreover, solutionism appears as a (naïve) promise for mastering the challenges and complexities in the management of mobility.

Previous chapters explored the category and role of sociotechnical imagination as a powerful reservoir for framing and building social order, directing epistemic and technopolitical orientations, and imbuing styles of collective reasoning and justification. I investigated the agential capacities of shared visions of border (in)security in the project of infrastructuring the border regime. Through the prism of eu-LISA, I examined the core narrative elements and practices that interweave promises, ideas, futures, and fictions with the construction and maintenance of large-scale databases in Europe. For example, Part II examined some of the agency's activities, such as its design of a wider sociotechnical imaginary of digital

transformation or its handling and maintenance of data. Part III proposed two main sites of infrastructural experimentation, where digital solutionism was enacted in the making of smart borders and interoperability.

Let us return to the statement made by eu-LISA's executive director that was cited in the introduction of this thesis (see Introduction, pp. 10–11). The director declared that "the virtual world of IT is now part of the equation" and emphasized "the importance of sophisticated, flexible and integrated IT systems and solutions." The analyses in previous empirical chapters allow us to identify two tacit, mutually reinforcing positions in this statement, against which the undertaking of this thesis was directed. The first position is the *inevitability* of technological change, which suggests that digital transformation is a nonnegotiable part of the future and specific technological measures (such as the production and ever-growing collection of data) must therefore be embraced by governments. The second position entails the *solutionist promises* of digital technologies and data for the management of borders and migration. This position holds that the expansion of databases will allow us to master the challenges, complexities, and uncertainties brought about by our global world and its multifarious forms of mobility.

As the empirical findings of this thesis suggest, both positions are problematic. Inevitability is a fundamentally flawed concept that seeks to prepare us for the permanent arrival of a so-called virtual world and digital future. As a determinist concept, inevitability is dangerously misleading because it equates digital change with progress. Moreover, it presents the virtual as a black box, only rendering visible its presumed input (i.e., data and information) and promised output (i.e., greater security, better cooperation, etc.). Inevitability both obfuscates and naturalizes the virtual—ignoring its controversial histories, the infrastructural inner workings, or the complex networks that must bring it into being and hold it in place. The position of inevitability also ignores the multiple performances, various interests (political and

economic), disparate goals of actors, and arduous infrastructural work that shape our sociotechnical trajectories. The investigations in this thesis have therefore aimed to unseal the black box and attend to the manifold social, epistemic, and material practices at eu-LISA that are necessary for realizing future digital borders.

The position of inevitability is not only encountered in the digitized domains of border and migration regimes. Technologies today are frequently viewed as powerful instruments that penetrate social structures, political institutions, and individual bodies or subvert the fundamental assumptions about human life and the building blocks of our social order. However, such narratives must not obscure the complex, co-productionist relationships between society and technology nor the network of actors, imaginations, practices, and material infrastructures that mutually sustain or transform these relationships. The idea that technological development is inevitable mostly ignores these relationships and promotes instead the notion of technological change as "an out-of-control history-shaping process" (Dafoe 2015, 1048). The sheer force of invention and innovation is presented as an unstoppable or irreversible technological momentum, largely independent of social forces.

Jasanoff (2016) accurately characterizes this fallacy as a *determinist trap*, which "suggests that technology sets its own moral codes, and public values simply catch up later" (p. 145). The empirical examples discussed in this thesis have exposed this fallacy in numerous ways. The fallacy was traced, for instance, in the performances of eu-LISA's digital transformation imaginary that was narratively framed as a unidirectional and inevitable process. Moreover, this determinist trap was detected in the making of database interoperability, which was performed as an irreversible momentum toward a necessary policy fiction. This fallacy is thus frequently articulated in official narratives, public statements, presentations, and policy documents and communications. In sum, the construction of new databases and increasing data collection have emerged as sine qua non for governing all manner of cross-border mobility—

the movement of both wanted travelers and unwanted intruders. The position of inevitability tends to immunize these otherwise contested policy trajectories and technopolitical interventions. It is therefore crucial to reject this position in governments' internal logic and strategies and refute the claims that large-scale IT systems for borders are indispensable elements of sociopolitical order.

This thesis also argued against the naïve promises and principles of solutionism. The empirical chapters demonstrated that new digital borders were never merely ready-made solutions or simple outcomes of rational scientific thought and planning. Instead, the various chapters' contributions decoded digital solutionism as a specific set of beliefs and values held by elite actors that must be continuously reenacted in order to accredit and justify the ongoing infrastructural investments in the EU border regime. In its most frequently articulated form, solutionism structures the projects and policies of new digital borders in ways that uphold the fictions of certainty, unambiguity, and mastery over complex, messy realities and ever-changing flows of mobilities. As a result, digital solutionism of this kind possesses a troubling yet attractive *eschatological quality*. It promises future rewards, the realization of governmental desires, and the materialization of border security through technological change.

Although several repertoires of justification (e)valuate and legitimize new digital borders as solutions based on different criteria of worth (see chapter 7), solutionism always assumes that once databases and new border technology are implemented, they operate flawlessly, dutifully delivering on the promises, values, and benefits of digitally mediated bordering. In any of these justificatory repertoires, databases become finely tuned machines that must meet the security, economic, efficiency, or logistical demands of governmental actors. The assumption of their effectiveness in delivering on these promises also haunts the critical analysis of digital borders: by leaving untouched the predefined problem–solution constructions and the inherent biases that underlie professional planning and technological development,

critical analysis can, at times, involuntarily confirm the policy claims and justifications of government officials or industry representatives.

Ultimately, the promises of solutionism also perpetuate what Jasanoff (2016, 21–26) calls the *myth of unintended consequences*. In this scenario, the repeated failures of technologies or their violent or harmful social repercussions are always perceived as mere anomalies or deviations resulting from a lack of adequate foresight (usually on the part of policy professionals or technical experts). The myth must reassure us of the (presumed) perpetual, progressive character of technological transformations. The myth of unintended consequences and digital solutionism are thus two sides of the same coin: if technology fails as a solution, it is only because its consequences have not been adequately foreseen, and experts and designers simply need to readjust their technological initiatives. Both diagnoses, however, build on what border experts, professionals, and designers define as the gap between *what is* and *what ought to be*. Both diagnoses only reinscribe the problem–assumptions, solutionist promises, and normative justifications in the design and development of digital border infrastructure in Europe.

8.2 Against simplification and sanitized realities

Thesis 2: The collective modes and conditions of sociotechnical imagination produce a temporary sense of coherence and collectivity and bind together the heterogeneous groups of officials, professionals, and delegates in the border regime. Sociotechnical imagination also produces the effects of simplification and abstraction, through which actors frequently position themselves as experts and planners who are in control of the messy, complex, and uncertain realities of border and mobility governance.

The study of eu-LISA in previous chapters revealed the agency's key role in creating a collective path of continuity, by, for instance, repeatedly invoking what it calls its *common journey*. Not only does sociotechnical imagination shape the discourses, narratives, and representations of borders, but it also produces—at least at certain times and specific sites—a sense of joint membership and collectivity among the dispersed network of actors, practices, and technologies. I have also emphasized the specific conditions and strenuous efforts necessary for drawing in the variety of actors and performing moments of collectivity and coherence: repetition of policy events, meticulous conference settings, or standardized patterns of communication, for example.

The agency's digital transformation imaginary, analyzed in chapter 3, is an excellent example of how a particular future was embedded, and only gradually stabilized, within a wider network of stakeholders. The imaginary combined fact, fiction, and emotion in addressing these actors as a joint political community sharing a common future. Once the imaginary was sufficiently collectivized, its vision of digital border (in)security appeared compelling and totalizing, creating potentialities for action, and silencing voices of dissent. In another example, I analyzed eu-LISA and its self-presentation as a European spokesperson whose performances of infrastructure sought to foster ideas of European identity and infrastructural integration (see chapter 4). The agency was promoted and interpreted by officials, agency experts, and other actors as an organization that could create unity out of fractionality and order out of disorder. Elsewhere in this thesis, I illustrated how—through acts of imagination—points of association (such as shared repertoires of justification) were created, various practices and experiences were gathered into what was represented as a single policy regime, and the heterogeneous mobility of people was translated into single logistical populations (i.e., as coherent entities of migration management). Indeed, metaphorically speaking, collective imagination can temporarily "operate as both glue and solvent […] to preserve continuity across the sharpest ruptures of

innovation or, in reverse, to upend firm worlds and make them anew" (Jasanoff 2015a, 29). In the examples in this thesis, collectivized modes of imagination had to bind together diverse governmental and industry actors, visions, interests, knowledges, and technologies of border control.

Another set of powerful effects includes what was characterized as the mechanisms of simplification and abstraction. Simplification and abstraction have always been crucial means of exercising modern state power; according to political anthropologist James Scott, state authorities must create clear demarcations and singularities to ensure the legibility of people (and thus their centralized control) in a world full of multiplicity and hybridity (Scott 1998; Jasanoff 2004a). In the same vein, Mitchell (2002) reminds us of a key formula of *expert rule*: "Politics itself [… is] working to simplify the world" (p. 34).[95] However, simplifications are not merely generalizable templates, readily at hand, for state elites to deploy onto populations. As the case of eu-LISA demonstrates, they are brought into being through the imaginative work and capacities of different actors, organizations, and institutions.

Simplifications must provide epistemic keys to a world in which borders, mobilities, and populations are known and represented as (seamlessly) manageable. For the actors in the border regime, they result in a sense of mastery over the challenging realities of mobility and

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[95] Simplification and abstraction have been explored by a wide range of scholars in a variety of contexts, especially in the discussion of the relationship between science, technology, and modernity. For example, in his essay "Drawing Things Together," Latour (1986) describes the flattening of the modern world, enabled by the creation of *immutable mobiles*—i.e., simplified technoscientific representations that make it possible to disseminate knowledge and draw actors together at a distance. The works of Hacking (1990), Porter (2020 [1995]), and Bowker and Star (1999) discuss how people's realities, looks, personal attributes, or behaviors are translated into the tractable language of numbers and comparable categories, which, in turn, allow modern institutions to pursue their business of ordering. Compare this to Busch's (2011, 116–17) observation of how standards are intimately connected to power and that *simplification* is often used as a less pejorative term than *standardization*. In an early account, Star (1983) states that scientific work entails simplification: "Scientific work involves the representation of chaos in an orderly fashion" (p. 205).

borders. Chapter 5, for instance, investigated how different communities collaborate and negotiate knowledge, representations, and semantics through which they craft an epistemology full of acronyms, logistical vocabulary, boundary objects, and abstract, calculative logics. This *epistemology of digital borders* (as I call it in chapter 5) is not simply a product of technoscientific rigorism. Instead, it reflects the governmental desire to *simplify* the socio-material realities of mobility and border management and its inconsistencies. At the same time, officials, bureaucrats, and industry representatives deploy rhetorical devices and a tractable language of logistics to position themselves as planners and experts of control. Furthermore, simplification was at work in the project of assembling the *policy of interoperability* (see chapter 6). This policy was essentially based on the promise of complexity reduction in what is known to officials and authorities as *identity management* in the EU border regime. Simplification, in this example, was integral for imagining database interoperability as a *novel, necessary policy fiction*. It also had to convey the sense of mastery and satisfy the desire to gain control over the complexity of IT systems, the many intricate bureaucratic implications, and the general infrastructural configurations of borders, which can be difficult for even their administrators, operators, and users to grasp.

Thesis 3: Simplification and abstraction not only create a sense of mastery and control; they also imagine migrants and travelers as abstract, digitized categories of border management. Simplification and abstraction thereby create a distance from the fractious and contested character of borders, ultimately generating visions of dehumanized and sanitized realities that remove questions of responsibility and accountability from discourse and deliberation.

The sense of mastery and control accompanies the creation of a distance that rather serves to conceal the realities of how bordering is enforced on the ground. This distance provides opportunities to ignore the frictions and contestations that human mobility produces when countering, resisting, or subverting border control operations. The same distance is enacted and reinforced through what was called, in this thesis, a *view from beyond*—a particular professionalized *mode of seeing* that is imposed on the governance of migration. I analyzed this view from beyond as part of the digital transformation imaginary that envisions migration control in a laboratory-like environment and as the business of handling fully virtualized streams of data (see chapter 3, Figure 1, p. 105). This professional gaze does not necessarily correspond to the reality of digital bordering as a locally grounded practice and encounter between human beings. Instead, it imagines bordering as the abstract alignment and interconnection of data points—the seamless future world of virtual control. It is the imagery of the laboratory, in which data becomes an instrument for sifting through and calibrating population flows and determining a traveler's status, rendering them either a legitimate object of circulation or a potentially threatening intruder. In this view from beyond, human subjects ultimately vanish from the imaginary because the real social violence of border operations or acts of political resistance contradict its assumption of the all-encompassing, smooth functioning of datafication. The creation of such a *space of experimentality*, gradually being realized at the infrastructural sites and projects of database construction in the EU Schengen space, is another powerful effect of sociotechnical imagination.[96]

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[96] As Pfotenhauer and colleagues (2022) argue, experimentation in and on societies today must possess the inherent potential for technological expansion and scalability. This potential introduces a form of experimentalism that enacts the highly regarded values of today's innovation societies and is, for example, promoted by the creation of eu-LISA as a growing "centre of excellence" (see also chapter 3): research, testing, and piloting, for example, must establish experimentation as a permanent condition to keep borders putatively innovative and technologically up to date (see also Karvonen 2018).

Other than the imageries of walls and militarized, barbed wire fences—widely recognized for their violent aesthetic and inhumane symbolism—new digital borders are imagined, framed, and promoted in different ways, seeking to invoke what can be called *sanitized realities*. This is exemplified, in particular, by border smartification projects (see chapter 5). As Aizeki and colleagues (2021) observe in the discussion of smart borders in the United States, smart border security promulgates a so-called humane alternative to physical border zones, walls, and fences—and not simply because of its innovative promise to counter new threats.[97] Instead, the visions and narratives surrounding new digital borders offer an *escape* from the escalating violence that migrants experience on a daily basis in contemporary border regimes—not because smart borders are more humane but because their representations are *dehumanized*. New digital borders are proposed as putative alternatives because the sanitized realities they propagate ideally render human elements *invisible*—i.e., humans are removed from the shiny representations of control, security, surveillance, and circulation.

Smart or digital borders are thereby—conceptually and rhetorically—separated from supposedly non-digital, territorial boundaries. This separation produces a misleading dichotomy that focuses public attention on the grand symbols of deterrence—walls, fences, and fortresses—while risking not paying enough attention to the more subtle but equally problematic imaginations and infrastructural practices of smart bordering: filtering, categorizing, selecting, detaining, and deporting people. As Benjamin (2019) argues, there is

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[97] In a recent report by the Immigrant Defense Project's Surveillance, Tech & Immigration Policing Project and the Transnational Institute, Aizeki and colleagues (2021) observe how the rhetoric of smart borders has been broadly embraced by both Democrats and moderate Republicans—as if smart borders represent a humane response to border insecurity and an alternative to former US President Donald Trump's hardline stance on immigration and his obsession with "The Wall" along the US–Mexico border: "[T]here is a belief that a 'smart' border—the expansive use of surveillance and monitoring technologies including cameras, drones, biometrics, and motion sensors—offers a humane alternative […]" (p. 4).

always the imminent danger that "the equivalent of slow death – the subtler and even alluring forms of coded inequity – get a pass" (p. 24). These false dichotomies between smart/digital and hard boundaries, virtual and territorial borders, or data clouds and physical deterrence should therefore be abandoned: they hide the fact that borders are built on equivalent goals, logics, and imaginaries that inform the massive extraction and collection of migrant-related data. They divert attention from the *infrastructural practices* that borders enact and that sort people into categories of worthy travel on the one hand and unworthy travel, anomaly, or intrusion on the other. In other words, the dichotomy between smart and hard obscures the sociotechnical assemblages of actors, knowledge practices, values, and material infrastructures through which borders produce and process *alterity* (Pelizza 2020; Pelizza and Van Rossem 2021), ultimately situating mobile individuals inside or outside the boundaries of legality.

Sanitized realities of digital borders not only tend to render human elements invisible but also bypass important questions about responsibility and accountability in the border regime. As mobile individuals continue to face ongoing violence and injustice at Europe's borders, these questions seem more relevant than ever. Who accounts for the mistakes, wrongdoings, vulnerability, and suffering at sites of infrastructural experimentation and implementation of digital borders? At what (human) cost must these sanitized realities and their spaces of experimentality be brought into being? These questions lie at the heart of what is at stake in the making and contestations of the imaginaries of future digital borders. As Hannah Arendt (2017 [1948]) claims in her epochal work *The Origins of Totalitarianism*, "In a totally fictitious world, failures need not be recorded, admitted, and remembered" (p. 508).[98] Arendt's

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[98] Arendt (2017 [1948]) makes this observation about totalitarian ideology that must constantly free itself from individual reason, factuality, and experience in an attempt to establish and verify its fiction against the odds of reality and its own inconsistencies. Accordingly, she claims, "Factuality itself depends for its continued existence upon the existence of the nontotalitarian world" (p. 508). In this sense, individuals are expected to fully conform

observation is instructive, as it emphasizes the problematic implications and totalizing tendencies that contemporary imaginaries of transformation (of future borders) may acquire, especially when they supplant any deliberation about the political ramifications and social consequences of technoscientific change and intervention. The tendency to imagine borders and their digital transformation as producing dehumanized, sanitized realities seems to strategically remove from the discourse the multiple failures and necessary responsibilities and accountabilities for the wrongdoings and injustices that occur in border regimes today.

8.3 On a final note: toward a politics of responsibility and mobility justice

This concluding discussion began with a critique of the prevalent forms of digital solutionism in the EU border regime. Furthermore, I summarized some of the effects of sociotechnical imagination: the occasional sense of coherence and collectivity, the simplifications and abstractions it enacts, the particular modes of seeing and experimentation it fosters, and the sanitized realities it creates and envisions. In this final section, I reflect on some potential steps toward a counter program for de-centering these concepts and encouraging our deliberations on a politics of responsibility and mobility justice.

The sanitized realities that are often promoted along with the imagination and justification of digital borders and their futures contribute to what can be called a form of *organized irresponsibility* (Beck 1995). Beck's well-known concept asserts that while people

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to totalitarian rule, which seeks to eliminate human spontaneity and individual responsibility. For Arendt, the concentration and extermination camps were the ultimate consequences of the totalitarian quest for complete domination, where its beliefs and ideology had to be enforced with the requisite terror. While I do not want to assess the general validity of Arendt's claims with regard to the National Socialists' murderous program of annihilation—and while I reject pushing this analogy too far—we should also note her use of the metaphor of the *laboratory* to describe "the ghastly experiment of eliminating, under scientifically controlled conditions, spontaneity itself as an expression of human behavior [...]" (pp. 578–79).

or organizations may be responsible for the risks and harmful consequences of their actions, conditions are created so that no specific individual or organization can be held accountable. As a strategic method and effect, sanitized realities obfuscate the diverse hierarchies, vulnerabilities, and arbitrary responses from state authorities that confront migration in the multiple realities of digital bordering. In the Schengen border laboratory, state authorities and supranational organizations, with the plethora of techniques and practices of inclusion and exclusion they enact, may well be *responsible* for infrastructural violence and its harmful consequences; however, there exist few means of holding these authorities accountable.

The governance of migration in Europe is not simply determined by invoking exceptional situations or states of emergency—although this may constitute a recurrent method by which European states respond to human movement across borders. Instead, the multiple infrastructural practices of bordering in Europe—surveilling, identifying, verifying, categorizing, and deporting—tend to produce *extremes* that are understood as the highly intensified mechanisms of selection and sorting, which lead to the inclusion of travelers in smooth circuits of mobility but also to the arbitrary detainment and banishment of human beings from European territory (see Dijstelbloem 2021, 181).[99] These practices inevitably result in precarious situations in which the rights of migrants and responsibilities of state authorities are blurred, fragmented, or simply suspended. Rights and responsibilities are sidelined in favor of the imperative to expand digital border infrastructure and the fervent solutionist belief in the unfettered power of data.

Against this backdrop, eu-LISA's prosaic claim that it operates border databases "24 hours a day, seven days a week[, … which] allows the continuous, uninterrupted exchange of

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[99] Also compare this to Dijstelbloem's characterization of Europe's borders as "extreme infrastructure" (2021, 173–184).

data between the national authorities" (eu-LISA 2014, 3) cannot remain unchallenged. Through the prism of organized irresponsibility, these claims must simply render the operations of digital border infrastructures ordinary and invisible and bypass the potentially violent and extreme circumstances of bordering upon which these operations rest. Numerous examples illustrate how the extraction and collection of data frequently build upon the unequal hierarchies and violent encounters between migrants and authorities: when, for instance, migrants are forced to provide fingerprints or facial imagery against their will or when monitoring devices, such as drones, track refugees' boats, then deliberately abandon these individuals to die at sea.[100]

Any counter program should take inspiration from Madeleine Akrich's (1992) concept of a *geography of responsibility*. A geography of responsibility unearths—rather than conceals—the way in which responsibilities and rights are scripted into and distributed through and across emergent infrastructural arrangements in the EU border regime. It must also scrutinize how the administration (and expansion) of border infrastructures in Europe emerges as a distinct materialization of certain ideas about Europe and European territory. The two intertwined lines of thought proposed by this thesis—infrastructure and collective imagination—expose borders as expressions of the policing and surveillance efforts that determine who is imagined to be a genuine European or non-European, citizen or non-citizen, intruder or tourist, a person granted the right of protection or the "fate" of deportation. A geography of responsibility should unravel the social, political and legal accountabilities of actors, organizations, and technologies in Europe that engage in these demarcating practices.

Moreover, this counter program must acknowledge that borders and their infrastructural configurations are markers for how societies seek to realize their desirable futures, political

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[100] See, for example, the report "Death by Rescue" published by the Forensic Architecture project. Available at https://forensic-architecture.org/investigation/death-by-rescue-the-lethal-effects-of-non-assistance-at-sea, accessed April 5, 2022.

agendas, and conceptions of (in)justice. A geography of responsibility must therefore become a *social* geography: it must address and challenge both the fundamental social categories that structure mobility in today's global world as well as the resulting sociotechnical infrastructures that sort people according to social boundaries—most notably, according to racial identity but also according to markers of class and gender (see, for example, Browne 2015; M'charek, Schramm, and Skinner 2014). Thus, border infrastructures are indeed global entities, as they reflect the way in which Europe confronts the global mobilities of underprivileged populations. In this sense, the border regime's preoccupation with finding and developing *digital solutions* to contemporary threats and challenges only further conceals the deep, global structural inequality that continues to be encoded in Europe's borders.

Ultimately, a counter program cannot simply advocate for the abolition of digital technologies and databases—it must fundamentally reroute the predominant imaginaries of the future that underpin the border regime's solutionism and expansion of digital infrastructure and dismantle the material and moral landscapes that govern mobility today. It will otherwise be impossible to reflect on how technology can be reimagined to contribute to, rather than obstruct, future mobility justice (Sheller 2018). This reflection will have to extend beyond the necessary discussions about data protection and personal privacy in the wake of the unparalleled collection and transmission of travelers' biometric data. It will require a reflection on the kind of future that must be created in order to abandon the dominant circuits of mobility that bind individuals to fates of inclusion and exclusion—based largely on their presumable birthright, which remains one of the main guarantors of legitimate cross-border movement today. It must also call for a *politics of responsibility* that involves various actors in genuine deliberation about how they can make their duties and practices transparent and how they can perform these duties to *respond* to, rather than ignore or conceal, the various injustices and violence that occur at Europe's borders.

None of this information represents a straightforward proposal or template for creating a utopian future. Yet it emphasizes the possibility and pressing need to imagine alternatives to the dystopian status quo. In the future, new border infrastructures will likely be constructed and transformed, to later perish again. To avoid more violence and suffering, Europe must first accept the world's multiple realities (instead of fighting and sanitizing them) in which people continue to be mobile and claim their right to cross borders—whether seeking refuge, escaping persecution, or searching for a better life.

9   Postscript

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This postscript addresses two developments that were not included in the thesis but will continue to shape the character of border infrastructures in the future.

Recently, eu-LISA and industry representatives have been actively advocating for artificial intelligence (AI) and big data in border control and surveillance. Although both are notoriously ambiguous terms, a great deal of their appeal derives from their novel machine learning techniques that automatize routine tasks—i.e., deep learning, translation, evaluating and sorting data, and automatically interpreting or analyzing risks. Nevertheless, the ways in which AI, big data, and their promises are performed are firmly embedded in the wider sociotechnical imaginary of digital border transformation and its narrative underbelly of inevitable, unidirectional, and urgent technological change. For instance, the event report from eu-LISA's industry roundtable "Artificial Intelligence and Large-Scale IT Systems: Opportunities and Challenges" claims that "[i]n order to understand the importance of AI as a disruptive technology, it needs to be considered in the broader context of digital transformation" (eu-LISA 2022c, 6).

Border control in Europe is therefore likely to continue to build on *algorithmic power* (Beer 2009; Mackenzie 2005), impacting how data is interpreted, what decisions are made, and what action is undertaken as a result. There will be further need for rigorous empirical studies that explore the manifold contexts in which AI and big data techniques are enacted through sociotechnical practices. The infrastructural character of digital border surveillance hints at the many ways in which AI at the border may reconfigure sovereignty, territory, and mobility:

being deployed at automated gates at airports, biometric registration centers at hotspots, or in drone monitoring activities over the EU's maritime borders. In these cases, algorithms do not operate in a vacuum. Instead, they operate on preconceived notions and assumptions, therefore risking objectifying or reproducing existing inequalities and patterns of discrimination. Moreover, these new technological artifacts invite a plethora of actors—from researchers, engineers, and private companies to official experts and policymakers—to engage in the design, development, and implementation of machine learning techniques, thus shaping the infrastructural transformation of border control. AI and big data raise questions about whether, and to what degree, their mechanistic design introduces autonomous decision-making at borders. In addition, as Amoore (2021) explores in her concept of the *deep border*, machine learning reconfigures the border "as world-making, or as a means of reordering what the border is, what it could be, and how it imagines and bounds political community" (p. 7).

Parts of this thesis were written and discussed against the backdrop of an unfolding and ongoing global pandemic. COVID-19 has caused, or rather exposed, multiple social, political, economic, and infrastructural crises. It has transformed border infrastructure and control around the globe. It has, moreover, generated new narratives of inclusion and exclusion and redrawn boundaries between communities, territories, and nation-states.

One of the earliest actions taken by European countries was the attempt to contain the aggressively transmissible virus and its variants. Measures included travel bans and other forms of containing human movement, often with dramatic and entirely unforeseen consequences. At the same time, the introduction of bans, mobility restrictions, and border closures were often performative acts in the pandemic theater rather than effective strategies for public health and medical safety. European states, for example, made drastic attempts to close borders—at best, only curbing the spread of COVID-19 rather than preventing it. When the Omicron variant began circulating at the end of 2021, the United States acted quickly in closing its borders and

banning non-citizens from South Africa, where laboratories first detected the variant, from entering the country (US citizens traveling from South Africa were still allowed to enter the US). European authorities followed suit, declaring travel bans or closing borders to African countries, although the variant had likely been circulating outside of South Africa and had already arrived in their own countries. Such bordering measures by countries of the Global North were thus conceived as *racist scapegoating* rather than being grounded in scientific reasoning;[101] these performances of political activity, at odds with scientific rationale left a bitter taste, especially when considering the extreme inequality in vaccine distribution across the globe.

Furthermore, COVID-19 offered a useful pretext for authorities to police migrants and refugees, thereby increasing their risk of exclusion, expulsion, or deportation. As the NGO Picum reported, there were varying levels of vaccine access without accompanying immigration checks for undocumented people across Europe: there was good access in some countries but inconsistent or no access at all in others.[102] For migrants, public spaces have gradually become locations for potential ID and police checks, often linked to COVID-19 certification controls. Checking personal identification has become normalized, now being carried out by state or non-state authorities, and continues to have potentially grave consequences for undocumented migrants. In general, during the pandemic, migrants and refugees have not been treated as subjects whose safety or health is potentially at risk; rather, the pandemic has intensified their framing as *risky subjects*. In many ways, as Tazzioli (2020a) emphasizes in her blog post, COVID-19 has not led to greater protection of migrants; instead, they have become more

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[101] See, e.g., https://blog.ucsusa.org/derrick-jackson/omicron-in-blackface-racist-us-travel-ban-scapegoats-africa/, accessed April 5, 2022.

[102] See Picum's report on their website, https://picum.org/covid-19-undocumented-migrants-europe/, accessed April 5, 2022.

"spatially confined and hampered from getting access to asylum in the name of safety." Finally, no matter how strict European countries were in their enforcement of travel bans and general lockdowns for the sake of safety, they never stopped the deportation of migrants putting their lives at risk.

COVID-19 has also served as a pretext for furthering the digitization of the existing border regime in Europe. No opportunity has been missed to state how the pandemic has affected all areas of our lives by making our lives increasingly digital: eu-LISA, for example, now points out "that this unparalleled crisis must be embraced as an opportunity to implement long-awaited changes" (eu-LISA 2021, 4). An ironic situation occurred at eu-LISA's virtual conference in November 2020, where the opening speech by the agency's director was repeatedly interrupted by a technical issue; nonetheless, the speech emphasized how the current trend of digital transformation would be accelerated by the global health crisis (field note, eu-LISA Conference, November 26, 2020). Similarly, during the industry roundtable "Contactless Travel in Post-COVID Times," eu-LISA explained that "the COVID-19 crisis has provided an additional impetus for the digital transformation of the EU Security Ecosystem, opening new opportunities for the entire community" (eu-LISA 2021, 4).

It is clear that the global pandemic has reconstructed a highly visible, discursive link between health, mobility, and security. Transnational health infrastructures will be newly established or revamped. Personal health data has become an inevitable part of safeguarding security in Europe. In other words, the domain of digital health has become an integral element of border infrastructures and their operations. Health infrastructures and the collection of health data have thus opened the field of intervention to a vast network of actors, practices, and technologies. It will be one of the major fields of the future, in which new discourses of (in)security and risk emerge, controversies unfold, and technopolitical orders are built.

Appendixes

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A) Overview of Existing and Future Large-scale IT Systems under eu-LISA's Management

SIS II

Description   In operation since 2001, the Schengen Information System (SIS) is the oldest centralized transnational database in Europe. Its current version dates from April 2013 and is known as SIS II. The system officially supports intergovernmental cooperation on law enforcement and external border management. It shares data among those state authorities that participate in the so-called Schengen Agreement Application Convention—currently consisting of 31 European countries, including 22 Schengen member states, the four associated countries Iceland, Liechtenstein, Norway, and Switzerland, and countries that cooperate with Schengen members in law enforcement (such as Bulgaria, Romania, and the United Kingdom). The central system can be accessed by law enforcement, border control, visa, and customs authorities as well as vehicle registration authorities. EU agencies such as Europol and Eurojust have limited access to data (in accordance with their legal mandates).

    SIS' origins lie in the creation of the Schengen space in 1985, when it was envisioned as a *compensatory measure* for the dissolution of borders between members of the newly founded Schengen community. After 2004, during the process of EU enlargement, SIS had to be made newly operational for countries planning to join Schengen. The EU's expansion also provoked a debate about significantly expanding the system's purpose and technical capacities. A so-called *second generation* of the system was envisioned to implement the "latest technological developments and added functions such as new categories of alerts, a facility to link alerts and the capacity to store documents associated with

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an alert" (European Court of Auditors 2014, 1). SIS was thus subsequently transformed from a simple *hit/no-hit system* to a broader search and intelligence tool, introducing new biometric data as sole identifies, new possibilities for creating links between stored entries and categories, and new access possibilities to national authorities and intergovernmental organizations such as Europol (see Brouwer 2008). SIS II ultimately planned to go online at the end of 2006, which would enable new EU countries to operate as full Schengen members. However, the realization of this project failed. The onset of operations was postponed by more than six years and ended up with a budget eight times higher than estimated (Parkin 2011).

Operational details	SIS II is an alert system that contains data categories of both persons and objects. It provides authorities with information, for example, on people involved in crime or denied entry into the Schengen space, missing persons, or on the kind of action to be taken by authorities in case of so-called misused identities. SIS II also contains data on stolen or lost objects (e.g., vehicles, firearms, documents, credit cards, and banknotes). In November 2018, the EU adopted a proposal for reinforcing the system and preparing its interoperability with other systems. Moreover, it decided to expand its capacity to collect additional biometric data, including fingerprints, palm prints, and facial images of so-called suspects. Additionally, the role of SIS II in the EU countries' strategies of deporting migrants has been strengthened, for instance, by including a new alert category on return decisions. According to eu-LISA's annual statistics, SIS II was accessed and searched over 3.7 billion times in 2020. It stored 93.4 million alerts in its central systems, of which 964,720 alerts corresponded to persons.[103]

VIS

Description	The Visa Information System (VIS) became operational in 2011. It connects immigration authorities at external border crossing points of Schengen states and consular posts in countries outside the EU. The VIS is a tool to implement the EU's common visa policy by assisting authorities in the management of applications for short-stay visas. Today, the system is one of the largest (biometric) databases in the world, registering both granted and refused visa

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[103] Statistical data that are used for this overview are accessible on eu-LISA's official website. See www.eu-LISA.europa.eu, accessed March 9, 2022.

applications, copies of travel documents, and applicants' biometric data. Its main purpose is to verify the traveler at the external Schengen border, establish their biometric identity, and check whether it corresponds to the issued visa. Therefore, authorities enroll fingerprints at the border and match them with the system's stored templates. The VIS thereby aims prevent the so-called practice of *visa-shopping*, i.e., when individuals repeatedly seek to obtain visa permission following the rejection of a previous application. Rejections are digitally stored in the VIS instead of being stamped into the passport (which can potentially be reissued). Furthermore, the VIS seeks to forestall the strategy of using a visa by a so-called *lookalike*, i.e., an individual using someone else's passport with a valid Schengen visa (see Scheel 2017).

Operational details	The system is designed as a central database, which registers visa permissions and refusals of individuals over twelve years. However, EU member states plan to also include data of children over six years and information on long-stay visa holders). The VIS stores categories of biographical data, within which are included names, place and date of birth, travel details (i.e., the purpose of stay), application status, type of visa or visa sponsors, facial images, and a full set of ten fingerprints. According to eu-LISA, the VIS communication network processes fingerprints for identity verification between a border crosser and their visa application within 1.87 seconds. At the end of 2019, the system had 69 million stored fingerprint sets; it performed 25 million alphanumeric and 7 million biometric verification searches.

Eurodac

Description	Eurodac is the abbreviation for the *European Dactyloscopy database*. As a large-scale fingerprint database, it primarily targets asylum seekers. The legislation for its implementation was first introduced in 2002. Eurodac has been operational since 2003 and seeks to determine the responsible country for assessing an asylum application lodged within an EU member state (or Schengen Associated country) using the technique of fingerprint comparisons. The principle of this responsibility is enshrined in the Dublin Regulation (currently Dublin III, Regulation [EU] No 604/2013), which aims to prevent the uncontrolled movement of asylum seekers within (and across) EU member state territories. Eurodac thus stores an asylum seekers' fingerprints to support to detect, for instance, multiple asylum applications in different EU member

states—a practice derogatively termed *asylum-shopping*. Authorities usually store a set of fingerprints taken during an application and, depending on the individual's purpose and category, search it against existing templates in Eurodac. The transmission of data between member states should ensure that multiple application claims are attributable to the country where the individual first arrived or applied for asylum. Currently, member states intend to significantly expand Eurodac to ensure its interoperability with other systems, store additional facial images, and include biometric data of children aged six years or older. The expanded Eurodac system should thus become a cornerstone in the interoperability project currently developed by eu-LISA. Moreover, member states have demanded to reinforce the system in the future by including data of third countries to facilitate deportations.

Operational details	Eurodac stores three different categories of fingerprint sets. Category 1 includes sets of applications of asylum seekers aged fourteen or older that are stored for ten years. Category 2 relates to third-country nationals (or stateless persons) that have "irregularly" crossed the border and are not turned back (which will be stored for eighteen months). Category 3 relates to third-country nationals aged fourteen or older who are "illegally" found on the territory of a member state. However, this data is only transmitted for a search. Categories 4 and 5 are sets of fingerprints searched by law enforcement authorities to prevent, detect, or investigate terrorist offences or criminal offences. In 2020, nearly 645,000 fingerprints were transmitted to Eurodac, of which around 401,000 sets of fingerprints belong to asylum applications, more than 82,000 to individuals in Category 2, and roughly 160,800 checks are related to Category 3.

EES

Description	The Entry/Exit System (EES) will become an information system for the registration of travelers from third-country nationals each time they cross the external border of the EU and regardless of their traveler status (i.e., short-stay visa holders or visa-exempt travelers). A joint system to register *entries* has been a longstanding vision of the European Commission, which ultimately promoted and introduced it as part of the Smart Border Package proposal. eu-LISA has officially been tasked to develop this system, which was expected to enter into operation in the first half of 2022 (however, the process has been significantly delayed).

The EES is expected to become one of the world's biggest biometric databases, recording both entries and exits as well as refusals of entry (for visits up to 90 days). It will replace the current practice of visa authorities to manually stamp passports with an electronic registration of biometric information, thereby creating more reliable data on border crossers. From the beginning, the EES was meant to become interoperable with the VIS because it also targets so-called *over-stayers*, i.e., travelers who have legally traveled to Schengen with a short-term visa (e.g., as tourists) but remain after their visa expiry. The EES thus officially aims to prevent "irregular immigration" by biometrically identifying persons who are no longer eligible for staying and automatically alerting national authorities once this stay is exceeded.

Operational details The EES will register a person's name, their biographical information, the type of travel document, and capture and store five fingerprints and a facial image. A central system must operate as a computerized database, which stores biometric and alphanumerical data. National interfaces in each EU member state serve as a channel between the central systems of both the EES and the VIS to enable data comparison. The design also includes a data repository for statistical reports—which will likely inform future visa policies of EU member states (i.e., restricting visa policy based on the system's new statistical information). Furthermore, carriers are currently required to install so-called *web services* that enable them to verify third-country nationals and their short-stay visa status when using carrier services.

ETIAS

Description The European Travel Information and Authorization System (ETIAS) will be a new border management information system that introduces an online authorization process for all *visa-exempt* third-country nationals before they embark on their journey to a Schengen country. This *pre-travel authorization system* must verify whether a traveler meets the entry requirements of a Schengen country. It obliges travelers to complete an online application with identity information mostly related to passport data or another travel document, residence information, contact details, and credit card information. The system will therefore resemble similar pre-clearance systems of other countries, such as the United States' ESTA system, Canada's eTA system, or Australia's ETA system. Information provided by ETIAS should be automatically checked

against the other EU IT systems (SIS, VIS, Eurodac, EES and ECRIS-TCN) and Interpol databases. ETIAS aims to complement—or rather compensate—the EU's various visa liberalization policies. As a preemptive dataveillance mechanism, it targets third-country nationals that should usually be exempt from visa requirements.

A significant part of the system is constituted by the creation of a *watchlist* that will identify connections between data in application files and individuals on the watchlist to filter out "risk subjects"—whether in terms of migration, security, or public health risks. Watchlist data can be entered by Europol or national authorities, although the conditions or obligations for entering and screening data are still unclarified. The ETIAS regulation (EU 2018b) mandates that the foreseen watchlist contain persons "suspected or having committed or having taken part in a terrorist offence or other serious criminal offence or regarding whom there are factual indications […] to believe that they will commit a terrorist offence or other serious criminal offences" (Art. 28). An *ETIAS Screening Board* composed of representatives from so-called ETIAS National Units and Europol, will serve as an advisory body to define and evaluate so-called risk indicators on a rolling basis.

Operational details	ETIAS will have the capacity to store personal data, travel documents, information on the intended stay, information related to criminal records, presence in conflict zones, country bans, or previous return decisions. The online application will cost €7 for applicants between 18 and 70 years old, providing a valid travel authorization for three years. Applicants may appeal if the authorization is refused. Carriers such as airlines, boat and bus companies are required to enroll into the ETIAS control system and verify travel authorizations prior to boarding. At any border crossing point, border guards will decide on the approval or refusal of entry based on a valid ETIAS authorization and a successful biometric registration for the EES. While eu-LISA develops and operates ETIAS, Frontex will be responsible for the *central unit*. The central unit includes the various application files and establishes screening rules in consultation with the ETIAS Screening Board.

ECRIS-TCN

Description	The European Criminal Record Information System on Third-Country Nationals (ECRIS-TCN) will allow authorities to store and process information on

convicted non-EU citizens. ECRIS-TCN builds on ECRIS, an existing decentralized electronic system for the exchange of information on convicted EU citizens. Since 2012, ECRIS has enabled member states to notify each other about citizens' convictions or criminal proceedings. The European Commission proposed a comparable centralized system for third-country nationals in 2017, reaching an agreement with the Council and the Parliament in 2019. ECRIS-TCN was part of the "European Agenda on Security," which promoted increased information exchange among EU member states to safeguard security in Europe. ECRIS-TCN is intended to contribute to more efficient exchange within border management by fighting cross-border crime. It will allow authorities to not only identify the criminal records of a third-country national or a stateless person, but also to file requests for retrieving information on convictions. Its official objective is to provide judges and prosecutors access to the criminal records and histories of non-EU citizens. ECRIS-TCN will furthermore include data on dual nationals. The system is currently in development and scheduled to become operational by the end of 2022. It will be implemented in conjunction with interoperability.

Operational details	ECRIS-TCN should technically operate like a *hit/no hit search system*. In accordance with interoperability, it stores and exchanges biographic data, fingerprints, and facial images. Regulation (EU) 2019/816 defines various situations in which ETIAS can also be accessed by Eurojust (the EU agency for Criminal Justice Cooperation), Europol, or the so-called European Public Prosecutor's Office of the European Union (EPPO).

Interoperability

Description	Interoperability is a large-scale IT project currently being developed by the eu-LISA agency. Its legal specificities are enshrined in two legal regulations: (EU) 2019/817 on borders and visa, and (EU) 2019/818 on police and judicial cooperation, asylum and migration. Although the content of these regulatory texts is almost identical, they differ on judicial grounds because some countries are associated with Schengen but do not engage in judicial cooperation (e.g., Switzerland or Iceland). Interoperability should allow the exchange of data across the six major databases in border, migration, and visa management. Furthermore, it seeks to provide faster and facilitated access to the databases to authorized national authorities (i.e., police and migration officials, visa

authorities, or border guards). Interoperability is repeatedly described as an EU response to a series of terrorist attacks in member states that occurred in 2016 and the migrant movements of 2015. Politicians and policymakers have linked these events to the existence of unconnected EU databases, insufficient data sharing on third-country nationals, identity fraud, and the existence of aliases in databases. Among the official objectives were the improvement of "effectiveness and efficiency of border checks at external borders," "the prevention and the combating of illegal immigration," and "a high level of security" (EU 2019a, Article 2). Furthermore, the interoperability regulations include legal provisions that facilitate national authorities to access and query Europol's data pool and Interpol's Stolen and Lost Travel Document database. The policy famously followed the recommendations developed by the so-called High-level Expert Group on Information Systems and Interoperability, a group established by the EC in 2016.

Technological components	The interoperability policy includes four main technological components. First, it has designed the European Search Portal (ESP), an interface for national authorities that enables the harmonized and simultaneous query across all six systems (SIS II, VIS, Eurodac, EES, ETIAS, and ECRIS-TCN). Second, it will introduce the shared Biometric Matching Service (sBMS), which underlies all IT systems as a data engine, thereby enabling authorities to query and cross-match biometric information. The sBMS entails a central infrastructure that replaces the respective communication infrastructures of other systems (SIS, VIS, Eurodac, EES, and ECRIS-TCN) and enables searches with biometric data. The Common Identity Repository (CIR) creates and stores individual data files for every person registered in at least one of the existing or future systems (due to previously established data formats, SIS II must be externally connected to the CIR). The CIR represents a *centralized data pool* of a limited set of data extracted from one of the systems. It thus operates like a "book index" (Interview 10 with EU official, 2019) and represents interoperability's backbone. With its distinct storage capacity, the CIR on its own could represent a fully-fledged database. However, individual files are stored there only for the period in which the corresponding data is stored in the original system. The conditions of access to CIR have been controversially debated and are now outlined in the Articles 20–22 of the interoperability regulations. For example, police authorities can access the repository once there "are reasonable grounds to believe that [its]

consultation […] will contribute to the prevention, detection or investigation of terrorist offences or other serious criminal offences" (EU 2019a, Article 22). Lastly, the Multiple Identity Detector (MID) should create and store confirmation files. It is designed as an instrument for the automatic matching of queried identities against other systems—for example, whether a screened fingerprint in one system can be linked to multiple names in other systems. The MID must accordingly establish and contain different *links,* which can indicate any potential (mis)match of identity data in different systems. It must determine whether and how biometric information corresponds (correctly or incorrectly) to biographic identity (stored in the CIR) and confirms whether different identities of the same person exist in EU systems. National authorities are then tasked to further evaluate and act upon MID links.

B) List of Conducted Interviews and Sites of Participant Observation

Conducted interviews

Interview 1	with EU official	21/09/2018	Telephone/VoIP	English
Interview 2	with member state representative	03/10/2018	Telephone/VoIP	English
Interview 3	with EU official	18/10/2018	Face-to-face	German
Interview 4	with EU official	30/11/2018	Telephone/VoIP	English
Interview 5	with private consultant	08/01/2019	Telephone/VoIP	English
Interview 6	with EU official	04/03/2019	Telephone/VoIP	English
Interview 7	with member state representative	11/03/2019	Face-to-face	German
Interview 8	with member state representative	15/03/2019	Telephone/VoIP	English
Interview 9	with EU official	19/03/2019	Telephone/VoIP	English
Interview 10	with EU official	26/04/2019	Face-to-Face	German
Interview 11	with EU official	29/04/2019	Face-to-Face	English
Interview 12	with EU official	29/04/2019	Face-to-Face	English
Interview 13	with EU official	29/04/2019	Face-to-Face	English
Interview 14	with two EU officials	30/04/2019	Face-to-Face	German
Interview 15	with member state representative	27/05/2019	Telephone/VoIP	German

Interview 16	with EU official	14/06/2019	Face-to-face	English
Interview 17	with member state representative	01/07/2019	Telephone/VoIP	English
Interview 18	with member state representative	11/07/2019	Face-to-Face	German
Interview 19	with EU official	18/03/2019	Telephone/VoIP	German
Interview 20	with member state representative	24/03/2019	Face-to-Face	German
Interview 21	with EU official	08/08/2019	Face-to-Face	English
Interview 22	with member of the European Parliament (EP)	18/09/2019	Telephone/VoIP	English
Interview 23	with member of the European Parliament (EP)	11/10/2019	Telephone/VoIP	English
Interview 24	with member state representative	16/10/2019	Face-to-face	English
Interview 25	with EU official	21/10/2019	Telephone/VoIP	English
Interview 26	with member state representative	31/10/2019	Telephone/VoIP	English
Interview 27	with EU official	28/11/2019	Telephone/VoIP	English
Interview 28	with EU official	29/11/2019	Telephone/VoIP	English

Sites of participant observation

OSCE Conference	"ID@Borders and Future of Travel"	10–11/04/2019	Vienna, Austria

eu-LISA Industry Roundtable	"Making EU Land and Sea Border Crossings Seamless and Secure – Operational Solutions"	24/04/2019	Bucharest, Romania
eu-LISA Annual Conference	"The New Information Architecture as a Driver for Efficiency and Effectiveness in Internal Security"	16/10/2019	Tallinn, Estonia
eu-LISA Industry Roundtable	"Towards Practical Implementation of the New JHA Information Architecture"	17/10/2019	Tallinn, Estonia
Visionbox	"Smart Borders explained: Air, Land and Sea – Travel Ecosystem"	30/09/2020	online
eu-LISA Industry Roundtable	"Data Quality and Interoperability: Addressing the Capability Gaps through Standardisation"	03–05/11/2020	online
eu-LISA Annual Conference	"Building Digital Resilience for the EU Justice and Home Affairs"	26/11/2020	online
eu-LISA Industry Roundtable	"Contactless Travel in Post-Covid Times: Enhancing the EU Security Ecosystems"	01–02/06/2021	online

C) List of Figures

D) Thesis Abstracts

Abstract – English

Borders and the mobility of people belong to the most contentious issues in Europe. A central and formative component in the governance of migration is the continuous construction of large-scale digital infrastructure to safeguard border security. While the existing literature at the intersection of critical border studies and critical security studies has widely acknowledged the constitutive role of technology in shaping borders, less attention has been paid to the role of material infrastructure in encoding and transmitting collective visions of border (in)security. Drawing on science and technology studies, this thesis analyses the way in which collective imagination coalesces with the technoscientific production of future digital borders. It explores how imagination is incorporated and scripted into the design of databases, both justifying and normalizing contemporary practices of bordering, through an empirical investigation of the European Union (EU) agency *eu-LISA*. By exploring the sites, projects, and activities of eu-LISA's management of large-scale IT systems in the Schengen Area, it is argued that the agency articulates, collectivizes, and stabilizes collective visions of digital border (in)security. In doing so, this thesis explores how these visions open or close down sociotechnical realizations and ultimately govern the project of *infrastructuring* borders in Europe. The empirical analysis adopts an interpretative research framework, based on *situational analysis*. It draws from a diverse set of ethnographic material collected as part of field visits, participant observations, interviews, informal conversations, and official documents between 2019 and 2021. At the core of the analysis are a series of expert interviews conducted with around thirty policymakers, officials, representatives, and delegates from EU institutions and national member states.

Abstract – Deutsch

Mobilität und Grenzen gehören zu den umstrittensten Themen in Europa. Ein zentrales Element in der Regulierung von Migration ist der anhaltende Ausbau einer digitalen Infrastruktur zur Gewährleistung von Grenzsicherheit. Die Fachliteratur im Bereich der Border Studies und kritischen Sicherheitsforschung hat die konstitutive Rolle von Technologien in der Formierung von Grenzen weitgehend anerkannt. Weniger erforscht ist hingegen die Art und Weise, wie kollektive Visionen der (Un-)Sicherheit in Grenzinfrastrukturen eingeschrieben und durch sie vermittelt werden. Mit Hilfe von Konzepten der Wissenschafts- und Technikforschung analysiert diese Arbeit die wechselseitige Verstrickung von gesellschaftlichen Visionen der Zukunft und techno-wissenschaftlichen Konstruktionen von digitalen Grenzen. Sie untersucht dabei, welche soziotechnischen Imaginationen in die Entwicklung von Datenbanken eingebettet werden und somit der Rechtfertigung und Normalisierung von Grenzpraktiken in Europa dienen, wie etwa der digitalen Verarbeitung, Kategorisierung, Sortierung, und letztlich auch Diskriminierung von mobilen Individuen. Die Dissertation erforscht dabei *Eu-LISA*, die offizielle Agentur der Europäischen Union (EU) für das Betriebsmanagement und die Entwicklung von IT-Großsystemen im Schengen-Raum. Anhand einer empirischen Analyse ihrer Standorte, Projekte und Aktivitäten wird argumentiert, dass gesellschaftliche Visionen von digitaler Grenz(un)sicherheit artikuliert, kollektiviert und stabilisiert werden. Jene eröffnen und schließen soziotechnische Handlungsräume und -möglichkeiten, und steuern das Projekt der digitalen Infrastrukturierung von Europas Grenzen. Die Studie folgt einem interpretativen Ansatz, der sich auf das Rahmenwerk der Situationsanalyse (*Situational Analysis*) bezieht. Zwischen 2019 und 2021 wurde dafür unterschiedliches, ethnographisches Material gesammelt, basierend auf Feldforschung, teilnehmender Beobachtung bei Konferenzen und Policy-Meetings, Interviews und informellen Konversationen, sowie offiziellen Dokumenten. Im Zentrum der Analyse stehen semi-strukturelle Interviews, die mit rund 30 politischen

Entscheidungsträgern, Beamten, Delegierten und Experten aus EU-Institutionen und Mitgliedsstaaten geführt wurden.

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