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Border control technologies: introduction

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ABSTRACT

This introduction together with the whole special issue on border technologies challenges the limitations of potentially simplistic understandings of contestation, disputes, and political intervention inherent in many accounts of material politics. How do border technologies turn borders into a contested space and how do they come to matter for specific affected communities, especially migrants? How do border technologies manifest hegemonic border-control regimes and thereby marginalise their contestations? Or else, how do they open up alternative versions of the border? Simplified notions of material publics assume that controversial issues may easily turn public. They are also too narrowly framed within the logics of the nation state, de jure citizenship, and specific political articulations of contestation as legitimate within representative democracies. Therefore, these notions disregard opaque, non-transparent forms of government as they are in place through border control regimes, on the one hand, and other less visible forms of contestation deriving from migrant issues and struggles as non-citizens, on the other hand. Migrants concerned with these issues are already marginalised population groups in the context of border technologies. They potentially struggle to make public issues of concern among a wider audience. The introduction together with the special issue expands the analytical repertoire, first, to understand forms of (im)possibilities of contestations related to border technologies and how they are co-shaped by socio-material and epistemic conditions; and second, to include less visible types of material politics, as contesting articulations may appear differently and remain only partially known to wider publics.

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Introduction

Borders are no longer merely lines of separation between so-called sovereign entities. They constitute multifaceted instruments by which those in power permanently turn certain spaces into places that are inaccessible to specific groups. Those spaces create or maintain social divisions that act both externally on

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international border demarcations controlling migration and 'internally in the divisions of subtly and not-so-subtly racially segregated regions, cities, prisons and internment camps' (Mbembe, 2018).

Mass media with global scope have noted the increasing sophistication of border technologies as well as the greater capital and expectations invested in digitalisation for migration control. *The Guardian* (2021) mapped the rising number of high-tech surveillance and registration systems that control moving populations along EU borders. *Politico* (2021) commented on the idea of a 'smart wall', a line of all-seeing surveillance towers aimed south, to confront irregular migration through innovation, being the technological dream of every US president since Bill Clinton. The *Washington Post* (2023) informed us about automated passport control machines that states and airports are introducing 'to streamline and speed up the entry and exit process'. Yet the *New York Times* (2023) emphatically states that 'we should give up the fantasy of solving the border crisis'.

In that sense, border technology development is here to stay as a means of addressing a permanent state of crisis across critical borderlands. Migrants are increasingly confronted by biometric technologies for scanning fingerprints and facial images, large-scale databases for identifying, registering, and documenting foreign travellers, as well as satellite surveillance systems and drones for detecting migrants in distress at sea (Amelung, 2021). Meanwhile, for a long time, migrants have found ways to cross borders, initially by manipulating identification documents. In recent years, they have been appropriating digital technologies (such as smartphones and social media platforms), either during their journeys or when claiming their right to asylum or reparation with the purpose of countering border-control regimes.

This special issue looks at a diverse range of border technologies. Some are devised to establish visible and increasingly less-visible digitalised, sophisticated, fortified border-control regimes. Others are invented and/or appropriated to circumvent, to contest, or to bypass border control and instead to enable self-determined migration. In that sense, borders constitute sites of contestation over different policy agendas, measures, interests and migratory mobility. To begin with the more obvious forms of contestation, diverse purposes assigned to border technologies have conflicted, especially when border-control regimes are highly politicised and public views tend to be polarised. In policy and public debates, border control technologies have become controversially discussed regarding how they serve to protect the humanity of some migrants at the cost of filtering out others, while neglecting the universal right to mobility, humanity and dignity of those excluded.

Here, we identify struggles over often contradictory aims attributed to borders – control versus autonomy, surveillance versus sovereignty, authority versus care, detention versus mobility. It is important to look beyond policy

and public discourse towards the multifaceted border technologies where they are designed, developed, and put into operation. This allows us to avoid separating issues of knowing from questions of being or becoming; such linkages make more visible the purposes, promises and visions assigned to border technologies.

From there, our perspective moves to exploring how technologies develop. They are inscribed with purposes and imaginaries of sovereignty (representations). Yet they may develop dynamics diverging from attributed functions and with consequences beyond the intended aims when put into operation (materialisations). When depicting the manifold practices and processes of operating technologies, we find that what technologies do for or against different purposes entangled with the border becomes complex and ambiguous. This is because different representations and materialisations of the border become enacted, with diverse consequences for migrant subjects.

Therefore we ask: 1. How do border technologies turn borders into a contested space and how do they come to matter for specific affected communities, especially migrants? 2. How do border technologies manifest hegemonic border-control regimes and thereby marginalise their contestations? Or else, how do they open up alternative versions of the border?

This special issue relates border technologies to migrant *subjects* who are shaped and enacted by them, while themselves shape and recuperate the technologies through contestation, resistance, and appropriation. This introduction develops a context-specific account of material politics that rethinks the (in)visibility of issues and the traceability of contestations, including marginalised political articulations.

Border technologies along contested borders

This special issue examines how border technologies are problematised and imagined, how they come into being, how they stabilise, evolve, co-exist and conflict with each other. This helps us to explore how borders create new conditions of (im)mobility and possibility, not just as an ideational concept, but also in their digitality-materiality. The issue of how technologies enable the hegemonic version of the borders enacted in border-control regimes is also explored (cf. Jørgensen and Galis, 2022).

The *control* versus *autonomy* nexus has been the core focus of most scholars engaged with border technologies. They also foreground how border technologies either attend to one or the other. Such analyses characterise Science and Technology Studies (STS), critical border studies and critical migration studies. Reflecting on this diverse literature allows us to approach our first research question more closely. We assume that diverse versions of the border enacted in border technology may remain in ambiguous silence and

implicit co-existence or undergo overt conflict with each other when becoming politically articulated.

An important body of work stemming from STS has turned the focus towards borders and migration by addressing the complex entanglements of migratory subjects and technologies at the borderlands. The rapid technologisation of the border through the implementation of state-of-the-art technologies for identifying and displacing undesired subjects (Galis *et al.*, 2016; Schindel, 2016; Galis and Summerton, 2018; Glouftsios and Scheel, 2020; Galis *et al.*, 2022), and the 'datafication of migration and mobility management' (Dijstelbloem and Broeders, 2015, p. 242; Scheel, 2019) have attracted major critical reflections (Leese, 2016; Bellanova and Glouftsios, 2021; Glouftsios and Casaglia, 2022).

At the intersection of STS and research on infrastructures employed to manage and control migrations, scholars have explored processes of logistic, organisational and administrative processing of alterity and thereby ordering and performing the identities of migrants (Pollozek and Passoth, 2019, Glouftsios and Scheel, 2020; Pelizza, 2020). Research has explored forms of extending the power to govern migration through such control infrastructures. This increases opacity and complicates possibilities of knowing of failures, errors and thus enclosing potential critical issues and their possible contestations (Glouftsios, 2021).

Border-control regimes and their technologies have also widely interested scholars who are attentive to forms of contestation in public policy controversies (Bayramoğlu and Lünenborg, 2018; Gillespie *et al.*, 2018; Sontowski, 2018), as well as contestation through practices and discourses of migrants and solidarity movements (Rygiel, 2011; Papadopoulos and Tsianos, 2013; Ataç *et al.*, 2016; Galis and Makrygianni, 2022). Influenced by the autonomy of migration debate, scholars engaging with STS have studied diverse practices of contestation as appropriation to border control technologies (Scheel, 2019). Subversive forms of migrant struggles producing counter narratives and contesting the performed 'non-publics' attributed to border control technologies have also attracted attention (Dijstelbloem and Broeders, 2015; Glouftsios and Casaglia, 2022). More recently in the context of contested borders, researchers have investigated border technologies that contribute to the autonomy of migration and introduce alternative technologies and infrastructures enabling migrants' mobilities in their own right (Amelung *et al.*, 2020; Milivojevic, 2020; Mora-Gámez, 2020).

In order to overcome 'control-biased analyses' (Scheel, 2019), we use the term border technologies in a dual sense: technologies installed with the initial purpose of establishing border-control regimes, as well as those used, appropriated or subverted by migrants themselves, thereby enacting alternative versions of the border. Various scholars have emphasised the importance of acknowledging the performative effects of border technologies installed for

control purposes. Information systems to prevent uncritically accepting the objective truth allegedly produced about the identities of people they intend to 'manage' would fall into this category (Glouftsios and Scheel, 2020). Inspired by Autonomy of Migration scholars, we study the material politics of contestation and otherness in the context of hegemonic border-control regimes. This assumes a 'strategic-analytical prioritisation' of migrants' practices in the study of migratory processes and the migration control regimes (Mitropoulos, 2007, p. 128; Moulier Boutang, 2007). A strategic-analytical prioritisation implies that taking migrants' practices as a focal point for investigations of border regimes helps to make visible their alternative enactments of the border, thus contesting hegemonic versions of border control.

In this issue, three papers challenge the performativity of information systems as border technologies as monopolistic producers of stable and objective knowledge and information for identifying migrants (Mora-Gámez, 2023). In that sense, this special issue gathers contributions that assemble studies demonstrating multiple versions of the borders enacted and performed in often ambiguous ways through border technologies and with regards to their political consequences for migrant subjects. Conversely, Makrygianni and Galis (2023) account for the ambivalences of border technologies being potentially both a possibility and a threat to the mobility of migrants. While interested in how border technologies may turn borders into a contested concept, we acknowledge that inequalities and injustices deeply rooted in power and history shape the capacities of different actors to multiply versions of borders, and to articulate contestations of dominant notions of hegemonic border regimes in substantially asymmetrical ways.

The following section addresses how specific conditions shape the potentiality of problematising and contesting borders. It touches on the material politics of disabling and marginalising contestation of hegemonic border-control regimes in some political situations. Another subject discussed involves enabling diverse forms of political articulations about alternative versions of borders in other political situations.

Material politics of border technologies

We study the material politics of border technologies to challenge and investigate their affordances for contesting or manifesting certain versions of borders. We believe that focusing on material politics of border technologies allows us to better understand and reflect upon our second research question: How do border technologies manifest hegemonic border-control regimes and thereby disable and marginalise their contestations, or else open up alternative versions of borders?

With inspiration from the notion of 'material politics' developed by Andrew Barry (2013), we argue in favour of the connection between the availability and

transparency of material information on the one hand and how contestation may consequently occur, depending on evidence about harm and injury. There is substantial evidence that border technologies deriving from border-control regimes as such have caused harm, injury, and death to migrants, especially in the Mediterranean Sea, at the US-Mexican border, or borderland between Poland and Belarus. Yet the specific impacts are not sufficiently visible and documented. In particular, the (im)possibility of contestation, shaped by the interaction between human and nonhuman agency, is what inspires us to take Barry's term of material politics as a starting point.

However, we consider that material politics, deriving from a family of analytical-conceptual signifiers such as 'object-oriented politics' (Marres, 2007; Marres and Lezaun, 2011), 'ontological politics' (Mol, 1999; Woolgar and Lezaun, 2013), and/or 'material democracy' (Marres, 2012), may be problematic in the specific context of forced migrations. Understandings of material politics and close conceptual relatives have been developed in specific empirical case study contexts (for instance, pipeline construction, Barry, 2013; or mundane consumption objects, Marres, 2012). In specific settings of liberal representative democracies, these are entangled with rationalities of de jure citizenship and particular conditions of power asymmetries, political inequalities and injustices, with consequences for the potentiality of public contestations.

We, therefore, additionally build on Huub Dijstelbloem's concepts, especially his most recent contribution on border infrastructures' technopolitics. Dijstelbloem developed a similar approach to Barry's material politics, but astutely applies it to the specific context of borders, states and infrastructures. He emphasises the politics deriving from unfolding technologies and their multiple ontologies:

> Technopolitics breaks with the normative distinction between humans and nonhumans, as well as with the idea that technologies can be designed and regulated according to political will […] The emphasis on ontological politics does not mean that the instrumental uses of apparatuses or the design of border environments according to political will has disappeared. Instead, the intimate entanglements among humans, institutions, and technologies that make up border infrastructures provoke all sorts of technopolitics to come into being. (Dijstelbloem, 2021, p. 74)

In that sense, by exploring the material politics along borderlands, we follow our interest in politics (epistemology) entangled with border technologies (ontology) – the objects, issues, actors, subjectivities of individuals and collectivities. Border technologies allow us to reflect on how border-crossing and border control are involved in co-shaping sovereignty as a sociotechnical agency (or the deprivation of agency) that produces (il)legalised mobile subjects and the material politics of migration. In other words, this conception of politics comes with an empirical interest in how political subjects and material objects come into being, begin to matter and are co-constituted with the

technoscience of border technologies and related sociotechnical forms of contestations.

Our take on material politics – just like Barry's and Djstelbloem's approach – inspired by actor network theory (ANT), attempts to include nonhumans in descriptions and ways of acting together with humans to assign meanings to an issue through networks of connectivity (Callon, 1987; Mol 2002; Law, 2004). It highlights exploring how specific intra-actions matter in human and nonhuman emergent interaction that can be studied along socio-material and epistemic practices (Barad, 2003). However, we problematise that many understandings of material politics inspired by ANT ignore or pay too little attention to 'the importance of a situated view of complex asymmetrical lifeworlds and the transversality of neglected experiences' (Papadopoulos, 2010, p. 194). Thus, it is imperative to reveal the way in which border technologies, migration policies, border guards, and how migrants situate us (social analysts) are entangled in the realm of ethics and material politics.

Haraway (1990) suggested the collective experience of humans and nonhumans as negotiating radical divergences between participants. In return, these negotiations constitute the processes of social and ecological world making. In this issue, we do not merely follow the actors, maintaining a symmetry between humans and nonhumans. We also problematise our 'response-ability' (Haraway, 2008) for 'the differential patterns of mattering of the world of which we are a part' (Barad, 2007, p. 394). We acknowledge the radical divergences of experiences between participants in social, material and ecological environments and their articulations (Haraway, 2001; Bracke and Puig de la Bellacasa, 2009).

Those patterns can be understood in two senses. Either as an invitation to account for situated experiences of participants who otherwise remain invisible by making visible their processes of alterity-processing and alterity-making through border technologies. This reifies the differences between non-marginalised and marginalised experiences, e.g. (Pelizza, 2020). Or alternatively, as a call to trace 'alter-ontologies', which create life forms that are 'the effect and the precondition for the continuation of existence of marginalized actors' (Papadopoulos, 2010, p. 193). In other words, the resulting understanding of politics is:

> [P]olitics arises from the emergence of the miscounted, those who have no place and whose capacities remain imperceptible within the normalizing organization of the social realm (Rancière, 1998). Politics is a collective enterprise that exposes a given social order to be limited, contingent and inconsistent by creating an alternative life-world inhabited by the previously miscounted. (Papadopoulos, 2010, p. 193)

Barry's criticism of early ANT work on the co-constitution of problematisations and publics is relevant in the context of visibility and invisibility of migration problems and the political consequences for the possibility of their (public) contestation:

> In actor-network theoretical approaches to the study of problems, problems and publics are co-constituted. Yet at the same time, the specific kind of empiricism espoused by actor network theory raises questions as to which problems are not articulated as objects of concern, as well as which voices may be excluded in the process of problematization. (Barry, 2021, p. 99)

Galis and Lee (2014) modify ANT vocabulary to suggest that, rather than simply following the actors, we may also turn the analytical lens on the invisible processes of undoing a network, othering an opponent, and constituting a group of outsiders. The focus lies on the making of weakness and otherness. This is material politics on another level, one that makes weakness constructed rather than an inherent state of social processes. This is an onto-epistemological strategy for making visible enactments of weakness and otherness (Galis and Lee, 2014)

In this issue, we examine the particularities of migrants' forms of political articulations and struggles, their unexpected presence, or their being out of place. Migrants often remain at the thresholds of any traceability and political recognition 'depending on their juridical status, on their migratory projects and the alternated migration regime of capture' and thus reveal the limits, but also politics, of their representation in media, policies, and research (Tazzioli, 2015, p. 11). The invisibility of migrants' presence is sometimes produced by mechanisms of capture but is sometimes strategically played out by migrants themselves (ibid: 2). The (in)visibility of issues as crucial conditions and potentialities of contestation, and political articulation may then lock-in and silence contestation, creating marginalised 'non-publics' (Dijstelbloem and Broeders, 2015). These non-publics may then be limited and/or unwilling to articulate political contestations visible to publics acknowledged as political collectives of publics in liberal representative democracies.

Addressing border technologies applied in border-control regimes, Dijstelbloem and Broeders (2015) developed the notion of non-publics. Non-publics are lost in the categorisation of border control technologies and databasing logics and differ substantially in the degree to which they could be classified as 'publics' (Dijstelbloem and Broeders, 2015, p. 32). The notion of 'non-publics' also emphasises their restricted access to the political articulation of de facto affected communities of migrants that are recognised by state-centred forms of political articulation. These communities are restricted from assembling as a collective around shared issues and therefore articulate how technologies and infrastructures do matter and come with constraining consequences for migrants.

The special issue: survey of articles

This special issue deals with onto-epistemological aspects of the material politics of borderlands. It contributes to problematising prevalent assumptions

about material politics through a context-specific account of border technologies. It also illuminates otherwise invisible consequences of border-control technologies, how they play out in marginalising migrant voices, and how certain border technologies in specific situations may create conditions for contestation. Contributions highlight positionalities with normative commitments that contribute to weakening asymmetries between the material arrangements shaping the conditions of (in)visibilities of migrant subjectivities and the possibilities of political articulation of migrant matters. Thus, the articles align their analyses with various forms of 'solidarity' in political terms or 'shared conversations' in epistemological terms (Haraway, 2001, p. 176; Galis and Hansson, 2012).

Returning to our two initial questions in this special issue, contributions respond to them in different ways. First, several authors respond to how border technologies turn borders into contested spaces that come to matter to specific affected communities. Especially migrants themselves are involved, as they account for multiple forms and epistemic standpoints of political articulation and contestation. Several articles deal with the asymmetries among different epistemic standpoints that turn matters into matters of concern. Different kinds of political articulation also exist to problematise border technologies entangled with migration control regimes. Contesting articulations of migrant subjects may appear atomised and as singular acts in response to control purposes of border technologies, as shown by Laura Lambert (2023). The collective political views of migrant subjects are articulated to some degree. And solidarity networks are shown using digital border technologies, such as mobile phones and social media, to support autonomous migration and navigating the ambiguities of being seen while speaking out, or remaining unseen to avoid harms of surveillance, as shown by Makrygianni and Galis (2023).

Lambert (2023) addresses the contestation of 'humanitarian infrastructures' of UN and IOM in Niger by studying migrants who aim to abandon their migration projects. She identifies migrants' forms of contestations through 'voicing criticism' and 'exiting' as responses to promises entangled with these infrastructures. By contesting these promises, migrants stepped out of the humanitarian protection politics that subjectified them as victims and challenged the legitimacy of international organisations preventing people from migrating. Through their contestations, migrants constituted themselves as political subjects. These forms of contestations by migrants take place as immediate resistance to border-control technologies Infrastructures can also be seen as attempts to transform atomised subjects of non-publics into political subjects. However, other forms of contestations derive from ways of collectively countering and circumventing border-control regimes.

Decolonial studies of politics of matter acknowledge, in particular, migrant and activist social movements' engagements in addressing questions of justice

by learning and experimenting with changing the material composition of life. They enable a focus on the ways migrants perform politics by delinking from the Western epistemic and ontological appropriation of matter as they do not consider them open for exploration and enclosure (Papadopoulos, 2018). Migrant movements tend to avoid directly targeting institutions of power and prioritise practices of movements on the ground over organising along existing institutionalised political channels. Instead, they build and facilitate imperceptible but robust alternative infrastructures that may facilitate the freedom of movement of migrants or may constitute everyday justice in migrant's everyday lives to restore relations that were broken, withdrawn, or neglected by states and the narratives of rights enacting statehood boundaries (Mora-Gaméz, 2020, p. 706). Materiality and technologies here serve to enable migrants to resist and give rise to alternative imaginations contesting dominant political orders (Amelung *et al.*, 2020, Milivojevic, 2020; Makrygianni and Galis, 2023).

In this issue, Makrygianni and Galis (2023) examine how digital technologies are appropriated by migrants as counter technologies to border control technologies. By studying ICTs at the disposal of queer migrants, they analyse how digital connectivity of queer migrants on the move to Europe plays a crucial role in the confrontation of border regimes and their material politics of silence and violence of border control technologies, heteronormativity and racist oppression. Yet, they account for the ambivalent or controversial role of ICTs as enablers or potential hazards. For instance, some ICTs can endanger migratory trips, whereas others facilitate safe border crossing, facilitate friendships, intimate relations, and solidarity bonds. The appropriation of digital media by queer migrants re-arranges the material politics of the borderland and contests border technologies, and through radical care allows communities to live through hardship, fear and abuse.

Once the focus shifts to the multiple struggles and various processes of negotiation through migrants' practices, we see borders as 'veritable battlegrounds' (Scheel, 2019) where dominant versions of borders as sites of control and surveillance of the border may provoke their appropriation, co-optation, and repurposing. Furthermore, many and multiple alternative versions of borders may be enacted in different forms of migrant practices and political articulations. We suggest that understandings of material politics of contestation in the context of border technologies need to be analytically further developed to be able to account for diverse forms of contestation, such as disruption, subversion and resistance (Galis and Lee, 2014; Scheel, 2019; Glouftsios and Scheel, 2020).

Additionally, in order to grasp the complex realities of material politics of borderlands, we propose an analytical vocabulary that revisits binary distinctions between publics versus non-publics, visibility versus invisibility, epistemology versus ontology. Instead, we suggest qualifying the conditions of

(im)possibility of political articulation when issues of marginalised population groups come to matter. This is when border technologies obscure their consequences for migrants and add additional layers of othering to their already precarious status. And when political articulation may yet take place, but beyond representational forms of material politics. Such forms of contestation may remain individual acts of political articulation or subversion, yet are often undocumented and marginalised (Glouftsios and Scheel, 2020; Glouftsios and Casaglia, 2022; Lambert, 2023). Or they may derive from organising common and alternative ontologies of existence (in)visible to pervasive political control regimes as potentially relationally achieved forms of resistance (Papadopoulos, 2018).

Second, several authors focus on border technologies manifest hegemonic border-control regimes by making and manifesting authoritative knowledge on border-control technologies legitimising the violent state, but also by particular mechanisms of disabling and marginalising contestation. Contributions in this issue therefore also shift the focus to the study of how socio-technical ontological and epistemic practices establish and maintain border-control technologies and regimes authorising and legitimising the violent state acting with additional regimes of suspicion (Borelli *et al.*, 2022) against risky noncitizens (Tonkiss and Bloom, 2015) and criminalised migrants (Franko, 2020). The interrogation with processes of social and epistemic control helps to illuminate how multiple versions and accounts of borders may become reduced to selected dominant versions. Alternative versions are therefore marginalised and excluded, further limiting possibilities for contesting the 'dominant' versions (Herberg and Vilsmaier, 2020).

EU governing infrastructures for migration control continuously shape border technologies. It is therefore relevant to understand whose expertise is made legitimate, how these processes make certain political ontologies inscribed in knowledge production processes authoritative in order to legitimise specific forms of border control while disabling and marginalising framings that would include contestations of sophisticated border technologies. Actors involved with these modes of infrastructural governance aim to reduce the potential for public contestation concerning bordering practices, until the next breakdown or collapse occurs. Contributions to this issue investigate how state authorities and intrastate networks become responsible and how legitimate actors monitor and assess the efficiency of border-control technologies when bordering practices collapse.

Securitised border management regimes are framed to be increasingly reliant on new technology, the socio-political contexts that shape technology choices and emerging technologies. The wider processes of scientific and technological advancement are relevant for consideration to understand how border security 'problems' and respective 'solutions' are co-produced by complex political situations involving a multitude of actors (Jasanoff, 2004; Martins and Jumbert,

2022). Thereby, they also rule out alternative co-constructed problem-solving pairs that may respond to and include articulated forms of contestations. As EU research framework budgets progressively grow, their impact on the scientific and technological landscape in Europe also expands (Stierl, 2020).

Martins (2023) analyses and critically reflects on how border security knowledge emerging from EU-funded research is fundamentally shaped and framed by the content of the calls issued by the EU itself. This content impacts on bureaucratic decisions taken by the European Commission, Frontex and other agencies tasked with border security and control. Such circular dynamics, with circulation seen both as a technology of control and as producing performative effects, problematise the dimension of epistemic control in the field of border security. Co-productionist epistemic practices across political and technical knowledge, as well as self-referential epistemic practices in the knowledge production of expert knowledge in the EU, manifest political ontologies of the hegemonic securitised border control regime. This, in turn, creates a certain epistemic resilience against contestation.

Disabling the potential of contestation is inherent in the contexts of (in)visibility, secrecy and opaqueness of border control technologies. The contributions in this special issue reveal forms of invisibility evident in hidden and subtle forms of governing and ordering border control technologies that stabilise the technologies through coercive forms of integrating migrants into them and making them highly operable by remaining provisional (Pollozek and Passoth, 2023). Such forms of governing border control technologies have various silent power effects on migrants. However, the silencing of alternative accounts of migrants and their possible contestation of border control technologies can take place through multiple and segregating forms of forced invisibility (Mora-Gámez, 2023).

Pollozek and Passoth (2023) reflect on how provisional border control infrastructures silence migrants' alternative accounts. In the context of the information infrastructure of the Frontex Joint Operation Poseidon, this occurs through hidden coordination and repair work, taming and turning messy data into valid, stabilised and immutable data. They argue that information infrastructures not only become sites of contestation but also produce and process contestations themselves. Inconsistencies and controversies, tensions and frictions are not exceptions, but are a constitutive and even productive part of infrastructures fuelling an ongoing process of (re)ordering. Such modes of (re)ordering can be characterised as provisional and mostly informal. They thereby support a rapid intervention into Hellenic border operations by Frontex and other security actors and give Frontex a central position in the ecology of knowledge production of European border control.

Mora-Gámez (2023) highlights the multiplicity of relations and possibilities that escape the Colombian government's 'Official Record of Victims' as a system of capture that thus segregates forms of invisibility. The Official

Record of Victims is internationally considered an exemplary reparation project and technological success in terms of bureaucracy registering and compensating victims of war violence, predominantly including people on the move due to forced displacement. By demarcating boundaries between legitimate and illegitimate applicants, and in consequence othering the latter group, the system segregates forms of (in)visibility (Van Houtum, 2021). This occurs by displacing those that do not meet the requirements for being registered as victims but remain visible in the numbers, therefore making invisible and ignored those who are not mentioned (Rancière, 1998).

Conclusion

This special issue on border technologies challenges the limitations of potentially simplistic understandings of contestation, disputes, and political intervention inherent in many accounts on material politics. These simplified notions assume that controversial issues may easily turn public. They are also too narrowly framed within the logics of the nation state, de jure citizenship, and specific political articulations of contestation as legitimate within representative democracies. They therefore disregard opaque, non-transparent forms of government as they are in place through border control regimes, on the one hand, and other less visible forms of contestation deriving from migrant issues and struggles as non-citizens, on the other hand. Such accounts suggest that issues that once turn public and become contested can easily be transformed into matters of collective concern. These accounts may therefore overlook whose issues are at stake. For instance, the migrants concerned with these issues are already marginalised population groups in the context of border technologies. As such, they potentially struggle to publicise issues of concern among a wider audience.

Consequently, this special issue highlights the very forms of (im)possibilities of contestations related to border technologies and how they are co-shaped by socio-material and epistemic conditions. Thus, contributions to the issue clarify obstacles to making visible and known the consequences for migrant subjects of border technologies. Not only as matters of isolated concern, but also as common and collective concerns not only of affected migrants, but also of the public in a broader sense. We hope the contributions help to expand the analytical repertoire to include less visible types of material politics, as contesting articulations may appear differently and remain only partially known to wider publics.

Border technologies come to matter for affected migrants, bringing existential consequences resulting from selective categorisation, invisibilisation and enabling/disabling access to mobility. Diverging or conflicting accounts are sorted, aligned, and excluded to make the apparatus of border control work. Contestation therefore remains hidden yet deeply entangled with border

technologies. Contested space around border technologies can be detected by tracing back what and how 'residual categories' arise, e.g. what does not fit, what emerges and how it is used; or by tracing back chains of translation and spokespersons who rule out conflicting accounts.

The contributions of Pollozek and Passoth, and likewise Mora-Gaméz, show how classification systems are required to align 'competing accounts of the same phenomena, […] or outright contradictions' (Bowker *et al.*, 2010, p. 110). Contradictions may derive from not fitting existing standardised categories of information infrastructures, or from contesting the ontologies of the state and border control regimes inherent in registration systems. Pollozek and Passoth point to residual categories as part of the Frontex Joint Operation Poseidon, which can be understood as the 'other' or left-over categories to be filled in when processing migrants' registration. They serve as 'containers' for accumulating all information provided and collected that does not fit the standardised forms in the classification system. Residual categories embrace additional and alternative views of particular events and thus accommodate accounts and data, including information that may not be alignable with hegemonic understandings of migrants and borders. Yet, alternative or even critical accounts of migrants that end up in the residual category are more likely to remain invisible and unknown, despite their consequences for migrants' own life trajectories.

Border technologies act as containing borders (Tazzioli, 2020), limiting spatial mobility, enforcing prolonged waiting times, preventing possible forms of employment, and exacerbating existing conditions of precarity. The registration processes of victims and internally displaced migrants in information infrastructures, such as the registration in the Official Record of Victims (RUV) in post-conflict Colombia, enact a border that limits and defines the access to rights restitution of the people it contains. Fredy Mora-Gámez demonstrates the multiple forms of creating selective (in)visibilities through the processes and forms of registration in the RUV that affect victims and internally displaced people, which is the largest category of registration.

Registration is intended to permit direct access to compensation for a wide range of victims of war-related crimes, including mainly forced displacement. However, the methods, ideologies, devices, and practices used to generate the Official Record of Victims (RUV) do not provide objective, neutral knowledge. Instead, the assessment practices for registration condense multiple chains of translations and spokespersons (Pelizza, 2021) when deciding whether to accept or reject applications. Applications that contest the official narrative of the armed conflict – as a war between exclusively illegal armed groups – are made invisible by the RUV, so that the official state account of the history and implications of the conflict becomes even more visible.

Expanding our palette of empirical and conceptual perspectives on overlooked acts of resistance, struggles and power asymmetries through border

control regimes in turn expands our repertoire for understanding material politics accompanying border technologies. One key starting point is that migration control technologies facilitate specific expectations and visions of a better short and long-term future for migrants. Migrants therefore object when confronted with the materialised operations of border infrastructures. These acts of migrants' contestations are individual, atomised acts, but rarely turn into publicly known and collective concerns. Laura Lambert shows that the 'humanitarian border' is contested based on promises of international organisations such as IOM or UNHCR; they lead one to expect assistance when abandoning migration projects, but without guaranteeing that these visions can turn into reality.

The focus of these organisations' missions ranges from encouraging voluntary return and providing reintegration support, to the less likely resettlement in the Global North. These promises meet fertile ground considering migrants' fears of being re-exposed to infrastructural deficits, social destitution, and the risks of migration in the Sahara and Sahel. Yet the international organisations' failure to offer decent care to refugees and migrants that could stop them from migrating onward leads to a significant share of migrants contesting the situation by abandoning the support of the organisations. Instead, they resort to 'acts of exit', i.e. refusing the roles and resources of the humanitarian border, and 'acts of voice', e.g. letter-writing, protests, and their faint grumbling to officials.

Border technologies constitute and stabilise hegemonic border-control regimes but rely on particular securitised and techno-optimistic understandings of migration control. These notions are based on exerting epistemic control over the agendas that determine what and how migration and security research receives funding and feeds back into policymaking. The kinds of epistemic control exercised by EU institutions and security agencies marginalise divergent directions of critical migration and security research and make contestation inherently difficult. Bruno Oliveira Martins demonstrates the circular dynamics of knowledge production in EU-funded border security research. Frontex and other agencies are often present and shape the agendas at all stages of the research funding cycle.

This can be traced from its origins when security agencies provide input for research programmes and respective research calls. The shaping continues during the research developed stage, and while agencies facilitate testing and validation processes and participate in consortia. Finally, shaping is evident when agencies promote the adoption and use of the research results. In other words, they ultimately co-define the issues that constitute border security 'problems' and 'solutions', including how border technologies are hailed as solutions to particular enacted problems, and then themselves co-constitute a particular version of the border control regime.

While border technologies are usually associated with border control regimes, here we suggest expanding the view to encompass situations when border technologies open up alternative versions of borders. Such situations include when migrants confront contesting hegemonic versions of borders enacted by border technologies and engage with technologies that help to contest border regimes and instead provide digital spaces of care. This is the case in particular arrangements that provide what Makrygianni and Galis call 'radical digital care' practices of mutual-aid and solidarity that appropriate the digital sphere to provide physical and emotional care to queer migrants, for example. The Emantes project revealed material politics that facilitated a transnational network of solidarity among queers and solidarians. Started by a WhatsApp group, the project resulted in a material social cooperative enterprise and political assembly. United by the contestation of border controls and confrontation of homophobic and sexist violence, queer migrants together with solidarians, reinvented care by repurposing digital technologies to confront the aggressive masculinity of borderland technologies. Makrygianni and Galis propose the notion of autonomy of queer migration to focus on the diversity of practices and behaviours of queer migrants and move away from individual narratives to a (mobile) common digital and physical space. The autonomy of queer migration centres around practices which redraw, redefine, and contest national borders, borders of normativity, homophobia, and racism as well as stereotypes of traditional healthcare.

Our outlook echoes the call for careful, critical, and reflexive engagement in our own and others' research collaborations. Such engagement should infuse our potential contributions to make concerns known and visible, while dismantling and problematising the material politics of border technologies. Crafting the visibility of alternative visions of borders enabled by border technologies is equally essential. We have therefore joined forces for this special issue as a collective endeavour to inspire research that will continue to expand the horizons of this journey in the material politics of border technologies to explore and enrich migration studies.

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