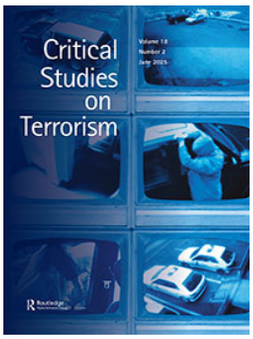

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Developing CTS 4-o: a CTS research agenda on AI, terrorism and counter-terrorism

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ABSTRACT

This article argues for the Critical Terrorism Studies (CTS) field to engage more thoroughly with the implications of artificial intelligence (AI) in both terrorism and counter-terrorism. Drawing from Science and Technology Studies (STS) and critical security studies, it highlights the importance of scrutinising AI as a socially constructed technology that is embedded in power relations and specific hierarchies. It examines how AI is discursively framed as both a threat and a solution in security-related matters, shaping counter-terrorism policies in ways that reinforce state-centric, racialised, gendered and militarised security paradigms. The article outlines a CTS research agenda on AI, focusing on key areas of inquiry: the discursive construction of "AI terrorism" and "AI counter-terrorism", the role of sociotechnical imaginaries in legitimising AI-based counter-terrorism measures, the (b)ordering of societies through algorithmic governance and the material dimensions of AI counterterrorism. By engaging with critical security scholarship and feminist, postcolonial and decolonial critiques of technology, CTS can expose how AI-driven security exacerbates inequalities while reifying the status quo. The article positions CTS as a crucial field for analysing the political and ethical implications of AI in counterterrorism and urges CTS to start engaging more robustly with AI implications in terrorism and counter-terrorism and reflecting on its political and (in)security consequences.

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Introduction

This article makes the case for Critical Terrorism Studies to develop a deeper and more systematic engagement with Artificial Intelligence (AI). AI is becoming more and more a central topic in a wide variety of spheres of production of knowledge for its capacity to perform tasks autonomously – mostly, the autonomous processing of a huge quantity of data. Nowadays, AI is an umbrella term used to refer to systems with different capabilities, among many others, visual perception, speech recognition, sentiment analysis, image generation, and generating coherent and contextually appropriate text to engage in conversations that closely resemble human interactions – such as the famous ChatGPT or Perplexity. While a future technological goal is developing what is called Artificial General Intelligence (AGI) – i.e. an AI that could perform autonomously any intellectual

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task that a human can – the current systems belong to Artificial Narrow Intelligence (ANI) – i.e. they rely on large datasets and algorithms to optimise their performance without, however, possessing general cognitive capabilities.

It is both because of the tasks it can currently carry out and its possible future capabilities that AI's uses in a wide variety of spheres is receiving more and more attention – including its implementation in security-related matters. In this case too, a wide variety of actors such as states, international organisations or even tech companies (Roberts et al. 2024) have been focusing on its possible uses in and by the security sector. Many of these are currently busy competing in the "global AI race" while also looking for common ways of regulating it globally (Smuha 2021) also in relation to security matters and, specifically, to terrorism and counter-terrorism. For the same reasons, security experts and scholars have been discussing and analysing the possible future consequences of AI uses in relation to security matters. Current worries focus on, for example, the possibility of terrorist groups embracing the use of AI and being able to pose a near-apocalyptic threat to the world in several ways (Nelu 2024). At the same time, scholarly and practitioners' debates have been focusing on how to implement AI in counter-terrorism to outweigh the possible terrorist threat while navigating ethical and moral dilemmas that would arise from the possible use of these systems in counter-terrorism (Bernd 2024; Mathur, Broekaert, and Clarke 2024; Nelu 2024).

These preoccupations reflect mostly more mainstream approaches' concerns towards security, terrorism and counter-terrorism. Nonetheless, these are not the only ones that have scrutinised AI's impact on security matters. From very different theoretical angles, critical security scholars have been robustly engaging with adapting theories and concepts from the field of Science and Technologies Studies (STS) to reflect on the political implications of AI and other technologies on security matters (Evans, Leese, and Rychnovská 2021; Bellanova, Jacobsen, and; Monsees 2020). It is the aim of this article to bridge CTS with works done in these other sub-fields while developing a research agenda for CTS' research onAI in terrorism and counter-terrorism.

Critical security scholars have produced important interventions on technological development and terrorism and counter-terrorism (see, among many others, Amoore and De Goede 2021; Aradau and Van Munster 2007; de Goede and Amoore 2008), but the literature on these specific themes can still grow. Here, I argue that CTS could further contribute to this literature with its very specific theoretical and empirical strengths that will position it in a good place to reflect critically on AI and terrorism and counter-terrorism (Jarvis 2024). At the same time, I argue, CTS can gain analytical skills by embracing some of the theoretical and methodological approaches used in critical security studies and, above all, STS. For example, CTS is well equipped to examine the discursive constructions of terrorism and counter-terrorism and to denounce power inequalities as (re)assembled by security measures (Jarvis 2009). Nonetheless, there is much to learn from STS and critical security scholars when examining these topics in relation to technological development. By bridging these bodies of literature, I argue, CTS could gain theoretical deepness and strengthen the academic production on terrorism, counter-terrorism and technologies scrutinising these topics from very specific CTS' angles.

At the same time, engaging with AI in relation to terrorism and counter-terrorism is becoming an urgent political task for CTS. Based on the core political commitments of

denouncing how constructions of security (re)produce inequalities, violence and oppression (Jackson 2007b), CTS is missing out on scrutinising a policy area that may magnify these processes. As this article will show, CTS is urgently needed to scrutinise the political consequences of the political debates and emerging global governance on AI in security matters and the specific constructions of AI in relation to terrorism and counter-terrorism, among other themes that will be highlighted.

Therefore, this article aims at putting forwards a research agenda for CTS on AI uses in terrorism and counter-terrorism. Clearly, this can only be a non-exhaustive research agenda; nonetheless, it hopes to raise important research questions and highlight areas of engagement where CTS production could be of use, academically and politically. The article first sketches a brief state of the art of STS and critical security studies literature to describe current lines of research in these fields. Then, drawing on their main theoretical contributions, the article highlights several areas of possible engagement for CTS to unpack AI development in relation to terrorism and counter-terrorism. It then ends with formulating various research questions and highlighting possible areas for CTS future work. Before delving into the discussion, it is important to note that the article uses broad and contested categories such as "AI" or "terrorism" and "extremism" without problematising the terms, or it discusses "counter-terrorism" in very broad terms (encompassing within it the Prevention and Countering of Violent Extremism). This is done not only for the sake of brevity but also because these categories mostly appear this way in the discursive constructions that will be examined.

Science and technology studies: a brief state of the art

Science and Technology Studies (STS) is an interdisciplinary field that has developed quite independently from others since approx. the 1960s (Evans, Leese, and Rychnovská 2021). It examines the creation, development and consequences of science and technology in their historical, cultural, and social contexts by bridging a wide variety of disciplines from social sciences, humanities and natural sciences. By integrating perspectives from philosophy, sociology, history and political science, among many others, STS provides a comprehensive framework for understanding the complex relationships between knowledge, power and technological changes. It is because STS allows for reflections on the co-constitution between technology, society and power (Jasanoff and Kim 2009) – i.e. human and non-human agents and structures – that International Relations has been interested in STS for a couple of decades now (Lidskog and Sundqvist 2015). While this engagement constitutes a strong body of literature approaching different themes, this section will focus mostly on three main sub-fields that will be of interest for the present work: critical security scholarship work on STS, and feminist and postcolonial STS.

As said above, despite some significant interventions aimed at creating synergies between CTS and critical algorithm studies (Miller 2019) or critical data studies (Amoore and De Goede 2021), CTS engagement with technological progress, computing developments and what these imply for security are still scattered. However, the same cannot be said for sub-fields that are close to CTS, such as critical security studies. In this case, the engagement with Science and Technology Studies (STS) has given rise to an important body of literature (Bellanova, Jacobsen, and Monsees 2020). In 2020, Bellanova et al. were laying ahead a new research agenda for (critical) security studies engaging with STS

(Bellanova, Jacobsen, and Monsees 2020; Evans, Leese, and Rychnovská 2021), elaborating on conversations going on about STS and International Relations (see, among many others, Lidskog and Sundqvist 2015). Despite some of the differences between the two fields and their "core commitments" (Jackson 2007b), many critical security scholars are engaging STS theoretical resources in a way that may be relevant for critical approaches to the study of terrorism and counter-terrorism. In fact, in the last decade, critical security scholars have been doing important work in understanding what and how STS resources can be helpful in thinking about security politically and how to adapt them to the study of (in)security (Bellanova, Jacobsen, and Monsees 2020, 2020).

Along these lines, various STS theoretical tools such as myths, sociotechnical imaginaries, controversies and narratives adopted by critical security studies scholars are of interest for CTS. Further defined below, STS uses these concepts to approach the study of the discourses and narratives on Artificial Intelligence or related technologies, how AI is imagined and narrated, the stories that are told about its possible uses and how all of these, in turn, shape political decisions (see, among others, Watts and Bode 2024; Natale and Ballatore 2020; Jasanoff and Kim 2009). Other authors have been scrutinising how different cultures interpret AI's benefits and risks differently (Cave and Sarasvati Monique Dihal 2023; Cave, Dihal, and Dillon 2020; see also Bode et al. 2024).

Overall, STS researchers have illustrated how AI is, in some cases, represented in utopian and dystopian ways, both in policy contexts and in popular culture (Chubb, Reed, and Cowling 2024; Dillon and Schaffer-Goddard 2023; Watts and; Bode 2024; Cave et al. 2018). For example, research in this strand has highlighted how AI is usually narrated as a disruptive technology capable of unimaginable things and as a technology that is about to replace humans (Cave and Sarasvati Monique Dihal 2023; Cave, Dihal, and Dillon 2020) and, based on this, critical security scholars have looked into how these depictions shape security and military decisions (Watts and Bode 2024). Other works have been analysing a wide variety of contexts and actors (re)producing narratives of AI as a security threat such as the discourse of the so-called "AI race" (Bareis and Katzenbach 2022) or looking at the securitisation of AI in different contexts (Zeng 2021). Moreover, they have demonstrated how these representations influence stakeholders' views on AI in relation to security (Bode et al. 2024), and how they reinforce public opinion's views on the "appropriateness" or even "necessity" of developing and using AI – even militarised AI – in relation to security matters (Bode 2024; Bode et al. 2024).

The literature studying the processes of social ordering through "sociotechnological imaginaries" or narratives also addresses the question of actors, agency and power. Within this, the state has been theorised as the main actor capable of capitalising on narratives and sociotechnological imaginaries – thus focusing mostly on its power of imposing social order (Jasanoff 2010; Jasanoff and Kim 2009, 2015). Nonetheless, the more recent literature has nuanced this more traditional STS reading of state power, pointing at the importance of, for example, technology companies' power to also shape these imaginaries (Mager and Katzenbach 2021, 223). The role of other actors and contexts of production of narratives has also been analysed, focusing on, for example, stakeholders, public opinion (Cave and Sarasvati Monique Dihal 2023) or popular culture (Cave et al. 2018; Watts and Bode 2024).

Another theme that has received attention has been the articulation of new global and local norms – and thus, ethical standards – in relation to technology and, more

specifically, AI (Bode 2024). And, pushing this reflection further, Foucauldian examinations of the security constellations or dispositifs arising from the governing of certain technologies – such as data – have also been produced (Bellanova 2017). Moreover, inspired by the recent Latourian "new materialism" turn, critical security studies has been reflecting on the central role of devices and technology and, ontologically, epistemologically and methodologically, on the role of non-human agents – such as tech devices – and their relationship with humans (Bellanova, Jacobsen, and Monsees 2020, 88–90). As Bellanova et al. put it, this has led the field to focus on "the devices, technologies, objects, knowledge and materialities that shape security" (Bellanova, Jacobsen, and Monsees 2020, 91).

Finally, taking a perspective on science and technology not so closely linked to security matters, the literature on feminist and postcolonial technoscience needs to be mentioned too (Harding 2009; Seth 2017). Despite the significant engagements produced by the critical literature, these philosophies still need to be fully incorporated in the existing critical analyses of security and counter-terrorism. As this literature reminds us, technological progress is deeply rooted in colonialism, capitalist exploitation and heteropatriarchy. This was already emphasised by Donna Haraway who, in her *Cyborg Manifesto*, stated that "[t]he main trouble with cyborgs [and] technology is that they are the illegitimate offspring of militarism and patriarchal capitalism, not to mention state socialism. But illegitimate offspring are often exceedingly unfaithful to their origins" (Haraway 1991, 151; as in Bellanova, Jacobsen, and; Monsees 2020, 90).

With reflections that are also of interest in CTS, these approaches denounce the Western-centric and androcentric ontologies and epistemologies – and social orders – that are at the core of (Western-led) technological and scientific progress (Harding 2009, 2011). They denounce the causal relations between technological and scientific development and colonialism and imperialism (Seth 2017), and heteropatriarchy (Harding 1986). They also highlight how these developments have been including non-Western subjects and/or women only in marginal sites – or in exploitation dynamics (Acheson 2021; Harding 2009). And,not only has STS as knowledge on these processes failed to acknowledge the excluding and exploitation processes, but technological and scientific development has also linked to heteropatriarchal, racial capitalism (Acheson 2021). It has also actively contributed to marginalise or erase non-Western knowledge and technology while constructing a hegemonic canon on science and technology, a canon that is imbued with colonial, racial and heteropatriarchal relations of power, exploitation and exclusion (Harding 2011, 2016; Seth 2017). This literature focuses on denouncing the role of technology – AI included – in furthering dynamics of exploitation and marginalisation of the "Global South" (Birhane 2020) or women and thus calls for decolonial and feminist approaches to technological progress (Mohamed, Png, and Isaac 2020). As I argue, all of these reflections are of relevance to formulate a CTS–AI research agenda, as I further illustrate below.

Critical security studies, STS, and artificial intelligence: making space for CTS

It is based on the existing critical, postcolonial and feminist literature that a CTS research agenda for AI's uses in terrorism and counter-terrorism can be formulated. CTS differs from some of its close fields in several ways. Considering its focus on terrorism and counter-terrorism, CTS is sometimes considered a sub-field of Terrorism Studies (TS).

Nonetheless, the two differ in their ontological, epistemological and methodological approaches to these topics (Jackson et al. 2011). Simplifying academic debates, CTS mostly – though not exclusively – takes a Reflectivist and Postpositivist view towards "reality" and looks at the social construction of "terrorism" and "counter-terrorism" and the political consequences of these constructions (Jarvis 2009; da Silva and; Martini 2021). In this sense, it is only to a certain extent that TS and CTS share their object of study. These approaches will also shape the way the two fields approach the use of AI in terrorism and counter-terrorism. While TS concerns are focused on terrorists' uses of AI and AI implementation in counter-terrorism (Bernd 2024; Mathur, Broekaert, and Clarke 2024), CTS should focus on the discursive construction of these threats and on their political consequences, as further detailed below.

On the other hand, CTS stands closer to critical security studies ontologically, epistemologically and methodologically speaking (Jarvis and Holland 2015). The labelling of ideas and authors is always a problematic exercise, and the boundaries between these labels sometimes are blurred. However, it can be argued that, despite mutual influences, the two have developed and remain somewhat separate – though linked – schools. Overall, critical security studies – with its ub-schools – is broader than CTS, as it has encompassed the analysis of a wide variety of topics linked to "security", broadly understood (Collective 2006). Within this range of topics, it has also approached the study of terrorism and counter-terrorism, producing important contributions that have had an impact in CTS (see, among many others, de Aradau and Van Munster 2007; Bigo and Tsoukala 2008; de Goede and Amoore 2008; Goede and Simon 2013). Simplifying broad bodies of literature, critical security scholarship has been focusing mostly on refining and advancing the theoretical proposals of the three main security studies schools (Collective 2006), while embracing new turns in IR such as the Latourian material turn (see, among many others, Salter 2019; Bellanova, Jacobsen, and; Monsees 2020), and specific criticism raised by postcolonial and feminist scholars towards the main theories used within the subfield (see, among many others, Hansen 2000; Howell and Richter-Montpetit 2020; Sjoberg 2010). Nowadays, as mentioned above, it has developed a body of literature on the incorporation of STS knowledge into critical studies of security and the role of "non-human agents" and "technological devices", among other things (see, among many others, Leese 2024; Evans, Leese, and Rychnovská 2021; Bellanova, Jacobsen, and Monsees 2020).

Despite mutual influences, CTS has established itself as a separate body of literature, mostly articulated around the main core commitments put forward by the founding figures of the field in the early 2000s (Silva and Martini 2021; Jarvis 2009; Martini 2021) and it has developed and transformed following, to some extent, that path (Jarvis 2024). Jarvis reminds us that CTS needs to be acknowledged as a "body of work with porous and imprecise borders [. . .] internally heterogeneous and characterised by theoretical, normative, and methodological dissensus as much as by any consistency of focus, approach, or ambition" (Jarvis 2024, 464). Nonetheless, despite disagreements within the subfield, it can be said that its literature has widely focused on deconstructing discourses and representations of "terrorism" and "counter-terrorism" produced in a wide variety of contexts and the political consequences of these discourses, approached mostly – though not exclusively – from Reflectivist or Foucauldian perspectives (for more details, see Jarvis 2024). It has also incorporated feminist, postcolonial/decolonial approaches to these

topics (Jackson 2016; Jarvis 2024), while also looking at emancipation as a general aim – though in a somewhat scattered way (Martini 2020; Toros 2016a). Moreover, CTS has also developed its internal debates on, for example, policy-engagement (Toros 2016b), pushing its critiques further (Martini and da Silva 2023), and theoretical and political critiques on, for example, the overreliance on Reflectivist methods and focus on discourses rather than materiality (Boukalas 2015; Joseph 2011) and, more recently, decolonial (Achieng, Samwel, and Richard 2023; Groothuis 2020), anti-racist (Abu-Bakare 2024) and feminist critiques (Martini 2022; Sjoberg 2024).

It is with this in mind and inspired by the debates happening in the other close subfields mentioned above that the following part of the article will lay down some lines for a future CTS research agenda on AI in terrorism and counter-terrorism.

Bridging CTS and STS: making the link between AI, terrorism, and counter-terrorism

This section points at various possible areas of research where CTS work is needed. Differently from more mainstream approaches, to further investigate the political consequences of AI in relation to terrorism and counter-terrorism, CTS would need to start from the acknowledgement that knowledge about AI – and technology in general – is a social construction (Harding 2016; Jasanoff 2010; Jasanoff and Kim 2009) – and, as such, historically, politically and socially contingent. This is one of the main reflections put forwards by STS, and it is an important matter to acknowledge for CTS too. Overall, this implies that it is worth analysing and deconstructing this knowledge for its political consequences. In Simplifying STS debates, two main points need to be highlighted about the understanding that knowledge about AI is a social construction.

On the one hand, this led STS and critical scholars to acknowledge that claims of AI as "intelligent", "ethical", "infallible" or even "objective" and "unbiased" are social constructions (Bareis and Katzenbach 2022; Holland Michel 2023). Moreover, scholars highlight how analyses of AI implementation are somewhat dystopic or utopic, mostly because these are usually projected towards the future skills this technology will – supposedly – possess and thus towards possible – supposed – implementation of it (Cave and Sarasvati Monique Dihal 2023; Cave, Dihal, and Dillon 2020). Overall, the positive effects of AI tend to be exaggerated, while the negative sides are hidden. These constructions matter because they produce political and social interpretations of AI . This happens with other technologies too and, consequently, STS has a rich history of theoretical conceptualisations of the "social imaginary" (Ferl 2024, 141), mostly aimed at grasping the "nexus of politics, discourse, and technology" (Bareis and Katzenbach 2022, 859), as (re)produced by a wide variety of actors and in a wide range of contexts.

All in all, the STS literature has widely approached how technological developments have been legitimised through history in different contexts (Cave, Dihal, and Dillon 2020; Jasanoff and Kim 2009). To grasp these processes, it has used concepts such as "sociotechnical imaginary" (SI), or "myths" – different theoretical tools to grasp the social constructions of technology and their sociopolitical consequences (Bareis and Katzenbach 2022, 859). It has also scrutinised "narratives" about technologies – i.e. "fundamental animators of sociotechnical imaginaries" (Cave, Dihal, and Dillon 2020, 7) – and "controversies" mostly focused on political debates about

technoscientific imaginaries (Monsees 2020). As argued below, these concepts become very useful when approaching the topic of AI and terrorism and counter-terrorism – and thus, they are of interest for CTS. Methodologically speaking, similarly to CTS, STS has embraced mostly interpretative and qualitative methods such as discourse/text analysis, visual analysis, ethnography, or case and controversy analysis (Monsees 2020), among others.

Despite STS work on these matters and despite the application of many of these concepts by critical security scholars, the role of narratives, myths or SIs in relation to terrorism and counter-terrorism is still understudied. As mentioned above, CTS is well equipped to address this gap in the literature. Moreover, it is becoming politically urgent for CTS to undergo this task. Understanding the way terrorists' possible use of AI is imagined is key to legitimise future developments in counter-terrorism; and both of these are of important concerns for CTS – intellectually and politically speaking. Therefore, in the following part, I sketch some possible areas of interest for future CTS research on AI. These are: the discursive construction of AI, terrorism and counter-terrorism; the use of "sociotechnical imaginaries" and other STS concepts applied to terrorism and counter-terrorism; STS understandings of how technological developments (re)produce social orders; and the implications of the emerging global AI governance in relation to terrorism and counter-terrorism.

The construction of "AI-terrorism"

The CTS literature has widely shown how the possible use of technology by terrorist groups has been narrated as having catastrophic consequences (Conway 2005; Jarvis, Macdonald, and Whiting 2017). It has shown how the discursive merging of various threats such as that of terrorism and the use of violence with the discursive construction of cyber technologies allowed the discursive construction of apocalyptic scenarios of destruction, resulting in the construction of the "hyper-terrorist" or "hyper-terrorism" (Martini 2021, 106). Cyber menaces are associated with a lack of control over the world (Conway 2005, 43–44) and Jackson, for example, argues that this discursive construction serves to extremise the threat (Jackson 2005, 103; Jarvis, Macdonald, and Whiting 2017).

The possible terrorist use of AI is also dramatised and narrated in futuristic and apocalyptic ways. While the use of new technologies by non-state actors is normal (Jackson et al. 2011, 165), some of the features constructing AI as detailed above are also reflected in the way its possible use by terrorists is narrated. For example, more mainstream analysis has been pointing at how technology represents a "democratisation" of access to lethal autonomous weapon systems (LAWS) (Espinoza 2018) which, according to some experts, implies that more and more actors will have access to the development and use of it. This, this literature argues, will increase and render more extreme these groups' perpetration of violence and it will reduce the asymmetry in conflicts – as groups will have access to similar technology as states (Boyle 2020; Mathur, Broekaert, and Clarke 2024). Automatised cyber-attacks, and automatised and enhanced online propaganda, recruitment and radicalisation strategies are also narrated as possible terrorists' uses of AI (Nelu 2024). Finally, it is also claimed that AI may be used to enhance terrorist attacks or to improve the planning of violent acts (Boyle 2020; Mathur, Broekaert, and Clarke 2024).

Looking at these interpretations from STS and critical literature, it can be highlighted how these reflect specific futuristic projections – and not event-led interpretations of what AI is capable of doing (Holland Michel 2023). Overall, these interpretations construct terrorists as capable of unimaginable attacks in an easy and accessible way by returning to the image of "AI hyper-terrorism". In this sense, the first area of research where stronger CTS engagement is needed is the merging of these different narratives and the construction of "AI hyper-terrorism". This deconstruction work would be important because the merging of these narratives returns an unreal picture of terrorist groups and their capabilities, a picture that, in turn problematically informs policy decisions (Holland Michel 2023)about counter-terrorism – as further discussed below.

Legitimising "AI counter-terrorism"

CTS has been focusing on showing how representations of "terrorism" shape and legitimise exceptional counter-terrorism measures (Jackson 2005). It has also shown that the narrative on terrorists embracing technological innovations leading to an utopian future of conflict is not new and it has been playing a central role in the turn towards precautionary policies aimed at the prevention of terrorism under the banner of exceptionality before (see, among others, Jarvis, Macdonald, and Whiting 2017). In this case, the discursive construction of "hyper-terrorism", merging terrorism and AI, and its influence on counter-terrorism is another theme that CTS will need to pay attention to.

Overall, experts and politicians are already exploring the possible uses of AI in counter-terrorism – and, from a constructivist point of view, they are constructing narratives about it. These narratives are also problematic, and CTS is well equipped to reflect on how they construct and legitimise counter-terrorism in different ways. For example, experts are looking into the automatisation of warfare – and in turn, counter-terrorism operations – (Blakeley 2018; Espinoza 2018), as an element that increases state power. Similarly, to other technologies such as drones, AI is usually narrated through frames of "infallibility" and "reliability" and as reducing the human costs of war (Blakeley 2018; Espinoza 2018). Another example is the narrative of massive surveillance, where AI is described as capable of automated surveillance, the processing and analysing of video feeds from surveillance cameras to identify suspicious behaviours in real-time or even carrying out "terrorist profiling" (Mathur, Broekaert, and Clarke 2024). It is also assessed that AI could also be used to predict potential terrorist attacks by analysing historical data and other sources, and thus provide decision-makers with real-time data and recommendations, enhancing the effectiveness of counterterrorism strategies (Bernd 2024; Nelu 2024). Moreover, it is said that AI could "support de-radicalisation programs by identifying at-risk individuals and analysing their online behaviour" (Nelu 2024).

Various narratives intersect here. First, the construction of AI and its futuristic uses which shapes the depiction of what its implementation could mean for counter-terrorism measures. Overall, as seen, experts emphasise that these depictions reflect only in part its current application (Holland Michel 2023). Second, the construction of "AI hyper-terrorism". As seen above, this depiction is also somewhat the result of the futuristic narratives on AI uses and capabilities. These narratives end up constructing an apocalyptic future where "AI hyper-terrorism" is an unimaginable, destructive threat. This discursive pattern legitimises not only the current implementation of AI in counter-terrorism but

also the need to use it in exceptional ways. It also focuses debates on futuristic scenarios of high-tech responses to ultramodern threats. In other words, and as a third intersecting narrative, counter-terrorism is also narrated in its "AI hyper" version, thus projected into the future possibilities of AI implementation.

Inspired by what Bode et al. emphasised in relation to LAWS, it can be claimed that these unrealistic depictions of AI possibilities in counter-terrorism result in several problems. First of all, they "distract from the more mundane real-world uses of these technologies" (Bode et al. 2024; Hudson, Finn, and Wylie 2023). By looking at and debating the future uses of AI in counter-terrorism, scrutiny of the current use does not receive full attention. Furthermore, for example, ethical and moral debates are mostly focused on these future uses of AI in counter-terrorism – and not so much on the current ones. For example, while debates are unfolding on the possible increase of violence in conflict settings because of LAWS (Bernd 2024), the violence that is currently perpetrated is hidden from global public opinion through discourses of AI "infallibility" and "reliability" – something that CTS authors were already denouncing in relation to drones (Blakeley 2018; Espinoza 2018).

Moreover, STS authors have emphasised how the narratives on terrorism and counter-terrorism shape the socio-political possibilities for regulating AI-related technologies and their uses (based on Ferl 2024, 140). And the construction of terrorism as an exceptional security threat widely analysed by CTS is already influencing the current regulation of AI (Jackson 2007a). An example of a contested legislation in this case is the EU AI Act[1] (AIA) adopted in May 2024. On the one hand, the Act prohibits the use of AI for the purposes of criminal offences such as terrorism.[2] On the other hand, the Act ranks and categorises AI applications by risk level and prohibits the ones considered unacceptable risk. Nonetheless, regulation in law enforcement and counter-terrorism in some cases represents a problematic and debated topic because some significant exceptions are made (Anlar 2024). For example, the Act prohibits[3] "real-time" remote biometric identification (RBI) in publicly accessible spaces for law enforcement, except when: '[. . .] preventing substantial and imminent threat to life, or foreseeable terrorist attack' (Anlar 2024). Other significant exceptions are made in this regard (Anlar 2024) and, while it needs to be acknowledged that these are debated and contested, they also show how the constructed exceptionality of terrorism and security matters – and the need for exceptional responses – permeates the regulation of AI.

Finally, and still drawing from Bode et al., narratives such as "AI infallibility" and AI development as "inevitable" erase the "role played by human decision-makers and corporate interests in sustaining the real-world development of these technologies" (Bode et al. 2024; Johnson and Verdicchio 2017). To this could be added the role of experts or other actors who are already identifying the possible future uses of AI in terrorism and counter-terrorism (Bernd 2024) – all of these being contexts of production of knowledge that CTS has already approached in relation to "terrorism" and "counter-terrorism" (Stampnitzky 2013). Overall, focused on the future, these narratives construct the implementation of AI and its technological development – also in relation to counter-terrorism – as a necessity, and as a normal part of "progress" – i.e. as the only path possible and as "inevitable" (Acheson 2021). They thus legitimise policy decisions (Ferl 2024). To study these processes, STS puts forward the concept of sociotechnical imaginaries, further detailed below.

Sociotechnical imaginaries and AI counter-terrorism

Theorised by Jasanoff and Kim (Jasanoff and Kim 2009), the concept of "sociotechnical imaginaries" (SIs) captures the collective visions of good and attainable futures, mostly as articulated by the state (Jasanoff and Kim 2009, 121). SIs are used to grasp the "relationship of science and technology to political power" (Jasanoff and Kim 2009). The authors defined them as "collectively imagined forms of social life and social order reflected in the design and fulfillment of nation-specific scientific and/or technological projects" (Jasanoff and Kim 2009, 121). These visions not only influence policies and channel public expenditure but also justify the inclusion or exclusion of citizens from technological progress as the concept is used to study the relationship between national technoscientific policies and social order (Jasanoff 2010).

Jasanoff and Kim theorised that SIs are produced by the state as instruments of legitimation. They are performative and construct specific visions of technological development – thus legitimising certain policy decisions over others (Jasanoff and Kim 2009, 121). While the narratives sustaining them circulate and are reproduced in a wide variety of contexts – e.g. stakeholders, public opinion, popular culture, etc. (Bode et al. 2024; Watts and; Bode 2024), the concept focuses on the state as the actor capable of formulating them and steering policy accordingly. Nonetheless, the more recent literature nuances these original formulations arguing that SIs are not monolithic but multiple and contested and are increasingly dominated by other actors too such as technology companies (Mager and Katzenbach 2021, 223) and, in the case of counter-terrorism, military industrial actors could also be mentioned. These "visions, and the policies built upon them, have the power to influence technological design, channel public expenditures, and justify the inclusion or exclusion of citizens with respect to the benefits of technological progress" (Jasanoff and Kim 2009, 121).

Overall, various are the reflections on sociotechnical imaginaries that may be of interest in CTS, considering that terrorism and, above all, counter-terrorism are also strictly linked to technological developments and their legitimisation. As CTS has widely shown, counter-terrorism is also constructed as a technological and political project – and, in some cases, terrorism too. Sociotechnical imaginaries shape what is seen as desirable possible, and legitimate in terms of technological development and governance, and they can be used to study technological development linked to counter-terrorism, mostly related to the production of social order and relations of power in various ways.

First of all, there is the question of the actors involved in the formulation of sociotechnical imaginaries. Jasanoff and Kim coined the concept to reaffirm the state's capacity to formulate and implement these imaginaries (Jasanoff and Kim 2009). On this, CTS partly agrees – the state is a key actor in formulating and implementing counter-terrorism in all its dimensions. And, as such, the state is also a key actor in narrating of "AI hyper-terrorism" and constructing the sociotechnical imaginary of "AI counter-terrorism". This is done not just as measures implemented, but also as future scenarios of protection of society through the development of high-tech and AI in counter-terrorism. In other words, counter-terrorism can also be studied as a technological and political project, in many of its manifestations. For example, AI-driven surveillance, biometric databases, and predictive policing are often framed as neutral, necessary, and inevitable. Sociotechnical imaginaries show how the (possible) use of technologies is deeply political. This is justified

and legitimised through specific narratives not only of "AI hyper-terrorism" but also of "safe societies", "management of risk" or even "zero risk" societies – and overall, a certain future and utopic view of security attainable through the deployment of certain technologies of security (Aradau and Van Munster 2007).

To this, however, is linked the question of the actors that may have an influence in (re) producing a certain vision of order through these imaginaries. While Jasanoff and Kim pointed explicitly at the state for its role in steering technological development as political projects, more current research is starting to acknowledge that other actors may also have this power (Mager and Katzenbach 2021, 223; Monsees et al. 2023). For example, critical scholars have emphasised how the security sector is following neoliberal tendencies of including non-state and even private actors in security dimensions (Martini 2024) and, therefore, tech companies and military-industrial actors have also been considered as having a powerful role in shaping sociotechnical imaginaries in this sphere.

There is then clearly the role of actors such as international organisations, epistemic communities and civil society, among others. These actors have an important role in (re) producing and engendering certain visions of the future that may sustain – but also contest – sociotechnical imaginaries (Bareis and Katzenbach 2022; Chubb, Reed, and Cowling 2024; Selwyn and Gallo Cordoba 2022). As such, these spheres of knowledge production also have an important role in (re)assembling narratives and imaginaries about AI in relation to counter-terrorism. Overall, as a first reflection on this concept, "sociotechnical imaginaries" may be a useful theoretical tool for CTS to explore the actors' power in the shaping of political projects such as "AI counter-terrorism".

Second, this concept also entails the element of "imagination", also of interest in CTS. The STS literature has widely shown how constructed social imaginaries serve to legitimise certain policies and, overall, as a "key ingredient in making social order" (Jasanoff and Kim 2009, 122). For the same reason, imagination has also been a key social practice widely scrutinised by CTS that has shown how imagining terrorism in certain ways also legitimises certain kinds of responses (Heath-Kelly 2017b; Zulaika 2012). For example, imagining terrorism as an ever-present possibility allows for the legitimisation of certain exceptional measures and the turn towards pre-emption and prevention of an "ever present threat" (Jackson 2007a). Pre-emption and prevention are, in fact, based on imagining "safe society" or "zero risk" society – attainable through the development and deployment of certain technologies (Aradau and Van Munster 2007). Nonetheless, these counter-terrorism practices find their bases in imagining who and how could be a potential threat. In this sense, they consist in imagining risk (Aradau and Van Munster 2007) and who could be a threat.

It is in relation to deconstructing pre-emption and prevention that the concept of sociotechnical imaginaries could also be of help to CTS. Sociotechnical imaginaries shape not only how terrorism is understood and but also what kinds of responses are deemed legitimate, as mentioned. They also help grasp how futures are constructed and mediated. Pre-emption and prevention work through this imaginary of a certain future. As CTS scholars remind us, prevention acts in the pre-criminal, before the act is committed (Heath-Kelly 2017a, 2017b). And, for example, the prevention of extremism and radicalisation acts on individuals before they embrace extremism or radicalisation. There is thus a process of imagining what terrorism, extremism and radicalisation look like, and this process is highly performative – i.e. it not only constructs extremism and radicalisation

before they happen, it produces them, but, it also constructs preventive measures (Heath-Kelly 2017b; Martini, Ford, and Jackson 2020). Here, sociotechnical imaginaries not only would be helpful to think of how futures are constructed through the construction of "AI counter-terrorism", but also whose visions of security dominate, whose are excluded and, overall, how these futures that are at the basis of counter-terrorism pre-emption and prevention are shaped by and (re)produce racialised, gendered, and other power relation logics, as CTS has widely shown (Ali 2020; Martini 2023).

In this sense, and importantly for CTS, "sociotechnical imaginaries" are considered as a "key ingredient in making social order" (Jasanoff and Kim 2009, 121) – and so is "AI counter-terrorism". As CTS has widely shown how counter-terrorism and prevention logics are also constructions – or Foucauldian dispositifs – of the power to (re)order society and to (re)produce certain social (b)orders. They are highly racialised and racialising, gendered and gendering, and classist structures, and as such, they (b)order societies along these inequalities, among others (Ali 2020; Gentry 2020). The same happens for "AI counter-terrorism". This is legitimised through specific envisioning of a "safe society", "management of terrorist/extremist risk" and the attainment of "security". Nonetheless, all of these "imaginaries of the future and the implementation of 'AI counter-terrorism' to achieve them, reflect power structures in society and are highly exclusive and violent towards certain parts of society (Ali 2020; Gentry 2020). They are political projects and, as such, they also (b)order societies, as further discussed below.

(B)ordering society through "AI counter-terrorism"

The issue of sociotechnical imaginaries as producing order and borders in society – i.e. structuring and gatekeeping access – needs to be further developed as it represents an important reflection for CTS. As mentioned earlier, sociotechnical imaginaries in counter-terrorism frame AI as an objective, efficient, and necessary tool to combat terrorism (Bode et al. 2024; Zeng 2021). Governments, tech companies and security institutions, among other actors, narrate a future "safe society" also in relation to the implementation of AI-driven technologies in counter-terrorism, described as neutral or superior to human bias. Nonetheless, not only has the STS literature been showing that technology is not "inevitable" (Acheson 2021), but also that it is deeply embedded in and (re)produces power structures, biases and political agendas (Jasanoff 2010). In this sense, "AI counter-terrorism" too (re)produces specific visions of security – and, in turn, interpretation of threats – (re)assembling specific biases.

The issue of AI bias is of importance here (Chen and Chander 2021). Despite the narratives of reliability, objectiveness and value-free technology that somewhat hide this issue, AI is trained on data that have been produced by humans, based on societal dynamics. In this sense, this data reflects, contains and (re)produces the power dynamics that structure societies. As mentioned, CTS has widely shown how counter-terrorism is a highly racialised and racialising, gendered and gendering, among other power relations, structure. Problematically, AI systems used in counter-terrorism are trained on datasets that mirror and have incorporated these historical and structural biases and that, for example, often associate specific ethnicities, nationalities or religious groups with higher security risks – biases that are intrinsic to counter-terrorism (Gentry 2020). However, they not only (re)produce them but further hide

them as they will be embedded in a huge quantity of data but also because AI is interpreted as a very reliable and objective technology – therefore, results are not often questioned (Holland Michel 2023). This may lead to AI identifying, for instance, racialised individuals as possible terrorist suspects, or to the targeting and marginalisation of racialised communities through prevention, while other kinds of terrorism may end up being ignored by the systems. While CTS shows that this is already happening (Martini, Ford, and Jackson 2020), "AI counter-terrorism" may aggravate these processes (re)producing the bias but in a more invisible way – as this would be covered by narratives about AI infallibility and objectivity.

This needs to be further discussed in the light of the concept of sociotechnical imaginaries and other STS visions. "AI counter-terrorism" bias cannot only be interpreted from more mainstream views as an issue with data that can be somewhat solved by developing value-free and bias-free AI (Bareis and Katzenbach 2022). The bias is deeply embedded in certain societal envisioning of technological progress, on the one hand, and, on the other, of security and counter-terrorism. The use of technologies in security and counter-terrorism is legitimised by the narrative and imaginary of "safe society"; however, as mentioned above, what vision of "security" is envisaged through sociotechnical imaginaries is rarely scrutinised. Put it differently, the who, what, where, when and for whom questions of security (including counter-terrorism) are rarely asked in relation to technological development and implementation in security matters. In other words, the use of technology is usually narrated and imagined as the way to achieve "secure society" or of preventing the threat of terrorism. Nonetheless, the questions of whose security, security for whom, and who is a threat and for whom are rarely asked. This implies that technology, AI included, reinforces security hierarchies as, for example, privileging state-defined threats or focusing on "racialised terrorism" while downplaying issues like far-right terrorism, white supremacy and state violence. "AI counter-terrorism" thus further (b)orders society. It is narrated as shielding (a part of) the population from violence, but it exercises it towards other parts interpreted as threats – power constructions that are (re)produced and aggravated by "AI counter-terrorism".

One more reflection needs to be done in relation to technological development – AI included – as (b)ordering societies and (re)producing power inequalities. As feminist and postcolonial STS scholars, not only is technology reproducing racialised, gendered and other kinds of social hierarchies, but also it is based on these power relations. Technological and scientific developments have been shown to be in a causal relation with colonialism and imperialism (Harding 2009, 405) – i.e. Western countries expanding through the world needed more sophisticated technologies and their development, in turn, allowed the West to further and strengthen colonial rule (Harding 2011; Seth 2017). Moreover, this literature shows how the fields of science and technology are highly men dominated and, in turn, produce very gendered science and technology that reinforce but also produce (white) men power and exclusion of women in various ways (Harding 2009, 2016). Overall, scientific and technological developments are always based on situated knowledge – i.e. produced from a particular perspective, shaped by social, historical and political conditions. Moreover, this literature shows how certain – Western and mostly produced by men – knowledge prevailed as "scientific" and as "technical", while other – non-Western and mostly produced by women – knowledges have been sidelined by heteropatriarchal, colonial processes (Harding 2009, 2011).

For example, AI – and, in turn, "AI counter-terrorism" – is largely developed by state security agencies, tech corporations, and military-industrial actors, sidelining perspectives from marginalised communities or certain parts of the population such as racialised individuals or women, who are the most affected by security measures (Harding 2009, 2016; Seth 2017). Turning back to CTS, the recognition that counter-terrorism technologies, particularly AI, are not neutral but deeply embedded and rooted in gendered, racialised, and colonial power structures leads us to the question of how "AI counter-terrorism" could further (re)produce and strengthen the (b)ordering of societies but also international hierarchies, as further discussed below.

Narrating global AI governance

Turning to the international scene and looking at global actors, some more questions can be raised in relation to the emerging global governance of AI and the knowledge that is produced about it (Roberts et al. 2024) – that is also of interest in CTS. Starting from the main actors involved, state security agencies, tech corporations, and military-industrial actors are all playing a role in shaping sociotechnical imaginaries of AI development. The current main global narrative, for example, is that of an "AI race". As several authors have discussed (Bode et al. 2024; Zeng 2021), describing the development of AI as a "race" escalates the matter to a geopolitical, global level framing it as competition among nation-states and tech companies (Holland Michel 2023). Moreover, this narrative also constructs AI development as a matter of National Security – focusing on other countries' and actors' AI application in the military sector, while securitising their own political decisions to invest in AI (Zeng 2021). In other words, AI development is seldom read in as advances in the military and security sector and interpreted as security matters. Consequently, internationally, other actors' development of AI is perceived as a threat – as it is happening, for example, in the US, China or the EU, among others (Roberts et al. 2024; Zeng 2021). Domestically, and resulting from this, AI military development is constructed, at least in part, as a security necessity and thus legitimised (Zeng 2021). This further links the military-industrial complex to the development of high-tech technologies such as AI by sidelining other approaches to AI development but also leaving aside other social issues.

Moreover, the narrative of "AI race" produces a certain kind of sociotechnical imaginary about AI development by, for example, returning to the idea that someone could win and that there is a clear way to win (Holland Michel 2023), thus constructing the idea that there is a clear path to follow. Furthermore, linking it to security matters also renders it a political priority while foreclosing dissent on these developments while also returning a feeling of urgency, thus not leaving space and time for sociopolitical reflections on its harms or even on its possibilities in relation to matters not so closely linked to security and militarisation. At the same time, depictions of AI as "autonomous and intelligent" or the issue of "the lack of accountability" behind AI result in a removal of the human decision-making element behind certain politics, thus deresponsabilisation of the actors behind these harms, and a depoliticisation of these matters (Watts and Bode 2024).

In this sense, the "AI race" narrative, together with some of the other narratives analysed above, (re)produces highly militarised and securitised paradigms – including those of counter-terrorism, focused on threats and threat prevention through AI

development, rather than addressing the root causes of violence and insecurity. It also results in hyper-masculinised and racialised paradigms of international security that (re)produce power relations and international hierarchies (Acheson 2021). On the one hand, as mentioned above, this narrative too returns to the image of a certain kind of "security", privileging the state security over women's or racialised individuals' security – for whom insecurities may be, in fact, deepened. Moreover, other alternative security imaginaries based on care, community resilience, transformative justice or the addressing of social inequalities and power relations are further hidden and discarded (Acheson 2021)

On the other hand, turning towards North–South divisions, Feminist and Postcolonial scholars are denouncing how technological development – AI and algorithms included – are furthering dynamics of capitalist exploitation and colonisation or imperialism from the North towards the South (Birhane 2020). Acheson and Porobić Isaković, for example, argue that "weaponisation of the AI technology is part of the capitalist growth cycle and search for new markets. Countries and corporations race to invest money in developing new, more 'efficient' and 'improved' killing systems as part of the capitalist process of accummulation, all while money is being de-invested from infrastructure that supports social reproduction and wellbeing" (forthcoming). "AI counter-terrorism" clearly also is a militarised enterprise and could be discussed in regard to capitalist extraction and accumulation along Acheson and Porobić Isaković's lines. "AI counter-terrorism" needs thus to be scrutinised from the point of view of militarism and heteropatriarchal-racial capitalism too.

Moreover, contextualising this within the capitalist North–South division, Birhane argues that "colonialism in the age of AI takes the form of 'state-of-the-art algorithms' and 'AI driven solutions' to social problems (Birhane 2020, 389) – to which the implementation of AI counter-terrorism could be added. Works on data colonialism and data capitalism (Couldry and Ali Mejias 2019; Couldry and Mejias 2019) denounce that AI invasion of the 'Global South' echoes colonial era exploitation as powerful countries' algorithmic invasion simultaneously impoverishes development of local products while also leaving the certain parts of the world dependent on Western or powerful countries' software and infrastructure (Birhane 2020; Mohamed, Png, and Isaac 2020) – thus furthering dynamics of exploitation and extraction of land, labour and relations through digital infrastructure (Couldry and Ali Mejias 2019; Mohamed, Png, and Isaac 2020).

CTS has also widely denounced Western counter-terrorism as an imperial and colonial enterprise in the Global South aimed at exploitation. All in all, thus, both counter-terrorism (Cainkar and Selod 2018) and AI-development (Mohamed, Png, and Isaac 2020) have been denounced as capitalist, colonial and heteropatriarchal enterprises and the oppression and violence they both perpetrate towards certain parts of the world or populations could be aggravated by their conjunction and the implementation of "AI counter-terrorism". Prioritising AI development – including of "AI counter-terrorism" – would further the capitalist dynamics of "algorithmic exploitation and colonisation of the Global South" (Birhane 2020), while privileging powerful countries with problems and agendas over other social matters affecting less powerful countries or marginalised parts of the population. "AI counter-terrorism" thus further complicates the overcoming of many oppressions that some CTS scholars have been pursuing (Jackson 2007b).

Moreover, not only does AI development further capitalist exploitation and division of the world. As Birhane adds, there is also the added matter that "Western-developed AI (is) unfit for African problems" (Birhane 2020, 389). As mentioned above, postcolonial STS shows how certain – Western and mostly produced by man – knowledge about prevailed as "scientific" and as "technical" and sidelined or erased other knowledges (Harding 2009, 2011). AI, as other technologies, are formulated and developed from Western, heteropatriarchal capitalist paradigms and, as such, their use may be unfit for other contexts. The same may be true for "AI counter-terrorism", as this would reproduce the same hierarchies. In a moment where CTS is called to embrace decolonised knowledge to formulate indigenous and local approaches to terrorism (Oando and Achieng' 2021) or to embrace anti-racial and feminist positions (Abu-Bakare 2024), it is an urgent time for the field to scrutinise "AI counter-terrorism" as one further process of heteropatriarchal, racial capitalism production.

Materiality, "non-human agents" and ANT

A final strand of research that critical scholarship of security has embraced and that is worth mentioning is the materiality turn and Bruno Latour's Actor-Network Theory (ANT). Simplifying theoretical approaches, ANT sidelines the primacy of "human centric" approaches and understands that everything in the social and natural worlds exists in constantly shifting networks of relationships and only in relation to these relationships (Salter 2019). It is not only humans that create social situations but also "non-humans", processes and objects. Technologies too cannot be interpreted as passive tools controlled by humans; rather, they also shape and are shaped by social, political and institutional networks – thus "active" parts of these relationships (Salter 2019). As mentioned above, critical security studies has developed a line of research focused on Latourian approaches to materiality and "non-human agents" (Salter 2019), mostly based on ANT – though not exclusively (Bellanova 2017). Linking it to STS, critical security scholars have analysed the role of "non-human agents" and "technological devices" as active participants in shaping security (see, among many others, Leese 2024; Evans, Leese, and Rychnovská 2021; Bellanova, Jacobsen, and; Monsees 2020) – shifting decision-making from human discretion to algorithmic governance (Bellanova 2017).

Theoretically looking at "other kinds of actors", and always in relation to "AI counter-terrorism", the application of ANT would lead CTS to scrutinise how AI systems do not merely reflect security policies, but actively shape them. For example, they have the power to shape counter-terrorism measures or the identification of certain subjects as terrorists – and thus they could also be interpreted as active nodes in the "terrorism/counter-terrorism" relationship. Moreover, they do not only (re)produce power relations, but, from this point of view, they also actively produce them. Along these lines, ANT interprets that "AI counter-terrorism" is not only "transmitting" information but also actively transforming and producing it by elaborating it – and, importantly, the information it produces leads to certain security decisions and not others (Salter 2019).

There is then the question of materiality. While this has been approached by important works in critical security studies (see, among others, Amoore and De Goede 2021; Aradau 2023), few works in CTS have looked at the material infrastructures of counter-terrorism and at its materiality (Geerts et al. 2023; Hussain 2023). In the case of "AI counter-

terrorism", the focus would be, for example, material infrastructures that enable counter-terrorism AI – i.e. data centres, biometric databases, but also automated drones, security cameras, etc. This infrastructure produces, sustains and allows for the implementation of "AI counter-terrorism", but it also shapes its effects (Aradau 2023). All of these dynamics would then be studied from as processes and nodes of broader networks of "AI counter-terrorism" governance that would take into account that "AI counter-terrorism" networks extend beyond states to include corporate, military, and other security actors. In this case, not only their agency would be of interest, but also their relationships and interrelation within the network as these processes would also produce "active" effects.

Overall, adopting this theoretical perspective would lead CTS to move beyond critiques of discourse to focus on how counter-terrorism – and, in this specific case "AI counter-terrorism" is materially and networkedly co-produced. Among other matters, here, CTS could reflect on how AI may shape and reconfigure counter-terrorism and power relations embedded in its structure by, for example, translating sociotechnical imaginaries into algorithmic practices and, then, into security measures. Or, on how "AI counter-terrorism" depends on material infrastructures and socio-technical networks.

Conclusion

This article argues for CTS to engage with the implications of artificial intelligence in terrorism and counter-terrorism. By drawing on insights from Science and Technology Studies (STS), STS feminist and postcolonial technoscience, and critical security studies, the article has highlighted how AI is not merely a neutral technological tool but also a complex sociotechnical system that shapes and is shaped by power dynamics, political interests and security imaginaries. Based on works in these bodies of literature, the article reflected on the implications of AI in terrorism and counter-terrorism specifically in relation to the discursive construction of "AI terrorism" and "AI counter-terrorism", the sociotechnical imaginaries and the legitimation of AI counter-terrorism as political projects, the (b)ordering of societies and approaching security matters from the point of view of Actor-Network Theory and materiality.

Based on this, the article has outlined several key areas for further CTS research on AI in terrorism and counter-terrorism. First, further CTS engagement is needed to critically analyse the narratives of AI in security governance, examining how AI is framed as both a threat and a solution in terrorism and counter-terrorism discourses. These narratives play a key role in imagining AI in relation to terrorism and counter-terrorism, and in legitimising specific security answers. In relation to this, and as a second area of future research, there is the investigation of the sociotechnical imaginaries shaping AI development in counter-terrorism. Here, CTS could focus on how these represent the exercise of power from specific actors, but also, and linked to this, on whose visions of security are prioritised and whose are marginalised – i.e. thus further investigating the political consequences of these "imaginaries".

A third and related area of concern where CTS work is needed is AI-driven counter-terrorism's role in social ordering and exclusion. CTS has been widely denouncing how counter-terrorism has been playing a key role in maintaining the status quo. However, a more robust reflection is needed on how algorithmic bias reinforces, aggravates, and deepens racialised, gendered, and class-based inequalities. In this sense, CTS also needs to

engage with feminist, postcolonial and decolonial approaches to AI and security, challenging the Western, racialised and patriarchal assumptions embedded in counter-terrorism technologies. In relation to this, capitalist dynamics of exploitation of certain parts of the world – thus possibly aggravating grievances – is another area of possible research. Lastly, a final debate CTS could contribute to is the one about the material infrastructures of AI security technologies, and the political consequences of focusing on "AI counter-terrorism" as an agent in security matters.

Intellectually, CTS has a key role to play in all of these debates. Politically, CTS engagement on these matters is becoming urgent – as AI is becoming an international priority in many areas. Finally, and as other possible lines of research, it needs to be acknowledged that the article has focused mostly on problematising AI in relation to terrorism and counter-terrorism. Possible positive impacts have not been addressed. This would need further engagement with feminist, postcolonial or peace scholars and the ways that have theorised alternative security futures that would prioritise justice, care and human dignity. While this discussion exceeds the scope of this article, it may also be considered a pending task as CTS could contribute to imagine a more just and equitable approach to AI as implemented and developed in relation to security.

Notes

1. EU, "AI Act", https://artificialintelligenceact.eu/ai-act-explorer/.
2. Mentioned in Article 5(1), first subparagraph, point (h)(iii) and detailed in Annex II: List of Criminal Offences.
3. EU, "AI Act", https://artificialintelligenceact.eu/high-level-summary/.

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