CODE-DEPENDENCY: SOUTH AFRICA'S PASSENGER NAME RECORDS AND RACE

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A note about this project:

This project initially stemmed from an interest in the history and the various stakeholders involved in South Africa's Passenger Name Record (PNR) regime. It quickly became clear that the issues at hand were far more complex than a simple dichotomy between public and private actors, particularly those that appeared following the events of 9/11 in the USA. The account of PNR use in South Africa is intricately tied to the country's deeply rooted racial history. Despite this, academic discourse on PNR in the country has been sparse and has remained focused on issues of privacy.

Though the need for an inquiry into the racial dimensions of PNR was clear, I hesitated to embark on a project that delved into the subject of Race. My hesitation came from a fear of not knowing how to approach the contentious subject matter appropriately and in doing so from a position of privilege; a concern echoed by many advisors and colleagues along the way. Nevertheless, given my personal connection to South Africa, I felt this conversation was essential. I am deeply grateful for the opportunity and support along the way, and I hope to have initiated dialogue on such an important topic. This research has been conducted with the best of intentions.

Lay Abstract

The implementation of Passenger Name Records (PNR) systems by sovereign states has been conceptualized within the framework of Western securitization measures enacted in response to the 'Global War on Terror' following the events of September 11, 2001. This prevailing narrative is substantively challenged by South Africa's official adoption of integrated PNR technology in 2014, wherein the nation became the first African state to do so despite the absence of significant terrorist threats. This dissertation shows that South Africa's deployment of PNR technologies transcends contemporary security priorities, instead representing a continuation of historically embedded practices of mobility control. The nation's extensive history of managing cross-border movements, particularly during the colonial and Apartheid periods, shows how contemporary PNR systems are intrinsically intertwined with legacies of racialized border governance and exclusionary territorial regimes. While PNR infrastructures are often characterized as being neutral, this research demonstrates that South Africa's PNR framework both reflects and reinforces historically constructed patterns of the management of mobile populations thereby perpetuating established modalities of surveillance. Race risks being embedded in every aspect of PNR; from its design, construction, implementation, and human use. Therefore, PNR functions as a material infrastructure that risks actively racializing mobile populations. By examining the sociotechnical dimensions of PNR, this dissertation offers critical insight into the potential racial implications of global security practices and in the circulation of surveillance technologies, particularly within the Global South.

Full Abstract

This dissertation critically examines the implementation of Passenger Name Record (PNR) systems in South Africa, foregrounding the historical continuities and racialized dimensions of surveillance technologies. While PNR technology and practices are often framed as a neutral, Western security tool developed in response to the 'Global War on Terror,' this study challenges that narrative by situating South Africa's adoption of an integrated PNR regime in 2014 within a longer genealogy of colonial and Apartheid-era systems of population control and mobility management. As the first African country to implement PNR for national security purposes in the absence of significant terrorist threats, South Africa provides a crucial case for examining how global surveillance infrastructures are racialized and repurposed within post-colonial contexts. Ultimately, this dissertation makes the argument that the South African PNR system risks being deeply embedded with Race. Drawing on sociohistorical and sociotechnical analyses, the dissertation argues that PNR is not a value-free or purely technical system, but rather a racialized assemblage that reflects and reinforces enduring forms of exclusion and differential governance. It demonstrates how the racial logics of the apartheid and colonial surveillance regimes are rearticulated through contemporary data infrastructures and are obscured by the technical semblance of algorithmic risk profiling and international security standards. This dissertation further shows how global events- particularly the 2010 FIFA World Cup, rather than the events of 9/11- catalyzed the development of South Africa's PNR regime, underscoring the role of mega-events in legitimizing intensified surveillance under the guise of global security. Finally, this dissertation seeks to problematize the global proliferation of PNR technologies by Western states and international organizations as problematic because PNR technology is presented as a neutral technology. By examining the sociotechnical dimensions of PNR, this dissertation offers critical insight into the racial implications of global security practices and the circulation of surveillance technologies, particularly within the Global South.

This dissertation makes three key contributions. First, it repositions border technologies like PNR as continuations of colonial and Apartheid modes of control rather than as novel post-9/11 innovations. Second, it contributes to security studies by revealing how international surveillance norms, often shaped by Western counterterrorism agendas, are exported without considering how they interact with existing racial hierarchies. As such, it is useful to consider PNR technology as a racializing assemblage. Third, it rethinks the ontological relationship between PNR and Race, highlighting the material role of technology in shaping racialized mobility, access, and exclusion - moving beyond identifying who is excluded by PNR technology towards an understanding of how certain bodies become marked by Race, and how these identities are constituted in the practice of PNR. This study challenges the neutrality of PNR and calls for a post-colonial reckoning with the racial histories embedded in contemporary PNR infrastructures. Theoretically, this research provides a materially oriented approach to PNR that includes a sustained engagement with post-colonialism and Race. Epistemologically, this research challenges dominant modes of knowledge production in the study of border technologies. Simply, this research reconsiders the nature of PNR as a security technology by examining its entanglement with Race, arguing that PNR does not merely reflect racial bias, but actively takes part in the construction and governance of racialized identities.

Acronyms

ACSA	Airports Company South Africa
AFRAA	African Airlines Association
ANT	Actor Network Theory
API	Advanced Passenger Information
APIS	Advanced Passenger Information System
APP	Advanced Passenger Processing
BCOCC	Border Control Operational Coordinating Committee
BMA	Border Management Authority
CRS	Computer Reservation System
CSIR	Council for Scientific and Industrial Research
DHA	Department of Home Affairs
DIRCO	Department of International Relations and Cooperation
DSS	Department of State Security
EU	European Union
GDS	Global Distribution System
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
ICCPR	International Covenant on Civil and Political Rights
INTERPOL	International Criminal Police Organization
OSI	Other Service Related Information
PNR	Passenger Name Record
POPI	Protection of Personal Information (Act)
PSS	Passenger Service Systems
SACA	South African Customs Administration
SAPS	South African Police Service
SARS	South African Revenue Service
SASS	South African Secret Service
SSA	State Security Agency
SSI	Special Services Information
SSR	Special Service Requests
STS	Science and Technology studies
UDHR	Universal Declaration on Human Rights (United Nations)
UN	United Nations
VFS	Visa Facilitation Services
WCO	World Customs Organization

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Chapter 1: Introduction

1. Introduction

The use of Passenger Name Records (PNR) by sovereign states for security purposes has been predominately understood as a Western response to the 'Global War on Terror.' [1] Surveillance technologies used to monitor mobile populations[2] may have been institutionalized in the West following the events of 9/11, but the current regime of global mobility and the logic and practices that are fundamental to it, are legacies of colonial systems of control.[3] South Africa's implementation of a PNR regime demonstrated that the use of PNR is no longer exclusively a Western response to the events of 9/11 and an attempt to control immigration and combat terrorism. In 2014, South Africa, without any significant threat of terrorism,[4] became the first country on the African continent to officially use PNR for national security purposes and one of only thirteen states globally to connect their Advanced Passenger Information (API) systems with their PNR systems.[5] While further inquiry demonstrates that South Africa has used PNR as a tool of security since the colonial era, and a computerized PNR system was in place prior to the events of 9/11. PNR data is now used by states globally to manage transnational security threats and to facilitate anticipatory risk management of mobile populations. The collection and use of PNR data for such purposes represents a complex sociotechnical assemblage of security practices that are used to create "digital prophecies" embedded in global surveillance operations.[6] Interestingly, there has yet to be any

[1] Global West or Western here refers to North America and Europe.

[2] For the purpose of this dissertation, mobile populations are understood as individuals, irrespective of citizenship, movements across international borders for any length of time or purpose.

[3] Yael Berda, "Managing Dangerous Populations: Colonial Legacies of Security and Surveillance," *Sociological Forum* 28, no. 3 (September 2013): 627–630.

[4] Jane Duncan, *Stopping the Spies: Constructing and Resisting the Surveillance State in South Africa* (Johannesburg: WITS University Press, 2018), 12.

Cf. In South Africa, the contemporary framing of PNR is heavily influenced by the global security discourse that emerged after 9/11, where PNR systems are presented as essential tools for counter-terrorism. While many states globally have implemented the use of PNR beyond strictly terrorism-related contexts, integrating it into broader border management and crime prevention efforts, South Africa continues to justify its PNR regime primarily within the language of counter-terrorism. Notably, South Africa has a long history of using passenger data for surveillance purposes, dating back to the Apartheid era. The current emphasis on terrorism does not reflect the objective presence or absence of specific threats, but rather demonstrates how PNR is legitimized through global security narratives. These narratives, shaped by both state actors and international institutions, render PNR meaningful and necessary within the framework of risk management, regardless of whether terrorism is the immediate concern.

[5] Aviation Week Network, "There Is Still Hope for African Aviation," July 29, 2017, http://aviationweek.com/mro/there-still-hope-african-aviation.

[6] Elena Esposito, "Digital Prophecies and Web Intelligence," in *Privacy, Due Process and the Computational Turn: The Philosophy of Law Meets the Philosophy of Technology*, ed. M. Hildebrandt and K. de Vries (London/New York: Routledge, 2013), 121.

significant inquiry into PNR use in the Global South nor how legacies of colonial practice of mobility management influence contemporary global practices of PNR.

South Africa's use of PNR represents an opportunity to better understand the global PNR regime because of the country's location in the Global South and because of its legacy of racist, colonial rule. For more than a century, South Africa served as a laboratory for the development of surveillance technology and for the technologies of racial segregation that were exported throughout the European empire.[7] South Africa's legacy includes strict control over cross-border mobility[8] in order "to prevent the evils that arise from the improper introduction of strangers into the colony,"[9] and it includes colonial rule that institutionalized inadmissibility on account of ethnicity.[10] South Africa's current system of mobile population management is closely connected to its colonial period and to the Apartheid regime;[11] in fact, now thirty years after the official end to Apartheid, the country still "retain[s] most of the features of the colonial border-regime."[12] South Africa's use of PNR is not only of interest because the country is located in the Global South and the use of data to control mobility in the Global North has strong connections to the technology developed and elaborated upon in the Global South but also because there continues to be a risk that PNR regimes may carry colonial and Apartheid-era logic of racial inequality.

This dissertation argues that South Africa's PNR regime should not be understood as a neutral technology that was developed in the aftermath of 9/11, but as a technology inherently connected to practices first articulated under colonial rule. This research will highlight the interconnectedness of technology, security, and Race in the global practices of PNR use. Specifically, this dissertation seeks to understand the relationship between PNR technology and Race in South Africa: especially when PNR is understood as a colonial infrastructure that helped create the necessary material conditions at the South African border to make colonial rule possible. This dissertation asserts that the notion of Race being embedded in PNR

[7] Keith Breckenridge, "Introduction: The Global Biometric Arena," in *Biometric State: The Global Politics of Identification and Surveillance in South Africa, 1850 to the Present* (Cambridge: Cambridge University Press, 2014), 2.
[8] Andrew Macdonald, "Colonial Trespassers in the Making of South Africa's International Borders, 1900 to c. 1950" (PhD diss., Cambridge University, 2012).
[9] Walter Harding, *Cape of Good Hope Government Proclamations from 1806 to 1825,* vol. 1 (Cape Town: A. S. Robertson, 1838), 11.
[10] Macdonald, "Colonial Trespassers."
[11] Macdonald, "Colonial Trespassers."
[12] Macdonald, "Colonial Trespassers," 294.

decision making must be taken seriously because PNR functions as a material system that enables the assignment of racial categories to mobile populations.

This dissertation challenges the assumption that PNR is a neutral technology and the assumption that South African PNR does not actively participate in the global circulation of racialization. PNR as a technical infrastructure, comprised of both human and non-human actants, contributes to the material reality that makes it possible to mark bodies with Race: this allows for 'otherness' and 'risk' to be represented. In other words, this dissertation examines how PNR as a material infrastructure assigns difference (including Race) to mobile populations interacting with the South African border, and how it is naturalized, ascribed, and experienced.

Building on insight from Actor Network Theory and from a sociotechnical-assemblage conceptual framework, this dissertation explores how PNR is incorporated into global politics and how Race may be embedded in national security practices. The South African case allows PNR to be problematized in a way that incorporates the sociotechnical nature of PNR with post-colonial realities, therefore making it possible to better understand the circulation of security technology and practices as it relates to the materiality of colonialism and Race.

1.1 South Africa's Passenger Name Records

A PNR refers to the data that is collected on each passenger by an airline for each journey; the records may be created by the airlines and travel agencies[13] and contain all data related to the booking.[14] A PNR is created each time a flight reservation is made and it is not deleted if a reservation is cancelled or a ticket purchase is not finalized.[15] The collection of PNR data is not new; PNRs have been collected by commercial airlines for commercial purposes since the 1960s.[16] PNR in its contemporary use is an umbrella term used to refer to the information that is recorded by airlines and authorized agents for tickets booked by or on behalf of a passenger; the data is collected by the airline operator and the information is

[13] This includes bookings made on the Global Distribution System (GDS) or the Computer Reservation System (CRS), which refer to online booking systems that transmit PNR data to the airline carrier for which the ticket has been purchased.
[14] European Commission, "The Passenger Name Record (PNR): Frequently Asked Questions," Press Release, Memo/07/294, July 13, 2007, http://europa.eu/rapid/press-release_MEMO-07-294_en.htm.
[15] Edward Hasbrouck, "What's in a Passenger Name Record (PNR)?," The Practical Nomad, updated January 19, 2025. https://hasbrouck.org/articles/PNR.html.
[16] Rocco Bellanova and Denis Duez, "A Different View on the 'Making' of European Security: The EU Passenger Name Record System as a Socio-technical Assemblage," *European Foreign Affairs Review* 17, no. 2 (2012): 109–124.

willingly provided by the passenger.[17] This data is stored on the airline's database, or contracted data repository, which allows various actors[18] to access and alter the PNR data.[19]

It is important to note that the information in a PNR can vary, but generally includes information such as a passenger's name, date of birth, address, passport information, telephone numbers, and information related to the means of purchase. Each PNR is different, depending on the information provided, what airline is collecting the data, and the security concerns of a given country. In 2003, the European Commission stated that there were "20–25 possible fields of PNR data, some of which include subsets of information, expanding the total to approximately 60 fields and sub-fields."[20] The data that is collected is dependent on a specific country's legislation, airline regulations, and whether or not 'optional' fields are included. As such, passenger data can include information from Other Service Related Information (OSI), Special Services Information (SSI), and Special Service Requests (SSR), which can include a range of personal information including medical services, physical and mental conditions, religious beliefs, or other sensitive information.[21] Under these categories – SSI and SSR – additional information is entered, though not required to purchase the ticket. This information may include seat assignment, meals, health and accessibility concerns, etc. The additional information in some fields is shared with other carriers through an interoperability mechanism.[22] Once a PNR is created, it has an audit train, that is, a chronological succession of data recording each entry or change to the PNR, including information on location, time, and information and user ID of employees, travel agents, and airline staff who edited or added to the PNR.[23] This demonstrates the intimacy of the PNR data that is collected and processed, and the amount of personal information that can be deducted from the PNR fields, in that a PNR can:

> show where you went, when, with whom, for how long, and at whose expense. Behind the closed doors of your hotel room, with a particular other person, they show whether you asked for one bed or two. Through departmental and project billing codes, business travel PNRs reveal confidential internal corporate and other organization structures and lines of authority and show which people were involved in work together, even if they travelled separately. Particularly in the aggregate,

[17] International Civil Aviation Organization (ICAO), *Guidelines on Passenger Name Record (PNR) data*, ICAO Document no. 9944 (Montreal, QC: International Civil Aviation Organization, 2010).
[18] This includes commercial and state actors as well as actors located in various countries.
[19] ICAO, *Guidelines on PNR*.
[20] European Commission, "Airline Passenger Data Transfers from the EU to the United States (Passenger Name Record) Frequently Asked Questions," Press Release, Memo/03/53, March 12, 2003.
[21] ICAO, *Guidelines on PNR*.
[22] Elia Zureik and Mark B. Salter, eds., *Global Surveillance and Policing* (London: Willan, 2005).
[23] Colin J. Bennet, "What Happens When You Book an Airline Ticket? The Collection and Processing of Passenger Data Post-9/11," in *Global Surveillance and Policing*, ed. Elia Zureik and Mark B. Salter (London: Willan, 2005), 113–138.

> they reveal trade secrets, insider financial information, and information protected by attorney-client, journalistic, and other privileges.[24]

The data that a PNR encompasses is inherently sensitive. PNR is non-discriminatory; along with potentially making it easier to detect terrorists and criminals, it impacts all people regardless of age, nationality, or status.

The implementation of a PNR regime in South Africa was primarily for customs and immigration purposes as well as for facilitating passenger safety and rights.[25] The 2014 amendments to the South African *Immigration Act 13 of 2002*, section 34.5, require that every airline submit PNR information to the government electronically.[26] This applies to every person travelling to, from, and within South Africa. The PNR information required by South Africa includes:

> (a) the date of reservation; (b) the dates of intended travel; (c) the first name and surname; (d) other names on the passenger name record; (e) all forms of payment information; (f) the billing address; (g) the contact telephone numbers; (h) all travel itineraries for that specific passenger name record; (i) the frequent flyer information, limited to miles flown and addresses; (j) the travel agency; (k) the travel agent; (l) the split or divided passenger name record information; (m) the ticketing field information; (n) the ticket number; (o) the seat number; (p) the date of ticket issuance; (q) no show history; (r) the bag tag numbers; (s) the number of bags; (t) the record locator; (u) the weight of the bags; (v) the no show information; (w) the seat information; (x) whether the tickets are one-way tickets; (y) any information collected as contemplated in subregulation (2); (z) standby; and (aa) names of passengers who have been taken off the flight.[27]

[24] Hasbrouck, "What's in a Passenger Name Record?," n.p.
[25] Anonymous employee at South Africa customs, Email message to the author, January 31, 2018.
[26] South Africa, Government Gazette 37679, *Regulation Gazette 10199, Immigration Act.2002*. Immigration Regulations (2014 amendments) 22 May 2014 [South Africa].
[27] South Africa, Government Gazette 37679.

The PNR system introduced by South Africa, intended for national security purposes, is laden with uncertainties and raises serious concerns about individual rights, irrespective of one's nationality.[28] While the collection of PNR data enables heightened surveillance of individuals, unlike the heightened discourse in North America and Europe, South Africa has yet to engage in a robust debate on the balance between privacy and security.[29] This system was quietly initiated in the lead-up to the 2010 Fédération Internationale de Football Association (FIFA) World Cup, and was further cemented by the 2014 amendments to the South African *Immigration Act 13 of 2002*, which institutionalized the use of PNRs for security measures.[30] Interestingly, PNR[31] collection for security purposes represents one of the "most detailed and personal data sources" available.[32] PNR as a large dataset is disseminated by state authorities for security purposes through the use of algorithms – yet PNR algorithms have been demonstrated to be discriminatory even with parts of the personal data removed.[33] This is because many of the PNR fields can serve as a statistical proxy for redundant coding for categories such as ethnicity, religion, and social status.[34] Thus, even though Race may not be a field in PNR datasets, it is often easily deductible through other data such as postal codes or mobility patterns. It is also important to note that the algorithms used for PNR are considered "learning algorithms"[35] – or "semi-autonomous information-processing systems"[36] – which means that the algorithm continues to change with new data, even without human instruction. In fact, "design decisions become encoded and encapsulated in complex inscrutable algorithms that enact (in millions of lines of source code) our supposed choices based on complex relational conditions, which after many iterations of 'bug fixing' and 'tweaking' even the programmers

[28] Kailey Taplin, "South Africa's PNR Regime: Privacy and Data Protection," *The Computer Law and Security Report* 40 (2021), 105524, https://doi.org/10.1016/j.clsr.2020.105524.
[29] Taplin, "South Africa's PNR Regime."
[30] Taplin, "South Africa's PNR Regime."
[31] In South Africa, PNR data is kept "for as long as certain periods require the information to be kept" noting that "certain face value/sensitive information is kept permanently on record," far exceeding international standards and practices. Anonymous, email message to the author, January 31, 2018.
[32] Paul De Hert and Rocco Bellanova, *Transatlantic Cooperation on Travelers Data Processing: From Sorting Countries to Sorting Individuals* (Washington, DC: Migration Policy Institute, 2011), 4.
[33] Christian Sandvig, Kevin Hamilton, Karrie Karahalios, and Cedric Langbort, "When the Algorithm Itself Is a Racist: Diagnosing Ethical Harm in the Basic Components of Software," *International Journal of Communication* 10 (2016): 4972–4990.
[34] Moritz Hardt, "How Big Data Is Unfair: Understanding Sources of Unfairness in Data Driven Decisions Making," Medium, September 26, 2014, https://medium.com/@mrtz/how-big-data-is-unfair-9aa544d739de.
[35] Philip Brey, "The Epistemology and Ontology of Human–Computer Interaction," *Minds and Machine* 15, no. 3-4 (2005): 383–398, https://doi.org/10.1007/s11023-005-9003-1.
[36] Matthias Leese, "The New Profiling: Algorithms, Black Boxes, and the Failure of Anti-Discriminatory Safeguards in the European Union," *Security Dialogue* 45, no. 5 (October 2014): 494–511, https://doi.org/10.1177/0967010614544204.

often no longer understands."[37] This has significant implications for the capacity for individuals to appeal the decision that the algorithms make, and further, makes accountability particularly complicated.

Algorithms are often conceptualized as a black box because the internal operations are largely unknown: this reflects the reality of security in state operations.[38] The case of South African PNR demonstrates that despite being a highly secret security technology, there is information available on how the country's PNR algorithms operate. Algorithm technologies are part of a complex sociotechnical assemblage and are not simply technical tools, however, they are always related to human actors. Unless there is effort to actively avoid racial bias in PNR algorithms,[39] algorithms will default to human bias. Governments and those who create PNR algorithms ought to be aware of potential biases and actively audit their systems for unintended discriminatory impacts. It requires intentional effort at every stage of development of the algorithm. Simply stated, algorithms do not inherently correct for human bias- algorithms will perpetuate existing inequities unless actively designed to promote fairness and equality. Therefore, 'colour blind' PNR algorithms do not equate to non-racists PNR algorithms in South Africa or elsewhere.[40]

[37] Lucas Introna, "Algorithms, Governance, and Governmentality: On Governing Academic Writing," *Science, Technology, & Human Values* 41, no. 1 (January 2016): 25, https://doi.org/10.1177/0162243915587360.
[38] Taina Bucher, *If...Then: Algorithmic Power and Politics*. (Oxford University Press, 2018).
[39] This is not currently recognized as necessary by South Africa or by the United Nations, both of which have asserted that PNR technology cannot exhibit bias because the data it processes is, by definition, not considered sensitive.
[40] Cf. Marzia Milazzo, *Colorblind Tools.: Global Technologies of Racial Power*, (Northwestern University Press, 2022).

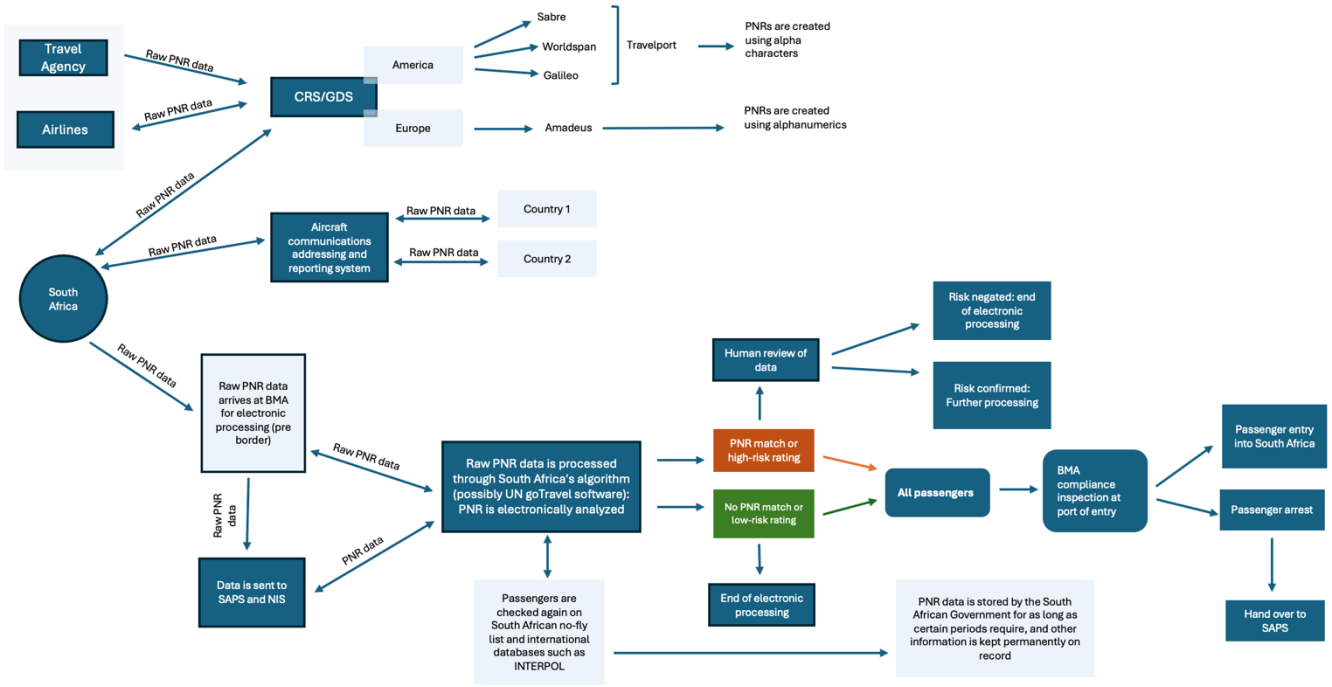

Figure 1: Movement of PNR Data in South Africa.

Description: The figure presents a detailed flowchart illustrating the creation, international transmission, processing, and operational use of Passenger Name Record (PNR) data for travellers entering South Africa. The diagram uses interconnected boxes and arrows to indicate data movement between commercial entities, international reservation systems, South African border authorities, and law-enforcement agencies. A full description of this image can be found in Annex 3.

1.2 Objective of Research

This project has multiple objectives. Empirically, the objective is to problematize PNR beyond its Western context and in a way that incorporates issues of colonialism and Race. The project seeks to examine South African PNR use and the ways in which Race is embedded in the processes and context of the practice, not just its impact.[41] Further, using an ANT approach, the objective is to show how bodies can become marked by Race. In doing so, attention will be drawn to how systems of colonial rule influenced South Africa's use of PNR and how ideas and technologies that developed in South Africa for uniquely South African struggles are infiltrating global politics (which requires an understanding of the circulation of PNR security technology and expert practices). Additionally, this dissertation suggests that when

[41] Wiebe E. Bijker and John Law, *Shaping Technology/Building Society: Studies in Sociotechnical Change* (Cambridge, MA: MIT Press, 1992).

understanding the relationship between security and Race, Race ought to be comprehended beyond the dichotomy of black and white. In other words, empirically, this dissertation suggests that studies of International Relations and technology need to problematize Race beyond its reducibility to a clear dichotomy of black and white. From a theoretical perspective, the project will analyze the challenges from technological developments on a global scale that are embedded with asymmetries related to Race and will examine how PNR technology is a significant actor in marginalization of certain mobile populations. In doing so, this dissertation presents PNR as a sociotechnical assemblage and as a technology that is co-constitutive of both human and non-human actants. Technology has not only changed the materiality of the border but has also impacted how mobile populations interact with the border and how they might become marked by Race. Thus, in approaching South Africa's PNR as a sociotechnical assemblage, this project reconciles post-colonialism and Race with materially oriented approaches to global politics.

This project is concerned with how South Africa governs its borders through the use of PNR, including the human and material actors and the logic that underpins and precedes this practice. The guiding research question that this dissertation answers is: *In what ways can Race embedded in Passenger Name Records as a seemingly neutral tool in the management of mobile populations?* A secondary question that underlines this project is: *How is South African Passenger Name Record use connected to the global management and circulation of security technology, experts, and practices?*

1.3 Précis of the Dissertation

This dissertation contributes to an ongoing engagement with materially-oriented approaches and studies of technology. Specifically, this dissertation offers an original and critical examination of how Race intersects with PNR use in border security and surveillance practices, and it also provides the first history of PNR in South Africa. By analyzing the racialized implications of PNR use in the case of South Africa, this research makes a unique and significant contribution to materially oriented approaches and surveillance studies more generally. While materially oriented approaches have tended to avoid direct engagements with Race, and with case studies from the global South, this research seeks to rectify this notable absence by providing a direct engagement with Race in the material network of PNR in South Africa.

The first two chapters of this dissertation are followed by an interlude, that together, will introduce and set the theoretical foundations of the project. The theoretical foundations are followed by seven chapters

that engage directly with South African PNR from its historical to its contemporary use. In following PNR as a material object that is deeply embedded with Race, the remaining chapters of the dissertation suggest that PNR must be considered as a racializing assemblage and that studies of technology must broaden their comprehension of Race to fully capture how Race becomes embedded in sociotechnical assemblages.

Chapter two situates the research methodologically. Rather than treating society as a network of purely human agents, ANT emphasizes that all actants have agency within a network. This chapter sets forward the research tools of the project and how actants were followed using the toolbox of ANT.

Chapter three situates this research in an already well-developed literature of materially oriented studies of security. These contributions provide the foundations to understand South Africa's use of PNR as a tool of security in a way that is sensitive to both Race and materiality and which can be organized into three main, and often interconnected, themes: 1) sociological approaches to security; 2) risk-based approaches to understanding security technology; and, 3) literature that reconciles the disconnect between studies on security technologies and Race. Despite PNR not being the primary focus of much of this literature, these three trends in security literature provide the empirical underpinnings necessary to understand PNR as a sociotechnical assemblage that is inherently related to post-colonialism and Race.

Chapter four is an interlude on Race. It seeks to provide the necessary foundations to understand Race in South Africa. This is crucial because of the country's long history of technology-mediated racial practices. The contemporary realities of Race in South Africa are deeply rooted in, and cannot be separated from, the historical processes of racial categorization established during colonialism and the Apartheid era.

Chapter five presents the historical foundations of the technologies of Race and racialization. Understanding the relationship of the politics of data collection at the airport makes it possible to build the argument that Race always risks being embedded in PNR as a sociotechnical assemblage- and that PNR can be understood as a Racializing assemblage. Conceptualizing PNR as a racializing assemblage makes it possible to understand how Race becomes embedded in PNR as a sociotechnical assemblage in ways that may be unintended or overlooked— often not through overt intention, but through the entanglement of data practices, institutional logics, and historical inequalities. This is a central theme throughout the remaining chapters of the dissertation.

Chapter six traces the material history of PNR in South Africa. Building on research conducted at the National Archives of South Africa, this dissertation traces the use of PNR in that country to the colonial era— almost a century earlier than the events of 9/11, which are typically recognized as the establishment of states' use of PNR for national security purposes. Further, a focus on the technology that made PNR use possible reveals that the technologies and logics of contemporary PNR are deeply embedded in historical practices. The case of South Africa is incredibly valuable to the global study of PNR because it has served as a laboratory for the development of surveillance technology for decades.

Chapter seven situates contemporary South African PNR as a sociotechnical assemblage. Understanding how PNR is embedded with Race requires examining contemporary technologized practices. The design of PNR algorithms is explored, and it is demonstrated that PNR algorithms that exclude Race are not inherently anti-racial but can still reproduce structural inequalities by ignoring the historical and social contexts that shape data and outcomes.

Chapter eight of this research examines the development of PNR in South Africa until the FIFA World Cup in 2010. This examination shows that PNR use in South Africa was influenced more by the World Cup as a mega-event than it had been subsequent to the events of 9/11. The implementation of PNR in the context of FIFA had a profound impact on the securitization of mobile populations and racial profiling as it institutionalized global surveillance practices and reinforced discriminatory patterns.

Chapter nine builds extensively from chapter eight in reflecting on the World Cup. Given that PNR is embedded in the practice of national security, much of the information is secret. However, the World Cup brought significant attention and publicity on South African PNR, and building on PNR as a sociotechnical assemblage provides valuable information to understand the ways in which Race becomes embedded— be it through direct intention or failure to actively create anti-racial technology.

Chapter 10 is an interlude on co-bordering in South Africa because South African borders are increasingly collaborative with bordering states. However, the use of PNR in this process has yet to be elaborated on in public information, although there is significant insight into the change in South African border logic and the increased value in collaborating with other countries.

Chapter 11 explores the contemporary use of PNR in South Africa. It presents the contemporary PNR regime as a state/non-state assemblage and illustrates the growing number of actors involved in the global use and circulation of PNR technology and practices. This chapter highlights a number of shortcomings in the proliferation of PNR technology. Specifically, the reality that PNR technology is considered to be inherently neutral. This chapter seeks to emphasize that technology that is colour-blind is not inherently Race-free or bias-free. Ignoring Race in the design and implementation of PNR— especially in South Africa— risks exasperating existing inequalities.

This dissertation concludes by suggesting that PNR needs to be attentive to the possibility of racial bias; not directly including data on Race does not make PNR technology Race-free. Ignoring Race in the design and implementation risks reinforcing existing inequality. Rather, there is a need to confront and tackle the racial logics that risk being embedded in technological systems. This research reconsiders the nature of PNR as a security technology by examining its entanglement with Race, suggesting that PNR does not merely reflect racial bias, but actively participates in the construction and governance of racialized identities.

1.4. Theoretical Framework

PNR represents a complex sociotechnical assemblage of practices, material objects, and actors. As such, to examine how Race is embedded in South Africa's PNR regime requires an approach that focuses on both the practice and relations between the human and material elements involved. Rather than seeking to understand PNR as circulating from the centre to the periphery, this project understands PNR as a site of politics related to the technologies of colonial political ideologies and institutional structures. PNR is connected to local spaces and politics in unpredictable ways; its technology cannot be understood without considering South Africa as a site of colonial scientific development and exportation of security technology for population management purposes.[42] Comprehending the relationship between PNR and Race requires an understanding of the sociotechnical relations that permit and enact security practices. Further, it is necessary to capture the dynamics of the interactions between shifting heterogeneous actors

[42] Breckenridge, *Biometric State.*

and actants[43] in networks at the local and global settings, which highlight how elements of Race and post-colonialism are found within PNR used for security purposes. Sociotechnical assemblage as a theoretical framework does not provide instances of Western PNR and sociotechnical assemblages in a different setting, but rather destabilizes conventional Western accounts of PNR as a neutral technology developed in the West in the wake of post-9/11 securitization. This sociotechnical approach reveals how, at "various sites, and in different ways, colonial power relations – especially ethnic hierarchies – have been 'conjugated' into distinctive technological futures" in the contemporary management of global mobility.[44]

1.5 PNR as a Sociotechnical Assemblage

An inquiry into the ways in which Race is embedded in South Africa's PNR regime will reveal the inner workings of technology and will give attention to the process and context of the technology itself, not purely its impact.[45] It seeks to examine how technologies, while they may not act alone, impact the world independently. PNR has agency,[46] and while it may reinforce racial biases, it does not do so independently. The decision making of PNR algorithms was developed in a way that puts the practice into a 'black box' wherein categories of risk, and likely Race, are automatic and the decision is communicated in a way that is autonomous, though still requires humans to act.[47] Agency, in the case of PNR, constitutes action rather than proceeding it. As such, the empirical foundation of this project is founded in sociotechnical assemblages that draw on the heterogeneous and material features of PNR. Before PNR can be situated as a sociotechnical assemblage, an understanding of assemblages will be required.

Assemblage theory allows for the study of how heterogeneous actants are established and how they maintain relations while also creating shared spaces of regulation, practices, and outcomes.[48] The term assemblage was first developed by Gilles Deleuze and Felix Guattari and was used to expose possibilities

[43] The agency of this project is captured by the utilization of the term 'actant.' An actant refers to anything that makes a difference be it human, animal, non-human, technological, etc. An actant is configured in a network wherein the effect is produced. As Bruno Latour has explained, "Anything that does modify a state of affairs by making a difference is an actor – or, if it has no figuration yet, an actant." Latour, *Reassembling the Social: An Introduction to Actor-Network-Theory* (Oxford: Oxford University Press, 2005), 71.
[44] Warwick Anderson, "Introduction: Postcolonial Technoscience." *Social Studies of Science* 32, no. 5/6 (December 2002): 651, https://doi.org/10.1177/030631270203200502.
[45] Bijker and Law, *Shaping Technology/Building Society*.
[46] Specifically, the PNR algorithms.
[47] Leese, "The New Profiling," 503.
[48] Xavier Guillaume, "Agencement and Traces: A Politics of Ephemeral Theorizing," in *Reassembling International Theory: Assemblage Thinking and International Relations*, ed. Michele Acuto and Simon Curtis (London: Palgrave Macmillan, 2014), 106–112.

of order with the intention to examine hierarchical and heterogeneous 'assemblages.' An assemblage is most simply understood as a complex configuration of heterogeneous elements that coalesce and produce without any fixed intention or centralizing principles.[49] Ontologically, assemblage theory has no pre-determined hierarchies or inclusive organizational principles and all entities have the same ontological status. Assemblage theory permits a move away from standard categories of inquiry in international relations and towards new materiality.[50] This means that all actants, including technology, are understood to be equal in their capacity to act and to make a difference, and are therefore ascribed a general capacity to act.[51]

It is important to note that assemblage theory has several limitations, particularly when used to study how Race may become embedded in PNR as a neutral technology. Assemblage theory's conceptual openness makes it difficult to delineate strong analytical boundaries,[52] and its emphasis on relational complexity can lead to descriptive accounts that lack a discernible causal hierarchy.[53] It has been noted that assemblage analysis still requires a strategic narrowing of focus; one cannot treat all elements as equally meaningful.[54] This means that assemblage approaches are contingent on processes of selection,[55] simplification, and conceptualization; often, there is a risk of underestimating the extent to which researchers must inevitably make conceptual choices.[56] Furthermore, since assemblage theory resists fixed boundaries, it can make it difficult to determine which relations are analytically consequential rather than merely descriptive. Nevertheless, assemblage theory captures forms of relational and infrastructural complexity that more structural approaches often overlook, and its attentiveness to socio-technical entanglement makes it a powerful tool for analyzing how Race becomes embedded in the everyday functioning of systems like PNR.

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[49] Gilles Deleuze and Félix Guattari, *A Thousand Plateaus: Capitalism and Schizophrenia*, trans. Brian Massumi (London: Continuum, 1987).
[50] These categories include the state, the city, the economy, society, etc. Assemblage theory rather, identities power and agency across public and private, human and non-human, global and local.
[51] Also known as 'generalized symmetry.'
[52] Martin Müller, "Assemblages and Actor-Networks: Rethinking Socio-Material Power, Politics and Space." *Geography Compass* 9, no. 1 (2015): 27–41. https://doi.org/10.1111/gec3.12192.
[53] Cf. Jane Bennett, *Vibrant Matter : A Political Ecology of Things*. (Durham: Duke University Press, 2010). https://doi.org/10.1515/9780822391623.
[54] Simon Curtis, *Reassembling International Theory : Assemblage Thinking and International Relations*. Edited by M. Acuto (2014. London: Palgrave Macmillan UK, 2014). https://doi.org/10.1057/9781137383969.
[55] In addition, researches must decide 'where' the assemblage ends in relation to their research.
[56] Simon Curtis, *Reassembling International Theory*

Technologies act in an assemblage of human and material actors, whereby technologies and humans enable each other to act and have an impact on the world. Technologies, such as PNR, are not passive objects, but have agentic capacity to make a difference in the social order and in global politics.[57] As a result of the distributed agency, the relationship between humans and technology is best understood as a sociotechnical assemblage. Sociotechnical assemblages inquire specifically into the way technologies shape contemporary and global society. It is not simply epistemological; the boundaries are distorted between the epistemological and ontological, human and material. The technical and the social are not taken as separate ontological domains but are part of the same phenomena.[58]

Sociotechnical assemblages ensure that the role of technology and its relationship to material and non-material elements are not overlooked by breaking the dichotomy between society and technology. This is critical in reference to PNR and in the connection to Race and post-colonialism because the technologies are required, designed, built, developed, and improved in relation to a myriad of global security and non-security dimensions. Thus, understanding PNR through the theoretical framework of sociotechnical assemblages reveals the local practices that give rise to global systems and claims more completely.

Therefore, the use of PNR in general, and in particular for national security purposes, represents a rather complex sociotechnical assemblage. The main elements of PNR are multiple and heterogeneous and include both humans and technology (material and non-material). A non-exhaustive list of the human and non-human actants include:[59]

[57] Sheila Jasanoff, "The Idiom of Co-Production," in *States of Knowledge: The Co-Production of Science and Social Order,* ed. Sheila Jasanoff (London: Routledge, 2004), 1–12.
[58] Bruno Latour, "Technology Is Society Made Durable," *The Sociological Review* 38, no. 1 (1990): 103–131, https://doi.org/10.1111/j.1467-954X.1990.tb03350.x.
[59] Cf. Bellanova and Duez, "A Different View on the 'Making' of European Security."

Table 1: Human and non-human actants in South African PNR

human actants and institutions:	**non-human actants and technology:**
Software engineers, Air carriers, regional and international organization (ICAO, IATA, WCO, UN, INTERPOL), Airports Company South Africa, Border Control Operational Coordinating Committee, Mutual Legal Assistance Treaties (MLATs), Border Management Authority etc.), commercial passengers, Department of Home Affairs, South African Revenue Service, State Security Agency, South Africa New Customs Act, border guards, engineers, South African Police services, computer scientists, and so forth.	PNR data, API, Integrated PNR, Global Distribution System (GDS), Computer Reservation System (CRS), Departure Control System (DCS), Automated Reservation Systems (ARS), Other Service Related Information (OSI), Passenger Service Systems (PSS), Special Services Information (SSI), Special Service Requests (SSR), Encryption programs, data transmission, physical data storage sites, digital networks, cloud storage algorithms, and so forth.

Supporting a state's use of PNR are a number of human actors, algorithms, networks, machine learning, data mining, and a range of other computer technologies that are refined and improved with each use. PNR as a sociotechnical assemblage is 'activated' by different data processing systems that 'translate' individuals into knowledge. Technology "brackets the initial element, the travellers, to make the PNR data produce a knowledge linked to other future individuals, contributing to refine the modes of inscription and 'calculation' for subsequent travellers."[60]

It is inaccurate to think of PNR algorithms as neutral technology that transforms personal data into knowledge about the mobile subject; it is not just a simple tool that sorts big data analytics and identifies patterns in the data. The PNR algorithm is developed by the state and is therefore political because when the software developer creates an algorithm, a state must have a specific intention and purpose for the algorithm.[61] This suggests that the relationship between Race and PNR begins before the algorithm is even created. The PNR algorithm is designed based on what the state deems to be a risk, and the datasets that the state collects and provides to software engineers to edit and process are derived from what the state understands to be a threat – or who the state is seeking to deny entry. In other words, states already have an idea of what and who is considered 'risky' and the purpose of their algorithm is altered to fit based on a pre-existing data base because "without historic data you can't train an algorithm."[62] Part of the

[60] Bellanova and Duez, "A Different View on the 'Making' of European Security," 120.
[61] Mareile Kaufmann, "Who Connects the Dots?," in *Technology and Agency in International Relations,* ed. Marijn Hoijtink and Matthias Leese (London: Routledge, 2019), 141–163.
[62] Kaufmann, "Who Connects the Dots?," 147.

complexity of algorithms comes from the fact that they combine datasets and provide decisions only, not explanations for the decisions. It would require advanced digital literacy to know, and understand, how precisely an algorithm combines the datasets and to fully understand the result.[63] PNR algorithms, even at their infancy, are an assemblage of both human and non-human actors that will determine how processes and procedures are implemented, and also what they will find. While algorithm decision making may become autonomous, the creation of the algorithm itself is dependent on human decision making and action: humans decide what data to include and must work with technology to actualize it.[64] Ultimately, algorithms cannot be isolated from the conditions in which they originated and, thus, ought to be understood in a way that is relational to, and contextualized in, the broader sociotechnical assemblage in which they are "culturally, historically and institutionally situated."[65]

Decisions made by algorithms have a significant role in how "action is constituted and how meaning is produced" from the personal data that is willingly provided by passengers.[66] PNR acts beyond human intentionality and in ways that humans cannot fully control or predict. However, agency is multiple and takes place by both humans and non-humans, and these actants influence each other; the algorithms cannot be made without humans and decision making based on PNR cannot be made without technology. Agency as it relates to PNR is co-constitutive of the human and non-human actants.[67]

1.6 Race and Post-Colonialism

The roles of Race and post-colonialism are important to this project. The technological elements of PNR and the practice of using PNR for security purposes not only change how mobile populations interact with the physical border of a state but also has a significant impact on the body and materialization of Race in mobile populations. Both Race and post-colonialism[68] are defined in broad terms for this project and are included to seek "more heterogeneous sources, and to reveal more fully the patterns of local transactions

[63] Leese, "The New Profiling."
[64] Kaufmann, "Who Connects the Dots", cf. Leese, "The New Profiling."
[65] Rob Kitchin, "Thinking Critically About and Researching Algorithms," *Information, Communication & Society* 20, no. 1 (January 2017): 18, https://doi.org/10.1080/1369118X.2016.1154087.
[66] Marijn Hoijtink and Matthias Leese, eds., *Technology and Agency in International Relations* (London: Routledge, 2019).
[67] Cf. this dissertation Chapter 7
[68] It is difficult to fully separate post-colonialism and Race in the case of South Africa. Taken together, they offer insight into understanding racialization ('othering') through the creation of social hierarchies by the state. Both are related to the outcomes of how Race is used as a tool for managing populations. When Race is only taken to understand black-white relations and colonialism only domination, the process by which racialization occurs can be overlooked. In the case of PNR technology, racialization and othering are more telling when understood as something of the same process.

that give rise to global, or universalist, claims" in PNR and the management of global mobility.[69] The intention is to identify the ways in which Race and colonialism are embedded in PNR technology and how they have constructed and still contribute to one another. For the purpose of this project, Race is understood not to be reducible to a pre-existing identity – socially constructed or otherwise.[70] Throughout this project, to understand how Race may become embedded in PNR as a sociotechnical assemblage in the case of South Africa, specific assumptions about Race are made. First, regardless of what Race is believed to be, it is always a tool for political management. Second, Race is not understood to be reducible to a pre-existing category and is not static. Third, Race is always the effect of material practices. Fourth, Race is understood as something is always, and can always, be used, rejected, and modified. Fifth, technology, such as PNR, that is understood to be colour-blind does not mean that the technology is Race free.

This project understands technology as being inherently connected to racial identification and, therefore, technology and PNR are central to the processes whereby bodies become marked by Race. PNR is understood as a technology that can contribute to the racialization process. As previously mentioned, Race as it relates to PNR is scientifically grounded in risk profiles based on data and expert knowledge.[71] It is important to further note that Race in this project cannot be understood without consideration of colonialism and how Western knowledge has represented and continues to represent the non-Western world; modern constructions of Race are very much related to the 'colonial project.'[72] The use of PNR to mark mobile populations by Race can be traced back to the colonial era of border management and early politics of mobility management. Race then, became an effective, and productive, tool to mark undesirable populations and prevent entry into South Africa through the use of passenger data.

Post-colonialism is understood as a state of being which is in constant evolution and which is always an ongoing response to the process of being colonized;[73] it recognizes that the 'post' in post-colonial does not signal the end of the colonial era but rather seeks to take notice of the effects that colonization has had

[69] Anderson, "Postcolonial Technoscience," 643.
[70] A full inquiry into how Race is understood throughout this project can be found in this dissertation chapter 4.
[71] Leese, "The New Profiling."
[72] Tayyab Mahmud, "Colonialism and Modern Constructions of Race: A Preliminary inquiry (Mapping Intellectual/Political Foundations and Future Self Critical Analysis)," *University of Miami La*w *Review* 53, no. 4 (July 1999): 1219–1246, https://repository.law.miami.edu/umlr/vol53/iss4/36.
[73]Deleuze and Guattari, *A Thousand Plateaus*.

and continues to have in shaping the world and politics (micro and macro).[74] Thus, the focus on Race and post-colonialism epistemologically challenges the privilege of the dominating Eurocentric account of PNR, which remains ignorant of the constitutive role of knowledge. The significance of the post-colonial reality is crucial to this project because the forms of discrimination, including Race, which are inherent to algorithmic governance, are often related to "practices of control and power [that] have been developed in complex back-and-forth traffic between the West and its colonies."[75]

A sensitivity to post-colonialism remains important because technological development has long been related to the European goal of projecting modernity into the Global South, and this was closely related to Race whereby Eurocentric narratives, intentionally or not, silenced coloniality and Race through claims of universality.[76] Any approach to technology that does not acknowledge its relationship to colonialism and that denies the relationship between the Global North and empire building in the development of technology is willfully ignoring the role colonialism has had in developing technology and contemporary racism.[77] In fact, in South Africa, these practices have always included the collection of data to contribute to colonial rule and to extend state power beyond the territorial borders.[78] Post-colonial attention on Race is necessary to understand the visible and invisible ways that PNR is related to Race and marginalization, especially considering that "algorithmic profiling continues many of the colonial practices of creating margins, outsides, and invisibilities of excluded subjects."[79] In an effort to account for this when focusing on Race and post-colonialism, there is reflexivity to the theoretical use of sociotechnical assemblages. Sociotechnical assemblages that embrace post-colonialism offer an opportunity to disconcert conventional accounts of PNR as a technology of global governance and to complicate simplistic and binary accounts of PNR and global mobility that continue to undermine studies of PNR. A focus on the

[74] Sanjay Seth, "Postcolonial Theory and the Critique of International Relations," *Millennium* 40, no. 1 (September 2011): 167–183, https://doi.org/10.1177/0305829811412325.
[75]Monique Mann and Tobias Matzner, "Challenging Algorithmic Profiling: The Limits of Data Protection and Anti-Discrimination in Responding to Emergent Discrimination," *Big Data & Society* 6, no. 2 (December 2019): 7, https://doi.org/10.1177/2053951719895805.
[76] Marta Araújo and Silvia R. Maeso*,* eds., *Eurocentrism, Racism and Knowledge: Debates on History and Power in Europe and the Americas* (New York: Palgrave Macmillan, 2015).
[77] Araújo and Maeso*, Eurocentrism, Racism and Knowledge*.
[78] Breckenridge, *Biometric State*, 1–23.
[79] Mann and Matzner, "Challenging Algorithmic Profiling," 7.

post-colonial elements of a sociotechnical assemblage allows for a better understanding of how racial,[80] temporal,[81] and class[82] differences are embedded in PNR as a technology.

The success of this project requires that abstract theories and all-encompassing models are avoided. This is because PNR ought to be understood in a way that is relational, contingent, and contextual to the socio-technical assemblage in which it was developed and is now situated. It is therefore important that this inquiry into PNR is conscious of the development and use of the colonial knowledge and technological relations of social sorting and border control in South Africa, while also being mindful of Eurocentric ontologies and epistemologies that are embedded in the field of international relations and the study of PNR more specifically. While embracing sociotechnical assemblages overcomes the bifurcation of human and material,[83] a post-colonial lens seeks to overcome the analytical bifurcations which are embedded in the social to avoid the domination of the West in technological practice and progress and to encourage reflectivity.[84]

1.7 End Notes

The theoretical framework utilized in this project contributes to the theoretical discussion of PNR and the management of global mobility in two novel ways. First, a sociotechnical assemblage of non-Western PNR has not yet been utilized and thus represents a unique means of inquiry into PNR. Second, in drawing on both Race and colonialism, this project contributes theoretically by questioning and displacing Eurocentric Western interpretations of PNR and addressing the fact that the prevailing accounts present PNR and technology in the management of mobile populations without a full understanding of what has both constrained and enabled them. The predominant approaches to PNR have largely overlooked the role of technology and have remained focused on the human elements, institutions, and social relations whereby technologies remain largely ancillary. Further, this approach can provide the theoretical foundation to later demonstrate how technologies and ideologies produced in South Africa have influenced PNR and the governance of global mobility. Thus, inquiring into PNR as a sociotechnical assemblage takes seriously the mechanisms that have been silenced and overlooked in examining PNR thus far.

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[80] White European/other.
[81] Moderns/traditional.
[82] Elite/subaltern.
[83] Subject/object, human/nature, material/non-material.
[84] Julian Go, *Postcolonial Thought and Social Theory* (New York: Oxford University Press, 2016).

The discourse relating to post-colonialism and Race is still developing. Focusing on PNR as a sociotechnical assemblage with specific attention on Race attempts to inject insights from post-colonialism into a materialist analysis. A focus on South Africa allows a sociotechnical approach to engage with the Global South in the same way that it has with the North. This is a valuable point of inquiry because "the founding debate of International Relations was not about idealism or realism, but about empire and race."[85]

[85] Vineet Thakur and Peter Vale, *South Africa, Race and the Making of International Relations* (New York: Rowman and Littlefield, 2020), 114.

Chapter 2: Methodology

2. Method and Case Justification

This research project is guided by Actor Network Theory (ANT), which embraces the material turn in International Relations. The methodological contribution of ANT is one that presents an alternative agency/structure dichotomy insofar as ANT represents a coherent methodology for the incorporation of non-humans, and specifically technology, into the research agenda. The ANT approach directs attention to global security norms and local practices that connect in a complex but coherent network. While ANT theorists may have thus far avoided "direct engagement with postcolonial studies, they seem to have picked up and amplified the vibe."[86] Thus, to achieve the main goals of this project, ANT is a well -suited methodology and 'toolbox' with a range of data collection techniques that can be used to account for the emergence and transformations of complex material-semiotic networks.

2.1 Case Selection[87]

This project is driven by an effort to understand PNR as a complex sociotechnical assemblage outside of the Western context. Located in the Global South and with a long colonial and racist history, South Africa has a security regime that has been overlooked in the current PNR literature. As noted previously, South Africa's security regime is largely the result of the Apartheid that was itself a technopolitical project.[88] The country has developed technologies for surveillance and for segregation and continues to be a site of evolving bureaucratic arrangements of racial supremacy.[89] There remains clear imperial legacies in South Africa's technologies of control, including the identification and policing of what are considered to be 'risky' populations.[90]

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[86] Warwick Anderson, "From Subjugated Knowledge to Conjugated Subjects: Science and Globalisation, or Postcolonial Studies of Science?," *Postcolonial Studies* 12, no. 4 (December 2009): 392, https://doi.org/10.1080/13688790903350641.
[87] The selection of this case does not assume that the South African PNR experience can be straightforwardly extrapolated to other contexts: The South African case is unique and *may* not be generalizable. The relationship between politics, technology, and geography resists uniform transposition from one case to another, but is shaped by historically and contextually specific configurations of spatial and political dynamics. Understanding this relationship requires analytical engagement across multiple registers, including material practices, discourses, institutional arrangements, and lived experiences. This approach enables a more nuanced and critically grounded understanding of how the entanglements of politics, geography, technology, and Race manifest across diverse spatiotemporal contexts.
[88] Paul Edwards and Gabrielle Hecht, "History and the Technopolitics of Identity: The Case of Apartheid South Africa," J*ournal of Southern African Studies* 36, no. 3 (September 2010): 619–639, https://doi.org/10.1080/03057070.2010.507568.
[89] Breckenridge, *Biometric State*.
[90] Breckenridge, *Biometric State*.

There has not yet been academic inquiry into PNR use as an instrument of national security outside of the Global West. PNR technology is gaining global importance, yet there remains little effort to incorporate cases from the Global South, and overall, technology is overlooked in the research agenda of international relations.[91] The South African use of PNR is novel; in 2014, the country implemented a sophisticated airport security infrastructure whereby it became the first country on the African continent to use PNR for security purposes. While PNR is widely used in the West to improve border security and to prevent terrorist activity,[92] unlike the West, South Africa has claimed to not have significant terrorist threats, yet, the country continues to invest in sophisticated security governance of equal standard to its Western counterparts.[93] This inconsistency is important because PNR has been conceptualized as being situated within "intensification of practices of security with the last decade defined by the 'Global War on Terror'" despite the fact that much of the logic and related practices were developed in colonial population management.[94]

South Africa has a long history of racially influenced border control and an early start to exporting their surveillance technology and practices throughout the British colonies and Europe.[95] Specifically, British rule in South Africa was early to implement a sophisticated paper-based system of strict control of cross-border mobility[96] to ensure that foreigners were not a threat to the colony.[97] This paper-based system dates back to 1880 and was centred on the role of documents in determining the identity of mobile populations and has contributed "to the historiography on identity and recognition."[98] By 1913, South African colonial rule forbade, through its Immigration Act 'deeming clause,' the immigration "of Asians as well as all 'coloured person' and, later, 'Tropical Africans' and eastern Europeans."[99] Simply, South Africa's colonial rule institutionalized inadmissibility on account of Race and ethnicity.[100] It is clear that "the documentary apparatus of identification itself has driven the history of categories and collectivities."[101] Discrimination has been the substance of South Africa's border since the arrival of Europeans. South

[91] Hoijtink and Leese, *Technology and Agency*.
[92] Leese, "The New Profiling."
[93] Duncan, *Stopping the Spies.*
[94] Berda, "Managing Dangerous Populations," 627.
[95] Breckenridge, *Biometric State.*
[96] Macdonald, "Colonial Trespassers," 1–10.
[97] Dhupelia-Mesthrie, "False Fathers and False Sons," 102.
[98] Dhupelia-Mesthrie, "False Fathers and False Sons," 101.
[99] Macdonald, "Colonial Trespassers," 37.
[100] Macdonald, "Colonial Trespassers," 37.
[101] Jane Caplan and John Torpey, *Documenting Individual Identity: The Development of State Practices in the Modern World*\ (Princeton, NJ: Princeton University Press, 2001), 3.

Africa's current immigration policy is still intricately connected to its colonial border control of the mid-eighteenth century, and certainly to that of its Apartheid regime,[102] and the current control of migration continues to serve the same purpose of reducing uncertainty. In fact, after the Apartheid, "the immigration bureaucracy – now part of the Department of Home Affairs – maintained most of the features of the colonial border-regime."[103] Therefore, the role of PNR technology and its technological elements is particularly interesting because South Africa is not only a well-known exporter and manufacturer of surveillance equipment – especially to authoritarian regimes[104] – but also because Airports Company South Africa[105] still maintains technical advisory and consultancy services to Ghana, Liberia, Zambia, Rwanda, as well as other services to Brazil, India, and Thailand.[106] As such, there is an obvious risk of globalizing the abuses and biases that were developed in South Africa's population surveillance technology.

The present insight provided into PNR is limited insofar as researchers have rarely included non-Western cases, thus, it is inextricably structured by Eurocentrism.[107] It is also not yet clear how security regimes such as PNR are operated outside the Global North, therefore making South Africa a valuable case study in terms of methodology. An empirical case study highlights the unique realities of South Africa's PNR regime while simultaneously calling into question the hegemonic understandings and practices of the global PNR regime. Studying the South African PNR regime through ANT provides a conceptualization of the multiple fields of power, which unlike prevailing approaches to understanding PNR, does not present concepts without a full understanding of what constrained and enabled them. Simply, ANT helps account for the colonial and Apartheid states, as well as for their aftermath – and importantly, the global significance of technology developed and perfected in South Africa. The imperial legacies of PNR technology used to control mobile populations remain incongruous in current scholarship. South Africa's technology related to systems of migration control have been institutionalized for nearly a century, but despite South Africa being the "culture-bed of Imperialism" and the "fulcrum of distinctive forms of racialized bureaucracy that have spread around the world," very little is known about the country's PNR

[102] Caplan and Torpey, *Documenting Individual Identity.*
[103] Macdonald, "Colonial Trespassers," 294.
[104] Macdonald, "Colonial Trespassers," 294.
[105] Over 70 percent is government owned and operated.
[106] Airport Company South Africa, "2019 Integrated Annual Report," accessed February 1, 2025, https://www.airports.co.za/Documents/ACSA%202019%20IAR.pdf.
[107] South Africa's racial foundations in connection to nationality and territory may provide interesting connections with Bigo's European account of security practices and the de-differentiation of internal and external security.

technology.[108] A focus on South African PNR through a research method sensitive to the material elements of the technology will help account for the current shortcomings in PNR literature while ensuring that the Western case is not mistaken for a universal reality.

2.2 Methodology

ANT is part of the material turn in International Relations whereby objects are taken seriously in social and political phenomena but diverges from materialism insofar as ANT does not ascribe intentionality to the material. ANT, despite its name, does not refer to a theory but rather a method to study material-semiotic networks and the emergence and transformation of these networks. ANT does not seek to provide generalizable conclusions of a range of phenomena. Rather, ANT is better understood a composition of methodological tools that help to incorporate the human and material objects into analysis by levelling divisions between the social and material categories that are typically ontologically given.[109]

ANT originated from the sociology of scientific knowledge (SSK) and science and technology studies (STS) and is firmly situated in the poststructuralist approach.[110] ANT, through its STS origins, is particularly sensitive to the representation of technology and the sociotechnical systems that produce knowledge and involve both humans and non-humans. The research design of ANT directs attention to the dynamic and fluid nature of networks and, thus, rejects narrow interpretations of the 'social' as a being independent from the material world: promoting attention to heterogeneity, dispersed agency, and materiality in the research agenda.[111]

Central to ANT is a flat ontology – that is to say that the method is heterogeneous insofar as it includes both human and non-human entities. Thus, the vocabulary of *actants* is central to ANT as a methodology. Simply, an actant refers to both the human and non-human components that have equal capacity to influence sociotechnical[112] systems (or actor-networks) through enacting relations and actors. ANT not only focuses on the agency of actants but also on the interaction between actants. The value of ANT is in

[108] Breckenridge, *Biometric State*, 20.
[109] John Law, "Actor Network Theory and Material Semiotics," in *The New Blackwell Companion to Social Theory*, ed. Bryon Turner (Chichester: Wiley-Blackwell: 2009), 141–158.
[110] Amany Elbanna, "The Theoretical and Analytical Inclusion of Actor Network Theory and Its Implication on ICT Research," in *Actor-Network Theory and Technology Innovation: Advancements and New Concepts*, ed. Arthur Tatnall (Hershey, PA: IGI Global, 2011), 130–142.
[111] Michel Callon, "Some Elements of a Sociology of Translation: Domestication of the Scallops and the Fishermen of St Brieuc Bay," *The Sociological Review* 32, no. 1 (1984): 196–233, https://doi.org/10.1111/j.1467-954X.1984.tb00113.x.
[112] Although it is important to note that this equally applies to different systems, including –socio-ecological systems.

the fact that it captures the role of actors and actants beyond a focus on intentional actions by humans, and it understands agency in a way that extends to the material.[113] Simply stated, ANT seeks to establish and understand relations that reveal the dynamics of any given actor-network. ANT emancipates empirical investigations from ontological restraints and seeks to generate concepts and explanations based on empirical investigations as opposed to ontological assumptions that occur when prior hierarchies are taken for granted.

However, the emphasis is not only on the agency of actants but also on the interactions between actants to draw a conclusion on practices and outcomes of any given network.[114] Thus, ANT is unique in that it does not start with hierarchical or structuralist points of departure.[115] Rather, ANT seeks to map a myriad of relations and interactions within a spatial or conceptual field in an effort to establish and understand the map of relations that can help to reveal the 'inner dynamics' of any given phenomena. While ANT does seek to understand the actants that form a network, it does not assume any coherency within the network. Rather, these networks are always dynamic with continuous making and remaking;[116] in other words, there is an element of continuous performativity that is required for networks to exist.

ANT offers a unique approach to the study of Race and PNR by surpassing definitional debates about *what* Race is in favour of understanding *how* and *where* Race is done. In other words, ANT allows an understanding of the process of how bodies become marked with Race; this is crucial in attending to Race not as a static reality but as something more dynamic. Including Race in an ANT-oriented approach to PNR calls attention to the complex history of the technology as well as attending to Race as an absent presence in the current and historical context of PNR. This approach to PNR and Race permits the assumption of multiple realities – or, object multiple[117] – where different ways of enacting Race can bring different conceptions of it. ANT contributes to the study of PNR and Race because it ensures that the historical elements are not overlooked. Seeking to understand how Race may be embedded in PNR forces

[113] Edwin Sayes, "Actor-Network Theory and Methodology: Just What Does It Mean to Say that Nonhumans Have Agency?," *Social Studies of Science* 44, no. 1 (2014): 134–149.
[114] Mark B. Salter and Can E. Mutlu, *Research Methods in Critical Security Studies: An Introduction* (London: Routledge, 2012).
[115] Salter and Mutlu, *Research Methods*.
[116] Salter and Mutlu, *Research Methods*.
[117] Annemarie Mol, *The Body Multiple: Ontology in Medical Practice* (Durham, NC: Duke University Press, 2002).

the consideration of other networks and objects, local and global, and contributes to the complex assemblage.

ANT is used in this project to reflect on the role of PNR technology and how actors are networked with actants. ANT, in taking agency of actants seriously and reflecting on the complexities of sociotechnical assemblages, allows for the agency of technology to be examined. When applied to PNR, ANT directs its organization to be understood as a sociotechnical assemblage. ANT directs research in a way that gives equal importance to human and non-human actors that are equal in their capacity to act and make a difference (also known as generalized symmetry). A network is stabilized through successful translation[118] – this involves making equivalent as well as the "displacement, drift, invention, mediation, [and] the creation of a link that did not exist before."[119] The durability of the network is understood to be dependent on the elements that constitute it.[120] By focusing on and illuminating the significance of actants in complex networks, it also demonstrates the "critical importance of scientific and technical knowledge to international relations."[121] The case of South Africa's PNR use is highly compatible with ANT as a research method that "extends the general case study approach with the concept of tracing the dynamics of heterogeneous networks consisting of human and non-human actors."[122]

2.3 Data Collection

As previously noted, to achieve the main goals of this project, a combination of ANT's key data collection and analysis tools was utilized: notably, mapping, document (and policy) analysis, and semi-structured interviews.[123] A central aim of this project was to understand complex sociotechnical assemblages within a socially and historically specific network. The focus on PNR technology in South Africa called for a research method that allowed for mapping if claims related to post-colonialism and Race were to be convincing. Mapping, or tracing, is central to ANT as a method that is concerned with understanding the transformation of heterogeneous networks. Thus, the "object, then, [was] to trace the interconnections

[118] Latour, *Reassembling the Social*.
[119] Bruno Latour, "On Technical Mediation," *Common Knowledge* 3, no. 2 (1994): 32, http://www.bruno-latour.fr/node/234.
[120] Mohammad Hossein Jarrahi and Steve Sawyer, "Networks of Innovation: The Sociotechnical Assemblage of Tabletop Computing," *Research Policy* 48, Supplement (December 2019): 100001, https://doi.org/10.1016/j.repolx.2018.100001.
[121] Andrew Barry, "The Translation Zone: Between Actor-Network Theory and International Relations," *Millennium* 41, no. 3 (June 2013): 420.
[122] Ulrich M. Löwer, *Interorganisational Standards: Managing Web Services Specifications for Flexible Supply Chains* (Heidelberg: Physica-Verlag HD, 2006), 30.
[123] Interview guide can be found in this dissertation Annex 2.

built up by technologies as they propose projects and then seek the resources required to bring these projects to fruition."[124]

A great deal of this research depended on the collection of data through relevant publications and document analysis. Document analysis is simply understood as the examination and evaluation of documents that have been collected and recorded without the researcher's intervention.[125] The basis for this research project was the general context of PNR. The foundations of PNR use globally are found by focusing on public documents prepared by the International Civil Aviation Organization (ICAO) and the International Air Transport Association (IATA). There is already a rich literature of peer-reviewed articles related to PNR and the role of technology in security more generally and can be found, for example, on Google Scholar, ProQuest, Taylor and Francis, and SAGE publications. While this provided a rich base on PNR and security technology with diversified historical viewpoints, very little had been published specifically on South Africa's use of PNR; this is true of academic works as well as official government documents, memos, technical documentation, technical reports, press releases, impact assessments, and documents produced by Commissions and Parliament, as well as by independent bodies and NGOs.[126]

To facilitate evidence-based descriptions, document analysis and semi-structured interviews were considered essential for the data collection process.[127] Semi-structured interviews can be understood as "organized around a set of predetermined open-ended questions, with other questions emerging from the dialogue between interviewer and interviewee."[128] The main departments that were contacted include Airport Company South Africa (ACSA); the South African Civil Aviation Authority; the South African State Security Agency (SSA); the National Intelligence Agency (NIA); South African Secret Services (SASS) ; the Department of Home Affairs (DHA); the Department of International Relations and Cooperation (DIRCO); the South African Police Service (SAPS; and specifically its terrorism department); the Department of Defence; South African Revenue Service (SARS); South African Customs

[124] John Law and Michel Callon, "Engineering and Sociology in a Military Aircraft Project: A Network Analysis of Technological Change," *Social Problems* 35, no. 3 (June 1988): 285. https://doi.org/10.2307/800623.
[125] Glenn Bowen, "Document Analysis as a Qualitative Research Method," *Qualitative Research Journal* 9, no. 2 (2009): 27–40, http://dx.doi.org/10.3316/QRJ0902027.
[126] Unfortunately, information on security systems tends to be highly controlled and largely limited by the South African government.cf. International Network of Civil Liberties Organizations (INCLO), *Surveillance and Democracy: Chilling Tales from Around the World* (Geneva: INCLO, 2016), http://www.inclo.net/pdf/surveillance-anddemocracy.pdf.
[127] A full example of the interview guide can be found in this dissertation Annex 2.
[128] DiCicco-Bloom B, Crabtree BF. The qualitative research interview. Med Educ 2006;40: 315.

Administration; the Department of Tourism; the research departments of several legal organizations; several non-governmental organizations (NGOs); third-party actors such as AeroCRS, Sabre, and Amadeus; and the Faculty of Law at the University of Cape Town. The objective also included interviewing engineers and tech-developers who contribute to building and designing PNR and algorithmic technology, as well as individuals in numerous fields in order to develop as concise an understanding of South Africa's PNR as possible. Given the dispersed nature of South Africa's border security, the minimum number of interviews was originally estimated at fifteen. However, from 2021 to 2024, forty-three interviews were conducted across public and private actors involved in South Africa's border management and PNR in an attempt to acquire a better understanding of the South African PNR regime. These interviews provided insight into formal and informal relations and perceptions and allowed each inquiry to be tailored according to the actor being interviewed rather than being restricted to a formal list of questions. However, it was essential to have flexibility in approach, direction, and vocabulary.

It is also interesting to note that there was an opportunity to interview a small number of algorithmic specialists in Canada and South Africa. This was valuable because while AI technologies are increasingly pervasive and recognized for their capacity to automate complex tasks far beyond human capability, the reality is that much of this work continues to rely on human labour – often hidden behind the façade of automation. This is to say that PNR technology is not neutral and is always the product of human decisions, institutional priorities, and programming practices/decisions. However, it was clear that the majority of software engineers who know and understand how the systems work seem to not be at liberty to speak openly and honestly about their work. This is reflective of the broader issue that is found in the systemic biases embedded within the global practice of PNR technology[129] – not only in determining who has access to participate in technological development but also who has access to shape prevailing assumptions about the technology itself and the processes through which design and engineering are carried out.

While it was possible to arrange a number of 'site visits,' notably to talk to airport staff, the added value with respect to the actants' knowledge of PNR was dismal. It became very evident that South Africa has implemented advanced technology but those who use it have very little understanding of it. In fact, to

[129] Be it technology developed by UN goTravel, Thales cybersecurity, and so on.

discuss PNR, even while using its full title, often yielded little more than blank stares and off-topic ramblings about the quick processing of arrivals.

To access the field, a number of formal and informal contact methods were implemented. Formal means included emails, direct messaging through social media,[130] telephone calls, and meeting requests with officials related to PNR and border management more generally. Informal methods included utilizing a well-developed network of academics and security professionals in South Africa, which included industry professionals and non-governmental organizations. Ultimately, utilizing an already well-developed network of security professionals was most fruitful – notably, former INTERPOL employees were very generous with their time, providing meaningful insight into how PNR could be used and reaching out to their contacts for additional information. Further, academic staff at WITS University were extremely generous with their time and resources. Ultimately, a 'snowball method' was used whereby through existing contacts and referrals it was possible to be directed to different actors and research subjects that had insight into South Africa's PNR regime.

Originally, there was a plan to attend industry fairs of security professionals, which had proved to be an essential tool of observation where recent technologies, ideas, and discourses among security professionals were presented. However, these were attended virtually due to travel and event restrictions in response to the COVID-19 global pandemic. While many of these events were attended to virtually, access to experts in the field was limited.

In addition to the restrictions caused by the pandemic, it is interesting to note that beyond the bureaucratic challenges of working in South Africa in a field marked by secrecy, it was often difficult to be taken seriously among professionals. While conducting research in what may have been traditionally a male-dominated field, the researcher was frequently subject to unwelcome remarks about age and gender. Additionally, when speaking to government officials in South Africa specifically on PNR, the responses were often negative, stating that academics could not possibly know what they were talking about because PNR was "complicated."[131] Even when accessing the historical government archives, comments were made about why students were provided permission to access documents, even though the researcher had

[130] LinkedIn and X (formally known as Twitter), for example.
[131] Anonymous Interview (South African security professional), Pretoria South Africa, October 13, 2022.

followed the proper procedures and had the proper credentials, including a letter of support provided by an academic host at WITS university South Africa. Even with local support with the proper connections, it was more difficult than expected to be accepted in security spaces.[132]

2.4 Limitations

The limitations of this project were anticipated because PNR is a tool of national security. More than forty interviews with public and private actors related to South African PNR were completed and should be considered a success; however, the specific information sought after was not always divulged. Ultimately, this research faced the same challenges that have been identified by other scholars conducting research in the field of security.[133] While attempting to 'follow actants' and learn both the language and challenge of practice,[134] researchers in security are often confronted with secrecy as part of the assemblage.[135] The struggle to access the field is not unique to the study of South African PNR, but represents a reiterating theme for those conducting research in the field of security whereby access is frequently denied, rescheduled, and closely regulated while being marked by issues of data obstruction and confidentiality.[136] Rather than strictly being a limitation to the research, it is more productive to reframe secrecy as a constitutional element of the field of security.[137]

Investigation into PNR use in South Africa proved challenging. As previously mentioned, it quickly became clear that the terminology of PNR was not well understood by South African government authorities, as phone and email messages were transferred among staff without the requested information ever being provided. The government almost exclusively refers to PNR as 'passenger name records' rather than using the more internationally recognized acronym 'PNR.' Official staff in South Africa often referred to the 'new passenger name record' but were unable to note in any way why or how this 'new' PNR was different from previous iterations. There is a similar issue related to the vocabulary used to describe those individuals who are prohibited from flying. For example, it became apparent that South

[132] This may be reflective of Race relations more generally in South Africa.
[133] Polly Pallister-Wilkins, Marieke de Goede and Esmé Bosma, *Secrecy and Methods in Security Research: A Guide to Qualitative Fieldwork* (Abingdon, Oxon: Routledge, 2019).
[134] Mark B. Salter, "Expertise in the Aviation Security Field," in *Research Methods in Critical Security Studies: An Introduction*, ed. Mark B. Salter and Can E. Mutlu (London: Routledge, 2013), 105–108.
[135] Pallister-Wilkins, de Goede, and Bosma, *Secrecy and Methods in Security Research.*
[136] Pallister-Wilkins, de Goede, and Bosma, *Secrecy and Methods in Security Research.*
[137] Clare Birchall, "Radical Transparency?" *Cultural Studies, Critical Methodologies* 14, no. 1 (2014): 77–88, https://doi.org/10.1177/1532708613517442.

African officials use the terms 'no-fly list,' 'red list,' 'blacklist,' and 'hit list' interchangeably. The research was further complicated by the fact that it was not explicitly clear internally which government department was responsible for PNR; many departments were involved yet none claimed clear responsibility and overall accountability for the program. Oftentimes government employees did not know where to direct inquiries nor who should be contacted to provide the requested information.

Further, public reports were difficult to access, and very little academic material had been published specifically on South Africa's use of PNR. The documents that were available were analyzed in order to determine and conceptualize the actors involved in South African use of PNR, and immigration/customs more generally, including technological and institutional actors that contribute to the PNR knowledge infrastructure. The lack of published material is reflective of an overall trend of the South African government, where information on security systems tends to be highly controlled and largely limited. South Africa was unwilling to publicly provide information, even through official legal channels (e.g., the *Promotion of Access to Information Act 2 of 2000*), on topics such as PNR but also regarding agreements or memoranda with foreign countries about information/data sharing between South African governments and other countries, or South African agencies and international agencies.[138]

It was more difficult than anticipated to gain access to information and documents related to South Africa's use of PNR, specifically ones that explained practices and limitations in the country's context. The data collection was further complicated by the fact that it was not explicitly clear which government department was responsible for PNR. More than fifteen government departments were approached for information, and only four responded – though none were willing to provide detailed information. While the general nature of the difficulty accessing the South African government was expected, the COVID-19 pandemic severely impacted the research. By the beginning of 2023, government workers were still not in their offices with any sense of predictability and meetings with the researcher were routinely cancelled. Personal phone conversations with representatives of the South African Security Agency (SSA) and the Department of Home Affairs (DHA) revealed that both agencies had limited information about, or were unwilling to discuss PNR use in South Africa. Eventually, the researcher was able to gain valuable insights from the South African Customs Administration (SACA), third-party service providers, and the Faculty of Law at the University of Cape Town.

[138] INCLO, *Surveillance and Democracy*.

This project required objective documentary evidence in order to understand the use of PNR in South Africa and to provide answers to the initial research question, though some information remained ambiguous and could not be confirmed by government officials. An examination of available documents provided rich, but dispersed, information on the network of actors involved in South Africa's use of PNR, the production of data and knowledge related to PNR, the related political structure, and the history of PNR use. Further, by examining official government documentation and public reports, information that was required to understand the various implications of the country's PNR use became more evident; that is to say, it allowed for a more comprehensive understanding of practices in the specific geographic use of PNR.

Finally, extensive requests were made for records held by South African departments, including the South African Customs Administration (SACA), Border Management Authority (BMA), South African Police Service (SAPS), and the National Intelligence Agency (NIA). No additional documents related to PNR were provided by any government department – even documents that were over twenty years old and should have been publicly available. However, this was in no way a unique situation. As a result of the increased security and lack of clarity, there have been many recent official Access to Information requests regarding South African intelligence, under the country's *Promotion of Access to Information Act 2* of 2000.[139] These requests have demanded the government to publicly share "agreements, memoranda of understanding and/or other arrangements with foreign countries concerning the sharing between South Africa and/or its agencies and any other country and/or its agencies of information and intelligence";[140] as well as to explain under which circumstances intelligence can be shared, the limitations of sharing intelligence, and the retention and use of information, among other related demands. However, the SSA has not responded to the requests.[141] While this is of concern, it may demonstrate the character of the government as it relates to respect of the law and transparency. Half of all requests made under the Access to Information Act in South Africa are refused (or simply ignored).[142] This represents failure at the public

[139] Legal Resources Centre and Avani Singh, *Access to Information Request in Terms of the Promotion of Access to Information Act 2 of 2000* (Johannesburg: LRC Constitutional Litigation Unit, 2017), http://inclo.net/pdf/iisp/INCLO-LRC_request.pdf.
[140] Legal Resources Centre and Singh, *Access to Information Request*, np.
[141] INCLO, *Surveillance and Democracy*, 101.
[142] Freedominfo.org, "South African Coalition Finds Weak Compliance with Law," March 2, 2017, http://www.freedominfo.org/2017/03/south-african-coalition-finds-weak-compliance-law/.

and private levels in relation to constitutional access to information. Furthermore, as it has been reported by the Access to Information Network:

> The most common ground for refusal was that the records do not exist or cannot be found (section 23). This is concerning because it speaks either to poor record keeping, and/or to the failure by public bodies to carry out duties which these bodies are required to undertake (since had these duties been carried out, records thereof would be available).[143]

These facts reflect poorly on the operation and organization of the South African government. Whether or not it is willing to provide information, there may also be a degree of incompetence. Given the ambiguity around PNR data, and the integrated nature of government departments, there is a lack of clarity of design and use in this context.

The challenge of studying PNR is that there is not a sufficient framework to oversee its use in mobility management. Much of the code that supports PNR decision making is not publicly available, which obstructs a full understanding of how these technologies operate. Additionally, there has yet to be any form of oversight, public interest, or inquiry over South Africa's PNR implementation or use. Simply, in the study of South African PNR, as with many studies in the domain of security regardless of the country, it has been necessary to examine the *absences* found. Drawing from patterns, practices, and institutional outcomes, it has been possible to reveal how seemingly neutral systems can reproduce racial bias. By engaging with the available information, it has been possible to meaningfully contribute to a deeper understanding of how Race and security intersect – even in the absence of overt declarations in official documentation.

2.5 A Note on the South African Archives

The South African Archives provided a crucial resource for understanding colonial statecraft. Government archives focusing on the country's border and populations have been present in South Africa since the advent of Europeans in the region. The archives are, thus, a representation of the colonial presence and logics in the region: the experience of non-white populations, those who compose the majority of the contemporary population, are not well documented.

[143] Access to Information (ATI) Network, "Shadow Report 2016," accessed January 10, 2025, http://www.r2k.org.za/wp-content/uploads/CER-Shadow-Report-2016-Final.pdf.

The National Automated Archival Information Retrieval System was a valuable tool that aided in the location of specific documents, despite the requirement that the search terms be very precise. The researcher found that the documents were generally poorly catalogued and/or were often found to be incomplete in the system, making it difficult to locate specific documents. The nature of research terms for this project were vast, combining terms from pre- and post-Union resources, in both English and Afrikaans, that were related to border management and technological developments. The technological developments were not documented as such, and thus, could not be easily searched. The system is based on a key word search; thus, one has to understand the archival group before being able to search for it. The NAAIRS supplied only a start at retrieving the necessary documents, and the physical inventories located in the reading room provided clearer direction to which records were archived and how. However, of the many collections that were identified for this project, more than half could not be located. It was also a common problem to find that documents located on NAAIRS were not located in the correct location in the archives and were, for all intents and purposes, lost. Notably, almost all resources related to '*Aviation*' under the Apartheid state have been lost. Further, documents were often found to be poorly categorized. For example, when selecting collections to review based on their descriptions that made them appear to be relevant, upon review it was clear that they had been incorrectly categorized.[144] Moreover, in light of protocols implemented in response to the COVID-19 global pandemic, the archives limited document requests to only ten per day per researcher; this was an unfortunate inconvenience.

Another challenge in working with the South African Archives was its decentralized nature. Despite the Law of Disclosure of 1995 stating that all governmental records should be transferred to the National Archives of South Africa, many of the departments (including the Department of External Affairs and the Department of Defence) have been unable to do so because of space constraints in the archives.[145] As a result, the National Archives typically only houses documents prior to 1984. Interestingly, the Apartheid government (1948–1994) had been characterized by an obsession for secrecy:

> ...tons of files, microfilm, audio and computer tapes and disks were shredded, wiped and incinerated. In little more than six months in 1993...some 44 metric tons of records from the Headquarters of the National Intelligence Service alone were destroyed.[146]

[144] For example, documents were requested on "airodomes" but the documents retrieved were adoption records.
[145] Sue Onslow, "Republic of South Africa Archives: Research Report," *Cold War History* 5, no. 3 (2005): 369–375, https://doi.org/10.1080/14682740500222150.
[146] Terry Bell and Dumsia Buhlen Ntsebeza, *Unfinished Business: South Africa, Apartheid, and Truth* (London: Verso, 2003), 9.

Many of the documents that reflect the technological shift of PNR from a paper-based system to a technical one were destroyed or lost. This provided a unique challenge to using the South African Archives, especially when the search coalesced with the fact that many of those documents that were retrievable were often in poor condition, having been damaged by fire, mould, water, etc. These factors presented a challenge to the inquiry of PNR, but not a total deterrence. Fortunately, the logic and practices of PNR were still fairly well-documented in the archival sources in South Africa and by third-party technical providers.

Documents from the Apartheid era were often difficult to trace back to the originating departments and individuals because policy documents often remained unsigned, and the intended recipient of the papers were ambiguous. In addition, there was little consistency regarding which language was used: Afrikaans was only used sporadically and inconsistently. It is also important to note that a significant percentage of South African official government documents were purposefully destroyed at the end of the Apartheid regime. [147] This made finding documentation referring to PNR and border management generally difficult and resources that were found often had pages missing or felt incomplete.

The concept and materialization of Race in South Africa's PNR regime is deeply tied to the country's colonial history, immigration laws, and everyday bureaucratic practices. The available documents serve as a concrete method to understand the dominant ideologies related to population management. This is based on the notion that governing global mobility relies, at least in part, on documents to produce state legitimacy and to validate state power. In South Africa, specifically in the context of their PNR regime, the materiality of migration and identity played a key role in validating the status of certain populations during certain periods. Therefore, these archival sources are crucial for understanding the processes of authorization and legitimization of inclusion and exclusion. Of note and of particular importance to consider when researching marginalized populations, is that the South African Archives appeared to lack accounts from civilian perspectives on the topic. As such, the South African Archives provide a very singular perspective on this part of the country's policy and society.

[147] Cf. Hennie Van Vuuren, *Apartheid Grand Corruption: Assessing the Scale of Crimes of Profit in South Africa from 1960 to 1994* (Pretoria, SA: Institute for Security Studies, 2006), https://www.opensecrets.org.za/wp-content/uploads/Apartheid-Grand-Corruption-2006.pdf.

Challenges in Accessing Historical Documents and Archives

- Many records are not digitized or available online.
- Some archives lack digital search tools or comprehensive catalogues.
- Physical documents are often damaged by water, fire, or mould.
- Documents are often misplaced and not found in their designated locations.
- Electronic catalogues are sometimes inaccurate, listing documents that cannot be located.
- Contemporary control books were used to track misplaced documents but were largely ineffective.
- Previously accessed documents were sometimes missing upon later requests.
- Photographing documents was limited with very little consistency.
- A strict daily withdrawal limit of ten documents hindered research efficiency; especially because the description of the documents was not always accurate.

Note: The difficulty in locating documents was partly due to the decentralized nature of archival collections, where records circulate between government departments without proper tracking.

Box 1: Challenges in Accessing Historical Documents

2.6 End Notes

As previously noted, an inquiry into the ways in which Race may be embedded in South Africa's PNR regime will serve to 'decode' the technology and will give attention to the process and context of the technology itself, not simply its impact. In doing so, this project contributes theoretically and empirically to existing PNR literature and the study of security more generally. The main research objective was to better understand how Race is embedded in seemly neutral technologies and to ultimately make the invisible exclusionary practices of PNR more visible. The South African case contributes empirically to the literature because of the country's location in the Global South and because of its long history of colonial and racist practices of control. An examination of the South African case also allows for a better understanding of the global circulation of PNR practices and logic. Problematizing South Africa's PNR regime with Race critically opens the study of PNR in a way that questions the global tendency to ignore the colonial roots of contemporary security practices, and particularly security practices related to the management of mobile populations. This project does not provide instances of Western PNR and sociotechnical assemblages in a different setting, but rather destabilizes conventional Western accounts of PNR as a neutral technology developed in the Western wake of post-9/11 securitization.

The theoretical contribution of this project is significant. Materially orientated studies have tended to overlook the categories of colonialism and Race. This project not only examines South African PNR as a sociotechnical assemblage but also represents an important attempt to draw attention to the fact that material and technology cannot be fully understood without considering colonial technological

development; that is to say that the technology is already embedded with inherent racial and structural relations of difference. Further, the act of contributing methodologically to materially oriented literature by focusing on a post-colonial state will also provide insight into how ANT might influence post-colonial analysis affects the study of global security, and vice versa.

While utilizing ANT and its 'toolbox' (inducing document analysis and interviews) represents the most promising methodological framework to understanding South Africa's PNR regime in a way that is attentive to both technology and Race, there are limitations to the approach. Naturally, an inductive approach rejects the orthodoxy of deductive reasoning and allows for research findings to emerge from the significant themes found in the collected data, while not being restricted by structured methodologies. However, this means that there may not be generalizable predictions beyond the South African case. This does not imply that findings in this project are irrelevant to other contexts of PNR, but simply that the theoretical insight regarding the relationship between PNR and Race may be limited. While there is high internal validity to this study of PNR, the external validity is limited in comparison to large-N studies.

There is also a risk related to the access to data. Thus far, South African government departments have been unable or unwilling to provide answers related to many questions about the country's PNR regime; it may be difficult for some assumptions that arise from the research to be confirmed by officials. As a result, while it is possible to understand the South African PNR regime in terms of its inputs and how the decisions are acted on by its human counterparts, the original dataset and instructions that the algorithms received to process PNR for security purposes remain elusive.

Chapter 3: Literature Review

3. Current State of Knowledge: Technology, Security, and Race

The use of PNR for national security purposes remains understudied, and of the limited PNR literature available, there has been a general focus on Western contextualization[148] and issues of privacy and civil liberties.[149] Despite the fact that PNR use in the Global South has not yet been well-studied, nor have there been meaningful attempts to examine the significance of materiality or Race as it relates to PNR as a tool of security, there have been excellent contributions to the broader field of study in which PNR is embedded. There is a solid literature base available that examines developments of the increased technologization of security that has led to the 'digitalization' of bodies and borders[150] and that represent a shift away from securing populations to monitoring populations.[151] This shift has inspired a number of excellent contributions to the study of the role of technology in security and surveillance. These contributions provide the necessary foundation to understand South Africa's use of PNR as a tool of security in a way that is sensitive to both Race and materiality and which can be organized into three main, and often interconnected, themes: (1) approaches to security that have strong ties to sociology and understanding the relationship between security and material technology; (2) literature focusing on how technology is used in surveillance and risk management; and (3) literature seeking to reconcile the disconnect between studies on security technologies and Race. Even though PNR is not the primary focus of much of this literature, these three trends in security literature provide the empirical underpinnings necessary to understand PNR as a sociotechnical assemblage that is inherently related to post-colonialism and Race. This review is not an exhaustive account of the literature but serves as a preliminary outline that

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[148] The majority of the literature that is focused on PNR takes up the debate between security and privacy. While this literature is helpful to determine how PNR operates in the West, it says very little in the way of the Global South or the discriminatory practices it may silently enact. Cf. Olga Mironenko Enerstvedt, "Russian PNR System: Data Protection Issues and Global Prospects," *Computer Law & Security Review* 30, no. 1 (February 2014): 25–40, https://doi.org/10.1016/j.clsr.2013.11.003; Gavin Robinson, "Data Protection Reform, Passenger Name Record and Telecommunications Data Retention: - Mass Surveillance Measures in the E.U. and the Need for a Comprehensive Legal Framework -," *KritV, CritQ, RCrit. Kritische Vierteljahresschrift Für Gesetzgebung Und Rechtswissenschaft / Critical Quarterly for Legislation and Law / Revue Critique Trimestrielle de Jurisprudence et de Législation* 95, no. 4 (January 2012): 394–416, http://www.jstor.org/stable/43265054.

[149] Leese, "The New Profiling."

[150] For example, biometric data travels faster than the physical body, allowing governments to make decisions on a body before it reaches the physical border.

[151] Didier Bigo and Laurent Bonelli, "Critique de la raison criminologique," *Cultures & conflits*, no. 94-96 (July 2014): 7–26, https://doi.org/10.4000/conflits.18879; cf. Zureik and Salter, *Global Surveillance and Policing*.

will be further developed in the case study that follows. The preliminary objective of this review is to provide the foundations on which to situate this research both theoretically and methodologically.

3.1 Sociological Approaches to Security and Technology

The relationship between security and technology is fundamental to understanding contemporary security practices. While the role and effect of technology is increasingly included in the study of security, "little work has been done on the practice of technology itself with regard to security."[152] Notwithstanding that there is a general lack of literature examining PNR from a material perspective, the current literature draws attention to the role played by (material) technologies in an assemblage of human actors and institutions, including surveillance systems,[153] predictive algorithms,[154] and databases.[155] This literature reveals that technology 'acts' and has a significant impact on the world, but that it does so within a network of other actors: in other words, the literature demonstrates that humans and technology mutually enable one another.[156]

The significance of technology in the study of social reality emerged most prominently from sociological traditions in the 1980s and the development of science and technology studies (STS), a subfield of new materialism that produced several significant insights that provide the necessary foundations of the incorporation of materially oriented approaches to security studies. This literature confronts the assumption that technology is neutral (and free of politics) and demonstrates that technology is not passive, but rather that it is part of a complex assemblage with human actors and institutions. Bruno Latour has been particularly impactful in questioning human exceptionalism[157] and establishes an agenda for a "sociology of association."[158] Challenging human exceptionalism is crucial to incorporating technology

[152] Emmanuel-Pierre Guittet and Julien Jeandesboz, "Security Technologies," in *The Routledge Handbook of New Security Studies*, ed. J. Peter Burgess (New York: Routledge, 2010), 229.
[153] William Walters, "Live Governance, Borders, and the Time–space of the Situation: EUROSUR and the Genealogy of Bordering in Europe," *Comparative European Politics 15*, no. 5 (August 2017): 794–817, https://doi.org/10.1057/s41295-016-0083-5.
[154] Louise Amoore, "Data Derivatives: On the Emergence of a Security Risk Calculus for Our Times," *Theory, Culture & Society* 28, no. 6 (November 2011): 24–43, https://doi.org/10.1177/0263276411417.
[155] Huub Dijstelbloem and Dennis Broeders, "Border Surveillance, Mobility Management and the Shaping of Non-Publics in Europe," *European Journal of Social Theory* 18, no. 1 (February 2015): 21–38, https://doi.org/10.1177/1368431014534353.
[156] Hoijtink and Leese, *Technology and Agency*.
[157] This is done by questing the prominent ontological assumptions of human exceptionalism: "When we act, who else is acting? How many agents are also present?" Latour, *Reassembling the Social*, 43.
[158] Latour, *Reassembling the Social*, 9.

into the study of security because by embracing an ontological perspective that acknowledges both human and non-human actants, it is possible to better understand the contribution of technology[159] on social production embedded in transient relational networks.[160] Despite the significant contributions of Latour's work, he often focused on areas where issues of Race and gender were absent. Further, he showed minimal interest in exploring questions of social inequality or oppression, and while Latour concentrated on social power relations, he overlooked the dynamics of oppression. Simply stated, understanding that non-human elements have a genuine impact on the world opens up research to account for a plethora of heterogeneous elements that need to be taken seriously in the study of security – including technology. This approach draws attention to the reality that apparently unitary actants are always mediated insofar as "when one acts, others proceed to action."[161]

Materially oriented approaches[162] seek to open the black box[163] of actor–networks[164] whereby it is possible to extract value from the elements that may otherwise be overlooked without understanding the material to have agency. In order to understand the complex network of actants in any given phenomenon, authors have utilized the term 'assemblage thinking' as an "approach that is capable of accommodating the various hybrids of material, biological, social and technological components that populate our world."[165] In rejecting human supremacy, the place of the human is not dismissed entirely but neither is it understood to be "the fundamental ground of things"; it is rather understood to be situated within the "complex relations between the human estate and a host of nonhuman processes with variable degrees of agency."[166] The question of agency, and specifically attention to the role of technology, is particularly impactful in the study of security because it allows for an examination of the network associations that

[159] And non-human actors more generally.
[160] Bruno Latour, "On Actor-Network Theory: A Few Clarifications," *Soziale Welt* 47, no. 4 (1996): 370, http://www.jstor.org/stable/40878163; and John Law, "After ANT: Complexity, Naming and Topology," *The Sociological Review* 47, no. 1 (May 1999): 4, https://doi.org/10.1111/j.1467-954X.1999.tb03479.x.
[161] Bruno Latour. "On Interobjectivity," *Mind, Culture, and Activity* 3, no. 4 (January 1996): 228–245, https://doi.org/10.1207/s15327884mca0304_2.
[162] For the purpose of this literature review, materially oriented is understood to be an umbrella term for approaches that focus on the relationship between material and human agency and includes both ANT and STS.
[163] Black box refers largely to a network of complex associations of heterogeneous actors that have become closed. While the output may be known, the components are often not considered or are seen as too difficult to examine.
[164] One common way of doing this is through focusing on controversies: "controversies are not simply a nuisance to be kept at bay, but what allows the social to be established and the various social sciences to contribute in its building." Latour, *Reassembling the Social*, 25.
[165] Michele Acuto and Simon Curtis, eds., *Reassembling International Theory: Assemblage Thinking and International Relations* (New York: Palgrave Macmillan, 2013), 2.
[166] William E. Connolly, "The 'New Materialism' and the Fragility of Things," *Millennium* 41, no. 3 (June 2013): 400, https://doi.org/10.1177/0305829813486849.

exist between human and material elements and those that transform security, but also how security technologies have an independent impact on the nature of security in ways that are unintended and that may surpass human intentionality.

Security literature has increasingly embraced materiality drawing on sociology and new materialism to demonstrate how material objects and technology (such as CCTV cameras and body scanners) have a significant and independent impact on security practices.[167] Security is not an objective condition but rather a complex assemblage of human and material objects that "fundamentally alter the condition of human possibility in ways that are unpredictable and irreducible to their constituent elements."[168] Materially oriented approaches have brought attention to the role of technology in an effort to understand security practices and the symmetry between humans and material.[169] As such, material approaches to security imply that agency is a distributed assemblage of human and material and is characterized by a capacity for actants to make a difference to a phenomenon without strict intentionality.[170] As a result, studies of security have acknowledged that "technological devices, systems, and routines are thoroughly interwoven with the structures and processes of social and political life."[171] This ontological stance allows for security to be understood in a way that is attentive to the social and technological realities of which it is constituted and is critical to understanding how technology may contribute to discriminatory practices, even without human intentionality.

Literature that examines the instruments of security policies that organize transnational security practices is growing. Notably, in examining European coordination of migration management, Didier Bigo draws a connection between security and technology in examining the role of technology as it relates to power and government, explaining that "the connection between person and machine, technological capacity and the will to use it to its fullest extent, whether resisted or otherwise, has to be appreciated in relation to historical

[167] Acuto and Curtis, *Reassembling International Theory*. Cf. Anthony Amicelle, Claudia Aradau, and Julien Jeandesboz, "Questioning Security Devices: Performativity, Resistance, Politics," *Security Dialogue* 46, no. 4 (August 2015): 293–306. https://doi.org/10.1177/0967010615586.
[168] Mark B. Salter, ed., *Making Things International 1: Circuits and Motion* (Minneapolis: University of Minnesota Press, 2015), viii.
[169] Latour, *Reassembling the Social*, 76.
[170] Latour, *Reassembling the Social*, 72.
[171] Langdon Winner, "Techniques of Preparedness," *in Surveillance and Security,* ed. Torin Monahan (New York: Routledge, 2006), 278.

and political figurations."[172] While not embracing a 'flat ontology,' the Bourdieusian inspired analyses espoused by Bigo[173] has been important in accounting for changes in security and the ontological shift away from the deeply embedded logic in International Relations of inside/outside.[174] From this insight, the notion of a "field of security" is developed that transcends the traditional dichotomies of inside/outside in the new habitus of a transversal field of globalised (in)security.[175] In demonstrating the rearticulation of state borders and the inside/outside dichotomy,[176] security and border security can no longer be understood strictly in terms of geopolitical territoriality, but ought to be understood in relation to technology and the distributed agency.[177] Approaches that embrace technology, even without embracing a flat ontology, bring attention to the material in the conceptualization of security.[178] It is in the relational elements of Bourdieu's theory of actors and routinized practices that the meaning of security arises, and that the reality of the field of security is one where "no actor can be the master of the game but in which everyone's knowledge and technological resources produce a hierarchy of threats."[179] However, even though the Bourdieusian approach to security begins to recognize material elements, there is considerable silence regarding the role of material and material agency in shaping security threats and the security agenda.

Simply stated, there has been an increase in the acknowledgment of the embeddedness of technology in everyday security practices and an increased "need to emphasize the social, political and historical context when detailing the design, development and diffusion of technological artefacts."[180] While these

[172] Didier Bigo, "Security, Surveillance and Democracy," in *Routledge Handbook of Surveillance Studies*, ed. Kirstie Ball, Kevin D. Haggerty, and David Lyon (Abingdon, Oxon: Routledge, 2012), 282.
[173] And the PARIS school of security: an approach to security that draws insights from sociology and anthropology.
[174] R. B. J. Walker, *Inside/Outside: International Relations as Political Theory* (Cambridge: Cambridge University Press, 1993); cf. Didier Bigo, "Security and Immigration: Toward a Critique of the Governmentality of Unease," *Alternatives* 27, no. 1 (February 2002): 63–92, http://search.proquest.com/docview/60619292/.
[175] Didier Bigo and Tsoukala Anastassia, eds., *Terror, Insecurity and Liberty: Illiberal Practices of Liberal Regimes after 9/11* (Abingdon, Oxon: Routledge, 2008), 11.
[176] Louise Amoore, "Biometric Borders: Governing Mobilities in the War on Terror," *Political Geography* 25, no. 3 (2006): 336–351. http://doi.org/fbc6kz.
[177] Acuto and Curtis, *Reassembling International Theory*; cf. Bellanova and Duez, "A Different View on the 'Making' of European Security."
[178] Cf. Didier Bigo and Anastassia Tsoukala (2008) (eds) Terror, Insecurity and Liberty: Illiberal Practices of Liberal Regimes after 9/11 (London and New York: Routledge). An analysis of the liberty/
security relation from an IPS/Paris School perspective., 11: "In very simple terms, we can no longer distinguish between an internal order reigning, thanks to the police, by holding a monopoly on legitimate violence, and an archaic international order which is maintained by an equilibrium of national powers vis-à-vis the armies and diplomatic alliances."
[179] Bigo, "Security and Immigration," 76.
[180] Daniel McCarthy, "Technology and 'the International' or: How I Learned to Stop Worrying and Love Determinism," *Millennium* 41, no. 3 (June 2013): 470–490, https://doi.org/10.1177/0305829813484636.

sociological approaches have provided insight into the significance of material elements in security, what remains evident about the authors who define the foundational literature, including Latour, Bourdieu, and Bigo, is that despite sojourns in Africa,[181] the authors do not write of or for the Global South. Ultimately, these approaches do well in showing what is present in material and human phenomena, but not what is missing; they have not yet sought to understand nor explain how categories like colonialism and Race are related to material elements in complex actor-networks. The outcome is that there has been a number of well-articulated criticisms that illuminate how these approaches tend to privilege "only certain human-nonhuman assemblages"[182] and risk reproducing "colonial ways of knowing and being by enacting universalizing claims."[183] As a result, there is a failure of these approaches to "'get beyond' categories like gender and Race" that "restrict not only the 'capacity to act' but our capacity to think that capacity."[184] Ultimately, it is necessary to be cautious of the universalization of these authors and in the application of their thoughts to the South African context. There is a risk that applying these authors to the South African context is transporting an "executive approach"[185] developed in Europe that would do well in identifying the colonial technology and technological developments that were imported to South Africa but not the developments that are indigenous to South Africa. In approaching South Africa's PNR regime, it is crucial to not focus only on how powerful actors contribute to the network and neglect actants at the margin.[186] Even with such shortcomings, this literature provides the necessary foundation to understand PNR as a sociotechnical assemblage and helps make visible "the joint production of actors" that may have otherwise been "entirely opaque."[187]

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[181] Pal Ahluwalia, *Out of Africa: Post-Structuralism's Colonial Roots* (London: Routledge, 2010). Cf. John Tresch and Bruno Latour, "Another Turn after ANT: An Interview with Bruno Latour," *Social Studies of Science* 43, no. 2 (2013): 302–313, https://doi.org/10.1177/0306312712468362.

[182] Annette Watson and Orville H. Huntington, "They're Here – I Can Feel Them: The Epistemic Spaces of Indigenous and Western Knowledges," *Social & Cultural Geography* 9, no. 3 (May 2008): 257–281, https://doi.org/10.1080/14649360801990488.

[183] Juanita Sundberg, "Decolonizing Posthumanist Geographies," *Cultural Geographies* 21, no. 1 (January 2014): 33, https://doi.org/10.1177/1474474013486067.

[184] Sara Ahmed, *On Being Included. Racism and Diversity in Institutional Life* (Durham, NC: Duke University Press, 2012), 180.

[185] Susan L. Star, "Power, Technology and the Phenomenology of Conventions: On Being Allergic to Onions," *The Sociological Review* 38, no. 1 (1990): 26–56, https://doi.org/10.1111/j.1467-954X.1990.tb03347.x.

[186] Star, "Power, Technology and the Phenomenology of Conventions."

[187] Bruno Latour, *Pandora's Hope: Essays on the Reality of Science Studies* (Cambridge, MA: Harvard University Press, 1999), 183.

3.2 Digital Surveillance and Security

Technology has facilitated an escalation of surveillance techniques that are now understood to "involve not only the watchful gaze of the state over the citizen but also vigilance among citizens."[188] This has led to a generalized suspicion where increased security has been synonymous with anticipatory forms of risk management and surveillance.[189] PNR is inseparable from its technological infrastructure and, when used for security purposes, represents an ambitious form of risk management through dataveillance – "the systematic monitoring of people or groups by means of personal data systems in order to regulate or govern their behavior"[190] – that operates through the collection of large datasets and seeks to risk profile mobile populations (irrespective of nationality) and transform uncertainties into calculable terms for the proactive and pre-emptive management of global mobility.[191] PNR, and surveillance more generally, is embedded with technology and in the technological infrastructure that has led to the 'digitization' of borders and a fundamental move away from the exclusive territorial concept of borders.[192]

PNR is constituted in, and is constitutive of, the technologization of borders whereby technology enables the projection of surveillance beyond the physical border in terms of security infrastructure and law enforcement and now blurs the distinction between internal and external security.[193] The technological shifts that have fundamentally altered the nature of security at the border have introduced a new vocabulary to describe the contemporary border which embraces the increased prevalence and reliance on digital technologies: 'iborder,'[194] 'smart border,'[195] digital border,'[196] and 'big borders,'[197] The use of

[188] Columba Peoples and Nick Vaughan-Williams, *Critical Security Studies: An Introduction*, 2nd ed. (New York: Routledge, 2015), 150.
[189] Peoples and Vaughan-Williams, *Critical Security Studies.*
[190]Sara Degli Esposti, "When Big Data Meets Dataveillance: The Hidden Side of Analytics," *Surveillance & Society* 12, no. 2 (2014): 209, https://doi.org/10.24908/ss.v12i2.5113.
[191] Bigo, "Globalized (In)Security"; cf. Claudia Aradau and Rens Van Munster, "Governing Terrorism Through Risk: Taking Precautions, (un)Knowing the Future," *European Journal of International Relations* 13, no. 1 (March 2007): 89–115, https://doi.org/10.1177/1354066107074290.
[192] Dennis Broeders, "The New Digital Borders of Europe: EU Databases and the Surveillance of Irregular Migrants," *International Sociology* 22, no. 1 (January 2007): 71–92, https://doi.org/10.1177/0268580907070126.
[193] Bigo, "Globalized (In)Security."
[194] Holger Pötzsch, "iBorder/ing," in *Routledge Handbook of Interdisciplinary Research Methods*, ed. Celia Lury et al. (London: Routledge, 2018), 93.
[195] Ben Hayes and Mathias Vermeulen, *Borderline: The EU's New Border Surveillance Initiatives* (Berlin: Heinrich Böll Foundation, 2012).
[196] Lilie Chouliaraki and Myria Georgiou, "The Digital Border: Mobility Beyond Territorial and Symbolic Divides," *European Journal of Communication* 34, no. 6 (2019): 594–605, https://doi.org/10.1177/0267323119886147.
[197] Philippa Metcalfe and Lina Dencik, "The Politics of Big Borders: Data (In)justice and the Governance of Refugees," *First Monday* 24, no. 4. (2019), https://doi.org/10.5210/fm.v24i4.9934.

technology in border security, as William Walters argued, is increasingly taking on a "sorting function"[198] in the separation of risky bodies from those deemed to be not a risk, and where the risk classification relies almost exclusively on data and algorithmic decision making. Louise Amoore explains that this increased dependency on technology in border functions transforms the physical body so that it becomes "the carrier of the border."[199] Further, Amoore and Marieke de Goede have demonstrated the reality that mobility in the post-9/11 era is always already connected to inequality because airport security utilizes the personal information of mobile populations to implement "targeted governance," which risks structuralizing inequality.[200] PNR is embedded in the practice described by Amoore and de Goede wherein personal data is used to inform security decisions[201] and algorithms "abductively generate the threats and targets via the recognition of patterns in vast volumes of data."[202] However, PNR data is not only used to prevent terrorism, but it is also used to prevent more conventional crimes and migration.[203] PNR has become essential to risk management as it allows border control authorities to focus on unknown high-risk individuals and, increasingly, undesirable mobile populations such as those whose risk profiles identify with classifications such as asylum seekers or those seeking illegal residence.[204] The result is that PNR is used to administer the risk management portfolios that have expanded in-line with increasing demands for security.[205]

PNR data is easily collected, analyzed, circulated, and reassembled. It is a surveillance technology that is "abstracting human bodies from their territorial settings and separating them into a series of discrete flows. These flows are then reassembled into distinct 'data doubles' that can be scrutinized and targeted for intervention."[206] In other words, through PNR data, states transform uncertainties into calculable terms

[198] William Walters, "Border/Control," *European Journal of Social Theory* 9, no. 2 (May 2006): 197, https://doi.org/10.1177/1368431006063332.
[199] Louise Amoore, "There Is No Great Refusal: The Ambivalent Politics of Resistance," in *International Political Economy and Poststructural Politics,* ed. Marieke de Goede (London: Palgrave Macmillan, 2006), 48.
[200] Louise Amoore and Marieke de Goede, "Governance, Risk and Dataveillance in the War on Terror," *Crime, Law, and Social Change* 43, no. 2-3 (2005): 149–173, https://doi.org/10.1007/s10611-005-1717-8.
[201] Rocco Bellanova and Marieke de Goede, "The Algorithmic Regulation of Security: An Infrastructural Perspective," *Regulation & Governance* 16, no.1 (July 2022): 102–118, https://doi.org/10.1111/rego.12338.
[202] Louise Amoore and Rita Raley, "Securing with Algorithms: Knowledge, Decision, Sovereignty," *Security Dialogue* 48, no. 1 (February 2017): 6, https://doi.org/10.1177/0967010616680753.
[203] Chang-Ryung Han, Rachel McGauran, and Hans Nelen, "API and PNR Data in Use for Border Control Authorities," *Security Journal* 30, no. 4 (March 2016):1045–1063, https://doi:10.1057/sj.2016.4.
[204] Han, McGauran, and Nelen, "API and PNR Data."
[205] Han, McGauran, and Nelen, "API and PNR Data."
[206] Cf. Kevin D. Haggerty and Richard V. Ericson, "The Surveillant Assemblage," *British Journal of Sociology* 51, no. 4 (2000): 606, https://doi.org/10.1080/00071310020015280.

for the pre-emptive management of global mobility before physical bodies arrive at the border.[207] While the current literature explains the changes that borders have experienced globally as a result of technology, there has not yet been an effort to understand the way that Race is materialized in such technology. The increased technologization of the border and the subsequent relocation of the body provoke questions of not only how technology and PNR have materially transformed the border but also how it has transformed bodies insofar as not all bodies are equal at the 'digital' border. PNR, like other surveillance technologies, "excludes certain groups in the name of their future potential behaviour."[208] Leese, in his analysis of PNR, notes that the data-driven knowledge that creates temporary profile hypothesis both institutionalizes and routinizes decision making based on algorithms and speculative futures.[209] However, profiling has clear connections to social sorting and discriminatory outcomes that are embedded in the creation of these technologies and that are reinforced through feedback loops and machine learning that perpetually "carry discriminatory potential."[210] However, the literature has rarely expanded its inquiry to examine how PNR technologies may silently enforce biases in unpredictable, and perhaps unintended, ways.

Glouftsios and Leese[211] have conducted the most comprehensive inquiry into the data-driven architectures underpinning contemporary security governance, tracing how large-scale information systems, algorithmic techniques, and transnational infrastructures reshape the production of risk and suspicion in their presentation of the concept of Epistemic Fusion.[212] The inquiry demonstrates how algorithmic systems increasingly conflate present data with speculative futures, producing forms of knowledge that are less about describing current realities than anticipating potential risks.[213] This fusion of the empirical and the speculative enables security actors to act on possibilities rather than definite behaviors, thereby expanding the scope of intervention while diffusing responsibility.[214] Within such systems, biases embedded in training data, model design, or institutional priorities become folded into predictive logics

[207] Bigo, "Globalized (In)Security"; cf. Claudia Aradau and Rens Van Munster, "Governing Terrorism Through Risk: Taking Precautions, (un)Knowing the Future," *European Journal of International Relations* 13, no. 1 (March 2007): 89–115, https://doi.org/10.1177/1354066107074290.
[208] Leon Hempel and Eric Töpfer, "The Surveillance Consensus: Reviewing the Politics of CCTV in Three European Countries," *European Journal of Criminology* 6, no. 2 (March 2009): 161, https://doi.org/10.1177/1477370808100544.
[209] Leese, "The New Profiling."
[210] Mann and Matzner, "Challenging Algorithmic Profiling," 2.
[211] Georgios Glouftsios and Matthias Leese,"Epistemic Fusion: Passenger Information Units and the Making of International Security." *Review of International Studies*49, no. 1 (2023): 125–42. https://doi.org/10.1017/S0260210522000365.
[212] Georgios and Leese, "Epistemic Fusion", 139-140
[213] Georgios and Leese, "Epistemic Fusion", 139
[214] Cf. Georgios and Leese, "Epistemic Fusion", 128

that appear technocratic and objective. As a result, algorithmic outputs come to function as seemingly neutral indicators of future threat, even as they subtly encode assumptions and reproduce existing hierarchies of suspicion. While Glouftsios and Leese do not focus on Race explicitly but bias more generally, applying this insight to PNR suggests that the technology's predictive orientation may not only amplify known patterns of social sorting but also generate new, opaque forms of discrimination that remain difficult to detect or contest. It is shown that data-driven security regimes blur the distinction between present facts and speculative futures, embedding anticipatory logics into routine decision-making.[215] This scholarship provides an essential foundation for examining how PNR technologies may reproduce or even intensify racialized patterns of sorting under the guise of neutral, future-oriented risk assessment.

In short, Glouftsios and Leese show how this convergence embeds anticipatory logics that can silently translate social hierarchies into technical criteria of suspicion.[216] When historical patterns of racialized mobility, policing practices, or geopolitical threat narratives inform the datasets and modelling choices that structure PNR systems, these systems operationalize race without ever explicitly naming it. In this way, the very mechanisms that make PNR appear neutral also enable it to reproduce and intensify racialized forms of sorting, rendering both less visible and more authoritative under the preface of data-driven security.

Despite the limited explicit engagement with PNR and material infrastructure, the available literature has demonstrated the ways in which surveillance and technology are increasingly interconnected and that there is an "increase[d] reliance on technology and computerised data-mining."[217] The literature has done well in identifying how surveillance is increasingly becoming inseparable from technology and how the connection between sovereignty and control over borders has shifted significantly away from understanding the "territorial state as a bounded entity with a clearly demarcated territory and population."[218] Most significant to studies of PNR is the fact that this literature demonstrates that surveillance and risk assessments of mobile populations take place in ways that are invisible and routinized

[215] Cf. Georgios and Leese, "Epistemic Fusion"
[216] Cf. Georgios and Leese, "Epistemic Fusion"
[217] Amoore and de Goede, "Governance, Risk and Dataveillance," 150.
[218] Fiona B. Adamson, "Crossing Borders: International Migration and National Security," *International Security* 31, no. 1 (July 2006): 175, https://doi.org/10.1162/isec.2006.31.1.165.

in everyday practices, but that have remained limited to Western contextualization.[219] The literature has not yet fully embraced materiality nor has it sought to fully explain how Race becomes embedded in surveillance practices in ways that often exceed human intentionality. In other words, authors have largely resisted or avoided incorporating Race and the non-Western implementation of surveillance technology into their research, nor have they specifically examined how categories like colonialism and Race are reinforced and materialized in security practices.

3.3 Race and Security

Security and surveillance literature focusing on material approaches have not traditionally placed an emphasis on the Global South, nor on Race. Race continues to be understudied in the field of security;[220] a field that is dominated by the Global West and that has been criticized for reproducing Eurocentric epistemological and ontological premises.[221] This is a significant issue because surveillance tools such as PNR often operate through silent algorithmic surveillance[222] and in ways that "amplify stereotypes and [that]...apply the most stringent and severe scrutiny to the most vulnerable – in socioeconomic, ethnic, and gendered terms."[223] As such, PNR is a form of surveillance that may occur in a way that is only visible to those who are excluded by it. Therefore, such practices are not neutral and tend to disadvantage certain populations more than others.

Despite the fact that the biases built into security practices have been researched for more than two decades,[224]only recently has the literature begun to resolve the disconnect between security practices

[219]Richard Jenkins, "Identity, Surveillance and Modernity: Sorting Out Who's Who," in *Routledge Handbook of Surveillance Studies*, ed. Kirstie Ball, Kevin Haggerty, and David Lyon (London: Routledge, 2012), 160.
[220] Those that discuss Race fail to define it, or generalize Race as a universal phenomenon. Cf. Mark B. Salter et al., "Race and Racism in Critical Security Studies," *Security Dialogue* 52, no. 1 (2021): 3–7, https://doi.org/10.1177/09670106211038787.
[221] Alison Howell and Melanie Richter-Montpetit, "Is Securitization Theory Racist? Civilizationism, Methodological Whiteness, and Antiblack Thought in the Copenhagen School," *Security Dialogue* 51, no. 1 (February 2020), 3–22, https://doi.org/10.1177/0967010619862921.
[222] Clive Norris, Jade Moran, and Gary Armstrong, "Algorithmic Surveillance: The Future of Automatic Visual Surveillance," in *Surveillance, Closed Circuit Television, and Social Control*, ed. Clive Noris and Jade Moran (Aldershot, England: Ashgate, 1998), 255–271.
[223] David Lyon, "Why Where You Are Matters: Mundane Mobilities, Transparent Technologies, and Digital Discrimination," in *Surveillance and Security, Technological Politics and Power in Everyday Life*, ed. Torin Monahan (New York: Routledge, 2006), 224.
[224] Batya Friedman and Helen Nissenbaum, "Bias in Computer Systems," *ACM Transactions on Information Systems (TOIS)* 14, no. 3 (July 1996), 330–347, https://doi.org/10.1145/230538.230561.

(specifically profiling) and the potential harm this has on already marginalized populations.[225] Simone Browne has presented a powerful attempt to reconcile studies of surveillance with Race.[226] Browne maintains that Race should be central to the study of surveillance, specifically in studies seeking to account for surveillance technologies that control and monitor populations as well as in the historical specificities of these technologies and the role these technologies have had in subjugating and monitoring populations of colour. Surveillance technology is not neutral; surveillance practices, both historically and currently, discriminate against certain groups more than others. Browne successfully demonstrates the racialization of certain bodies in security practices whereby "enactments of surveillance reify boundaries, borders, and bodies along racial lines, and where the outcome is often discriminatory treatment of those who are negatively racialized by such surveillance."[227] This is particularly problematic in algorithmic governance, where PNR is embedded, that creates categories of "probabilistic assumptions"[228] and perpetuates hierarchies based on Race or socioeconomic status.[229] Social sorting and discriminatory practices that take place through algorithmic profiling often occur in ways that are not clearly visible but which fuel a self-enforcing feedback loop whereby certain populations become overrepresented because of their Race,[230] even if the algorithmic program was created in a way to avoid discrimination based on Race.[231] While the question of Race is brought to the centre of analysis, the conceptualization provided by Browne is limited to the North American geographic context where it is situated. This is to say that, in relation to South Africa, it is necessary to understand surveillance beyond its reducibility to whiteness. It is necessary to expand the historical and contemporary relation of surveillance technologies and Race beyond the Western geographic imaginary.

[225] Simone Browne, *Dark Matters: On the Surveillance of Blackness* (Durham, NC: Duke University Press, 2015); cf. Safiya Umoja Noble, *Algorithms of Oppression: How Search Engines Reinforce Racism* (New York: New York University Press, 2018).
[226] Browne, *Dark Matters.*
[227] Browne, *Dark Matters*, 16.
[228] Leese, "The New Profiling," 502.
[229] Browne, *Dark Matters*.
[230] Andrew G. Ferguson, *The Rise of Big Data Policing: Surveillance, Race, and the Future of Law Enforcement* (New York: New York University Press, 2017).
[231] Mann and Matzner, "Challenging Algorithmic Profiling," 2.

Researchers in the study of security are now examining the widespread consequence of using personal data for security purposes[232] and the impact of these technologies on vulnerable groups.[233] Specifically, scholars are demonstrating the embeddedness of the archaic categories of Race and gender in surveillance technologies. As these practices produce truth in the process of reducing bodies to data,[234] the results increasingly demonstrate how security technology acts beyond strict human intentionality.[235] There are clear demonstrations of how technology diverges from functioning strictly as directed by its human counterparts. Even without human intentionality, surveillance technologies "bring to life assumptions about bodily identity" with regard to Race;[236] PNR data contains information that makes the body 'readable.' Increasingly, then, surveillance technologies, including PNR, are codifying inequality. As security technologies, especially those related to algorithmic governance, become increasingly complex, their biases and unequal treatment of marginalized groups will be increasingly difficult to identify, account for, and reconcile.[237] While the PNR literature has begun to note the discriminatory features embedded in the practice, the literature has not yet sought to fully understand how these discriminatory factors become embedded in the technology or how Race materializes in the practice.[238]

The relationship between the development of surveillance technologies and colonialism has been well documented in South Africa's colonial efforts registering and controlling populations.[239] In fact, this technology spread from South Africa to other British colonies;[240] for more than a century South Africa developed Race-based government security that has produced, and reproduced blueprints for a "new architecture of state power that is spreading through the former colonies of the European empires."[241] However, literature has rarely drawn a clear connection between surveillance practices developed in the

[232] Irma Van der Ploeg, "Security in the Danger Zone: Normative Issues of Next Generation Biometrics," in Emilio Ordini and Dimitros Tzovaras, *Second Generation Biometrics: The Ethical, Legal and Social Context* (Dordrecht: Springer Netherlands, 2012), 287–303. Cf. Clive Norris and Gary Armstrong, *The Maximum Surveillance Society: The Rise of CCTV* (Oxford: Berg, 1990); Louise Amoore and Alexandra Hall, "Taking People Apart: Digitised Dissection and the Body at the Border," *Environment and Planning Society and Space* 27, no. 3 (June 2009): 444–464, https://doi.org/10.1068/d1208.
[233] Kirstie Ball and Kevin Haggerty, "Doing Surveillance Studies," *Surveillance and Society* 3, no. 2-3 (January 2005): 129–138, https://doi.org/10.24908/ss.v3i2/3.3496.
[234]Shoshana Magnet, *When Biometrics Fail: Gender, Race, and the Technology of Identity* (Durham, NC: Duke University Press, 2011).
[235] Magnet, *When Biometrics Fail*.
[236] Magnet, *When Biometrics Fail*, 126.
[237] Mann and Matzner "Challenging Algorithmic Profiling," 3.
[238] Mann and Matzner, "Challenging Algorithmic Profiling," 2.
[239] Breckenridge, *Biometric State*.
[240] Breckenridge, *Biometric State*.
[241] Breckenridge, *Biometric State*, 60.

colonies and how these technologies may play out in a colonial state differently from the state in which it was developed.[242] Despite a clear connection between surveillance technologies and colonialism, there have been few efforts to understand how racial inequalities may still be embedded in these practices or how they have developed and spread from the Global South – not strictly a creation of Western modernity designed and implemented exclusively for the West.[243]

It is important to note that there has been increasing acknowledgment of Race in security studies; however, authors continue to present their understandings of Race as something akin to common sense as opposed to engaging with Race directly.[244] Inquiries into Race and racism remain somewhere at the margins of inquiry into Race and technology. Yet there is a clear movement towards acknowledging the importance of Race in critical security studies.[245] Ultimately, Race continues to be understudied in the field of security. Authors who have started to address this gap provide valuable foundations of study in demonstrating the importance of putting Race at the centre of security studies, but they have largely failed to incorporate non-Western accounts. Not only has the Global South been subalternized[246] in the global power structure,[247] the legacies of colonial racism continue to exist and are influencing security practices globally.[248]

3.4 Conclusion

The current literature has been successful in challenging the ontological assumptions of state-centric security and has begun to address the significance of technology in facilitating security practices. However, it has not yet been able to fully incorporate Race or post-colonialism in the examination of technology that facilitates PNR and that "fundamentally alter[s] the condition of human possibility in ways that are unpredictable and irreducible to their constituent elements."[249] PNR is largely situated in literature

[242] Engin Isin and Evelyn Ruppert, "Data's Empire: Postcolonial Data Politics," in *Data Politics*: *Worlds, Subjects, Rights*, ed. Didier Bigo, Engin Isin, and Evelyn Ruppert (London: Routledge, 2019), 207.
[243] Isin and Ruppert, "Data's Empire."
[244] Columba Achilleos-Sarll, Julia Sachseder, and Saskia Stachowitsch, "The (Inter)Visual Politics of Border Security: Co-Constituting Gender and Race through Frontex's Risk Analysis," *Security Dialogue* 54, no. 4 (2023): 374–394, https://doi.org/10.1177/09670106231182314.
[245] Salter et al., "Race and Racism," 3–7.
[246] Rendered or made subaltern
[247] Sinah Theres Kloß, "The Global South as Subversive Practice: Challenges and Potentials of a Heuristic Concept," *The Global South* 11, no. 2 (2017): 1–17, https://doi.org/10.2979/globalsouth.11.2.01.
[248] Erna Oliver and Willem H. Oliver, "The Colonisation of South Africa: A Unique Case," *HTS Theological Studies* 73, no. 3 (August 2017): e1–e8, https://doi.org/10.4102/hts.v73i3.4498.
[249] Salter, *Making Things International*, viii.

that has made "issues about the past and present of colonial relations no longer relevant or even comprehensible."[250] Examining South Africa's PNR as a sociotechnical assemblage supports the fact that Race and non-Western post-colonial contextualization are missing from the current literature focusing on PNR. Ultimately, examining South Africa's PNR regime provides a meaningful case to address what is missing from the materially orientated security literature by presenting an explicit focus on Race and how security practices may contribute to the racialization of bodies in ways that exceed human intentionality,[251] but which still create forms of "exclusionary invisibility."[252]

The examination of the current literature leads to more specific questions related to how PNR operates as a security regime in South Africa, notably:

- How localizable is the current literature in which PNR is embedded?
- What role has the West (and colonial relations) had in the development of South Africa's PNR technology, and what role has South Africa played with respect to technologies of the West?
- How is PNR technology already embedded within structural relations of difference?
- How might insights from new materialism influence post-colonial insights to the global study of security and PNR, and vice versa?

This project seeks to understand both the intended and unintended consequences of PNR as a technology implemented for security purposes. In approaching PNR as a sociotechnical assemblage, and by putting Race at the centre of the analysis, this project contributes theoretically and empirically to current security and PNR literature while ensuring that, as previously noted, the Western experience is not mistaken for a universal experience.[253] This research offers the first history of PNR in South Africa—and the first history of PNR outside the global North—and, in doing so, makes three primary contributions to knowledge, beginning with the integration of Race into the study of PNR and STS; a field of study that has traditionally not seriously considered Race. Ontologically, this research suggests[254] that an effective study of Race and PNR technology needs to consider Race in a way that is more attentive to non-Western contexts where Race is more than a simplified black and white binary. Second, this research contributes to the literature

[250] Sandra G Harding, ed., *The Postcolonial Science and Technology Studies Reader* (Durham, NC: Duke University Press, 2011), 7.
[251] Rick Dolphijn and Iris van der Tuin, *New Materialism: Interviews and Cartographies* (Ann Arbor, MI: Open Humanities Press, 2012).
[252] Mann and Matzner, "Challenging Algorithmic Profiling," 7.
[253] Pinar Bilgin, "The 'Western-Centrism' of Security Studies: 'Blind Spot' or Constitutive Practice?" *Security Dialogue* 41, no. 6 (December 2010): 615–622, https://doi.org/10.1177/0967010610388208.
[254] That is to say that the ontological contribution of this research is in the constitution of Race as a concept, emphasizing that Race exists differently across contexts, and that those differences must shape how PNR and Race are analyzed.

by providing a unique case in the study of PNR as a sociotechnical assemblage. Theoretically, this research represents not only the first study into the relationship between PNR and Race but also the first sustained materially oriented study to include both Post-colonialism and Race. Finally, this research contributes to the literature by demonstrating the need to rethink the nature of PNR security technology and the need to rethink the relationship between ANT as a theoretical approach and the study of Race. Building on an already promising literature, this research puts forward a new materialist theorization of PNR that is attentive to Race, and the technological dynamics of Race and racialization.

Incorporating Race into the study of PNR reinforces the commitment of STS in making visible actants and dynamics that are often overlooked. This dissertation addresses the lack of attention on the global South and on Race in studies of technology. Further, focusing on South Africa's PNR system exposes how material-oriented approaches often marginalize non-Western countries and overlook South Africa's contributions to knowledge production. This dissertation helps fulfil the need of STS to engage with Race and take seriously the processes whereby technology mediates and materializes Race. By situating South Africa's PNR system within its historical and socio-political contexts, it reveals the entanglement of racial logics with technical infrastructures. This work bridges STS with post-colonial and racial analyses, offering an important framework for understanding the governance of racialized bodies in global technological practices.

Chapter 4: Interlude on Race

4. Introduction

To understand how Race may be embedded in PNR as a seemingly neutral technology, it is necessary to situate the concept of Race in South Africa and show how technology has been intimately entwined with racial politics in the country. It is important to note that this interlude does not engage in debate about what Race is or ought to be, it simply provides the necessary foundation to understand Race in South Africa and discusses how technology and technoscientific practices have led to technologized bodies and bodies that can be marked by Race. Engaging in the debate as to *what* precisely Race is does not provide insight into the main inquiry of this project; rather, the concern is how bodies get marked by racial differences. This interlude presents a limited history of Race in South Africa to demonstrate how categorization was never neutral, how Race has always been used as a tool of population management, and how this tool creates distinct possibilities and limitations for the bodies that interact with the technologized practices.[255] The intent of this section is to position the concept of Race in South Africa and to specifically locate Race in the unique historical formation of the contemporary state. Notably, it is necessary to demonstrate that the racial categories that continue to be operationalized in South Africa had been implemented previously and were then reimagined by the colonial and Apartheid governments.[256]

The word 'Race' is capitalized throughout this dissertation because it remains a meaningful category of identification and classification in South Africa. Often, academic literature places Race in quotation marks to make note of the fact that Race is something that *may* exist or *was* meaningful, or to suggest that Race is an arbitrary category that should not hold power. Race is often presented as something authors wish to distance their argument from or to indicate that "there is no such thing as Race."[257] However, the argument presented in this thesis relies on confronting Race directly, and in a meaningful way. This project does not attempt to define Race, but rather builds upon a South African understanding of Race as a nebulous and often arbitrary categorization. This, however, does not mean that the term Race lacks significant cultural, political, or social implications. The concept of Race continues to be meaningful, and the contemporary

[255] The use of the term 'technology' here refers to an epistemological apparatus. Technology was always already incorporating the body; to speak of the body is to speak of technology (embodied subjectivity).
[256] Gerhard Maré, *Declassified: Moving Beyond the Dead End of Race in South Africa* (Auckland Park: Jacana, 2014).
[257] Anoop Nayak, "After Race: Ethnography, Race and Post-Race Theory," *Ethnic and Racial Studies* 29 no. 3 (2006): 41, https://doi.org/10.1080/01419870600597818.

racial dynamic is far more than "just the way things are."[258] Further, it is important to note that Race in South Africa is inherently connected to the Western-European history of Race. There are geographical variation and diverse ways that other parts of the world have imagined the concept of Race. This section does not attempt to write a universal history of the connections between Race and technology, but merely attempts to initiate a conversation about Race as it was subject to the use of technology in South Africa.

The architects of the South African Apartheid built the state on the foundations of racial classification of all peoples within its borders; Race was used to categorize the entire population, often capriciously, creating social hierarchies and making differences intelligible. Despite the official end of the Apartheid three decades ago[259] and the adoption of a national policy of non-racism,[260] the legacies of racial classifications established under the Apartheid government continue to prevail in the contemporary democratic state. Simply, South Africa has not yet moved beyond the racial categories established under the Apartheid to organize the population. To understand how Race may be embedded in PNR as a seemingly neutral technology in South Africa, it is necessary to present the foundations of Race in South Africa, and to introduce the long connection that Race has had to security and surveillance practices.[261] This interlude traces Race from the Apartheid era, through the development of technologically mediated racial control and identification, and into the new democratic state.

It is important to re-emphasize that this dissertation is concerned with the connections between Race and technology as it relates to PNR and is not an extensive inquiry into Race in South Africa. While the exploration of Race is limited, it is sufficient for the study of racial bias in PNR technology. This is especially important because contemporary PNR technologies and practices in South Africa were established on the foundation of nearly a century of racial, colonial, and Apartheid practices.[262] Technology in South Africa has primarily been used to manage populations and mark bodies by Race, and in doing so, materialize difference.

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[258] Maré, *Declassified,* 56.
[259] Apartheid officially ended on April 27, 1994.
[260] South Africa, *Constitution of the Republic of South Africa, 1996*, Department of Justice and Constitutional Development, chap. 1, https://www.justice.gov.za/constitution/SAConstitution-web-eng.pdf.
[261] Cf. This dissertation, chapter 5 and 6
[262] Cf. This dissertation, chapter6

4.1 Race in South Africa

The regions that comprise contemporary South Africa have endured approximately 350[263] years of racialized politics that set the epistemological foundations for the Apartheid State.[264] By the end of the nineteenth century, South African society was highly racialized, but there was no legal framework for racial segregation. The Union of South Africa was dubbed "a white man's country."[265] In fact, when the Union was formed in 1910, after decades of hostility,[266] it was defined as a white democracy and the main concern was reconciliation between two Races, the Afrikaners and the British, to create a homeland suitable for "civilised men."[267] In reality, South Africa was a "union of the European Races in South Africa."[268] As such, all non-white Races were excluded or marginalized economically, socially, and politically.

[263] It is important to note that unlike other colonies, the native population (Khoi-San) in South Africa comprises less than one percent of the contemporary population, and under Apartheid were classified as 'coloured.' Much of the population that were considered 'native' to South Africa were enslaved labourers. A more complete history of pre-Apartheid colonialization in South Africa can be found in Oliver and Oliver, "The Colonisation of South Africa: A Unique Case"; and in Clifton C. Crais, "Slavery and Freedom in South Africa," *Slavery & Abolition* 13 no. 3 (1992): 201–206, https://doi.org/10.1080/01440399208575073.

[264] For a more complete history, see Paul Maylam, *South Africa's Racial Past : The History and Historiography of Racism, Segregation, and Apartheid* (Abingdon, Oxon: Routledge, 2016).

[265] Malusi Gigaba, "Address by Deputy Minister of Home Affairs Malusi Gigaba during National Assembly Debate," Government of South Africa, June 1, 2010, https://www.gov.za/news/speeches/address-deputy-minister-home-affairs-malusi-gigaba-during-national-assembly-debate.

[266] Known as the Boer Wars, during which the British fought the Boer republics for control over South Africa. The British won and the Union of South Africa officially became part of the British Empire. Cf. Bill Nasson, *The Boer War: The Struggle for South Africa* (Stroud, Gloucestershire: History Press, 2011).

[267] Cf. Alfred Milner, *The Nation and the Empire: Being a Collection of Speeches and Addresses* (New York: Houghton Mifflin Company, 1913), 82–83, accessed March 13, 2020, https://archive.org/details/nationempirebein00miln/page/82/mode/2up.

[268] Saul Dubow, *A Commonwealth of Knowledge: Science, Sensibility, and White South Africa 1820–2000* (Oxford: Oxford University Press, 2006), 198.

Figure 2: Hulton-Deutsch Collection/Corbis, via Getty Images. During the Apartheid, infrastructure and access to infrastructure was regulated based on Race. Apartheid was largely about separation; infrastructure – including schools, transportation, medical institutions, and all public spaces – was a way to separate and police mobility of the population.

Description: A black-and-white photograph showing an apartheid-era segregation sign posted along the South African coastline. The top line reads "THE DIVISIONAL COUNCIL OF THE CAPE," identifying the authority responsible for erecting the sign. Beneath this, the sign states "WHITE AREA (BY ORDER SECRETARY)," indicating that the space was legally reserved exclusively for white people under apartheid legislation. Below the English text, the same message appears in Afrikaans: "DIE AFDELINGSRAAD VAN DIE KAAP" followed by "BLANKE GEBIED (OP LAS SEKRETARIS)."

The Apartheid Project (1948–1994) – also known as the Grand Apartheid – and the legalization of racial discrimination was built on the already well-established tools and ideologies of white supremacy.[269] The Apartheid was profoundly rooted in the principles of eugenics, asserting that each Race was inherently distinct and therefore necessitated separate developmental trajectories.[270] The word 'Apartheid' is derived from the Afrikaans language; 'apart' means separate, and the suffix 'heid' means '-ness.' Therefore, the direct translation of Apartheid[271] is 'apartness.' The ongoing Apartheid formally defined each Race and established physical boundaries between them.[272]

[269] Deborah Posel, "Race as Common Sense: Racial Classification in Twentieth-Century South Africa," *African Studies Review* 44, no. 2 (2001): 88, https://doi.org/10.2307/525576.
[270] Posel, "Race as Common Sense."
[271] In Afrikaans it is pronounced as a:PART:hate.
[272] This was achieved through the *Population Registration Act* of 1950, the *Group Areas Act* of 1950, and the *Separate Amenities Act* of 1953. Cf. Alan G. Morris, *Bones and Bodies: How South African Scientists Studied Race* (Johannesburg:: Wits University Press, 2022), 249.

It is important to note that at the beginning of the Apartheid, what was happening politically, socially, and economically in South Africa was connected to a wider transfer of knowledge and the technologies of power in the white colony. The knowledge and practices that created the Apartheid were shaped by ideas that had been formed in other British colonies[273] and the metropole more generally.[274] The Apartheid was built on the classification of the entirety of South Africa into four legal categories that were used to manage the population: *(1) Black African, (2) White, (3) Coloured, and (4) Indian.* These identity categories were based on Race and were created and consequently policed by the Apartheid government. Although the Apartheid government imagined a society where Race was the ultimate source of organization, the reality of centuries of European presence in the region, as well as migration to the area from other African regions and Asia, meant that the idea of racial purity was little more than a fantasy. For example, in 1967 in a South African House of Assembly Debate, it was stated that:

> it [was] almost impossible to determine with any certainty which people are natives and which people are Coloureds…It would be an uneconomical waste of time and money to try, throughout the country, to determine a person's Race with precision.[275]

As a result, the Apartheid government gave officials the power to assign racial identities to individuals. Difference was assigned to individuals where none would have existed otherwise. However, these racial categorizations were no less powerful to surveil the entire population and create boundaries between the Races.

[273] Notably Canada, India, and Australia.

[274] It is important to note that these ideas did not flow exclusively from North to South. Moreover, South Africa was something of a nexus that connected the Pacific, Atlantic, and Indian colonies. However, the South African Institute of Race Relations (SAIRR) was directly modelled after the ideas found in the Southern United States after the First World War (specifically looking at infrastructures of segregation in the United States). Cf. Anjuli Webster, "Transatlantic Knowledge: Race Relations, Social Science and Native Education in Early Twentieth-Century South Africa," *South African Historical Journal* 72, no. 3 (2020): 366–385, https://doi.org/10.1080/02582473.2020.1827019.

[275] Deborah Posel, "What's in a Name? Racial Categorisations under Apartheid and Their Afterlife," *Transformation (Durban, South Africa)* 47 (2001): 55. Original source: 14. Union of South Africa, *House of Assembly Debates,* 17/3/67, col 3172.

Table 2: The Racial Organization of Apartheid South Africa (a Summary)[276]

White/European	European, Afrikaans, White (pure European descent) *Exception: Jewish, Soviet*
Black African from South African region (also called Native or Bantu)[277] (often considered to be the lowest class)	Bantu (pure-blooded aboriginals) Swazi Tonga Xosa Zulu Rhodesian Tribes Portuguese East African tribes
Coloured	Cape Malay Mozambique American coloured Creole Mauritian St Helena *Children of any mixed marriage with White*
Asian/Indian	Chinese Hong Kongers (honorary white) Indian Afghan Burmese Egyptian Japanese (honorary white 1960) Syrian West Indian

While Race existed in South Africa prior to the Apartheid, racial categories were normalized and became institutionalized under the Apartheid. Technology was used to manage identity and to materialize differences between people; this was best articulated through the use of personal identity documents that were automated and connected to a data processing system.[278] It was also technology that enabled the

[276] For a full list, see Tom A. Moultrie and Rob E. Dorrington, "Used for Ill; Used for Good: A Century of Collecting Data on Race in South Africa," *Ethnic and Racial Studies* 35, no. 8 (2012): 1447–1465, https://doi.org/10.1080/01419870.2011.607502.

[277] The name assigned to this racial category changed periodically and reflected the Apartheid governments obsession with separating those who were truly South African from those who were from other African countries. For example, a 1966 Report to the Department of Bantu Administration and developments states that "the fingerprint record is absolutely essential, because it guarantees positive identification and precludes the possibility of foreign Blacks infiltrating into the Republic from other parts of Africa." Edwards and Hecht, "History and the Technopolitics," 625.

[278] Edwards and Hecht, "History and the Technopolitics."

documentary order that underpinned and facilitated Apartheid and its complex classification system of racial identity.[279]

4.2 Negotiating Race

During the Apartheid, Race became the dominant form of identity and population management in South Africa. The Apartheid government sought to neatly organize the South African population based on racial lines; however, it was not a straightforward process. With hundreds of years of Race relations in the region, many people did not feel that they fit the categories assigned to them by the government and defined by the law. For example, their physical appearances could differ from assigned classification, they lived with people of another Race, they spoke a different language than the assigned Race, or because they had some other historical deviation.[280] While Race was institutionalized, racial identity was liable to change. The *Race Classification Act* of 1950 sought to classify the entire population and although by 1958, "53,598 disputes arising from the course of the first classification under the Act had been dealt with…nearly 100,000 remained."[281] The difficulties with racial classification were so severe that the Apartheid government had to create a formal Race Classification Board that would hear complaints and petitions about Race classification.[282]

There were many problems with the formal elaboration of legal differences, notably that Race "could not be established with any precision,"[283] and that Race was often negotiated by individuals. Under the *Population Registration Act*[284] of 1950, the individual Race categories were defined, albeit, with some ambiguity:

- Native: "a person who in fact is or is generally accepted as a member of any aboriginal Race or tribe of Africa" [285]

[279] Breckenridge, *Biometric State*, demonstrates how the grand Apartheid was built on technologies of population management and registration.
[280] Cf. Geoffrey C. Bowker and Susan Leigh Star, *Sorting Things Out: Classification and Its Consequences* (Cambridge, MA: MIT Press, 1999).
[281] Maré, *Declassified*, 37.
[282] Yvonne Erasmus and George T.H. Ellison, "What Can We Learn about the Meaning of Race from the Classification of Population Groups during Apartheid?," *South African Journal of Science* 104, no. 11 (2008): 450–452.
[283] Posel, "What's in a Name?," 56.
[284] Many inquiries into South Africa take Race as being something of common-sense, especially because at the beginning of Apartheid the racialized practices were similar to those operating in the rest of the world; much of the colonial empire had long organized populations based on racial hierarchization. The Apartheid, however, was unique in its reach and duration. During the twentieth century, South Africa was considered to have been the most meticulously surveilled society.
[285] South Africa, *Population Registration Act, no. 30 of 1950, section 1 (xv), (x) and (iii)*, P277.

- White: "a person who in appearance obviously is, or who is generally accepted as a white person, but does not include a person who, although in appearance obviously a white person, is generally accepted as a coloured person"[286]
- Coloured: "a person who is not a white person or a native"[287]

Evidently, there were a number of conceptual shortcomings in the racial categories as defined under the Apartheid.

These imprecisions were a benefit to the Apartheid government and gave it additional power to govern the population. Race classification affected every level of life in South Africa during the Apartheid era; it determined where people could live, who they could socialize with, and where they could work. Race-based Apartheid laws also included control of "political rights, voting, freedom of movement and settlement, property rights, right to choose the nature of one's work, education, criminal law, social rights including the right to drink alcohol, use of public services including transport, social security, taxation, and immigration."[288] There were, therefore, many motivating factors for individuals to appeal the Race classification to which they had been assigned. Furthermore, various aspects of Apartheid law could classify different people in different ways. For example:

- Where a woman lived depended on her husband's Race classification (the exception was if she was married to an individual classified as 'white,' which was technically illegal under the Apartheid but which could be possible if done in a different country)
- Children of mixed unions (also, technically illegal) were classified on the 'lower' classification of their parents
- Children, after the age of sixteen, could be classified as a different Race than their parents and forced to live and attend school in a different area (usually based on physical appearance)
- Association with the wrong group could be used as proof of membership of the associated Race
- Appearance
- Acceptance and repute in a group

It is important to emphasize that all areas of life were impacted by Race classification. Life was hierarchized and it was explicit that white lives were valued more than non-white lives. This was seen not only in the distribution of rights and liberties, but also in the allocation of state services and resources. For example, education, medical care, and cemeteries were segregated.[289]

[286] South Africa, *Population Registration Act, no. 30 of 1950, section 1 (xv), (x) and (iii),* P277.
[287] South Africa, *Population Registration Act, no. 30 of 1950, section 1 (xv), (x) and (iii)*, P277.
[288] Bowker and Star, *Sorting Things Out,* 197.
[289] Bowker and Star, *Sorting Things Out,* 197.

The significance, then, of conceptualizing Race in South Africa is that Race could be negotiated and changed.[290] Legally, Race was essentially "whatever people understood or wanted it to be, and racial classification could be attained through 'performing' an identity with sufficient proficiency to 'get away with it.'"[291] For the duration of the Apartheid, the concept and classification of Race was operationalized inconsistently; laws changed frequently and so did the categorization of the population. The technologies that supported Race classification "to make South Africa a white man's country"[292] spread to the entirety of the South African population and eventually allowed for racial differences to be neutralized and reproduced in infrastructures and institutions.

4.3 Race and Technology

Under the Apartheid, the National Party[293] successfully codified the differences that had already existed in South Africa. Race classification provided the bureaucratic and social foundation to facilitate and normalize "vicious racism."[294] This was accomplished and was sustained by implementing the use of passbooks that were originally required by all blacks in South Africa but that were eventually required by all South Africans. The passbook was an approximately 95-page passport-sized book that contained personal information about the individual, including biographic information such as birth information, education history, employment history, marital information, tax information, and medical information.

It is important to note that the passbook as a form of an internal passport was not unique to the Apartheid. The Dutch Cape Colony had established an internal passport system in the eighteenth century to control and monitor the movements of slave labourers.[295] As the Dutch spread from the Cape area – known as the Great Trek in the 1830s – to the interior of contemporary South Africa, the practice followed.[296] The British then adopted a similar practice to keep tabs on the general population and specifically the labour

[290] Maré, *Declassified*, 51.
[291] Yvonne Erasmus and George Ellison, "What Can We Learn about the Meaning of Race from the Classification of Population Groups during Apartheid?" *South African Journal of Science* 104, no. 11 (2008): 450–452, http://dx.doi.org/10.1590/S0038-23532008000600016.
[292] Institute for Democracy in South Africa**,** "The Emergence of Racial Politics in South Africa," United States Institute of Peace Case Study Competition (March 22, 2013), 3.
[293] The National Party was the ruling political party in South Africa during the Apartheid (1948-1994) and was the primary architect of the apartheid system. The party was closely identified with Afrikaner Nationalism and became synonymous with institutionalized racism.
[294] Bowker and Star, *Sorting Things Out,* 195–196.
[295] Lily Saint, "Reading Subjects: Passbooks, Literature and Apartheid," *Social Dynamics* 38, no. 1 (2012): 117–133, https://doi.org/10.1080/02533952.2012.700178.
[296] Saint, "Reading Subjects."

force. However, the documents developed during the Apartheid were unique in the volume of information they contained. The requirement to carry the passbook allowed for racial identities to be assigned to all people living in South Africa[297] and for the management of all populations and their movements within the country. The passbook was effectively an internal passport that had to be carried at all times by all South Africans over the age of sixteen. The passbook contained "personal history and movements" of all South Africans in the country[298] but were used to specifically monitor the black population "from registration to death."[299] It is widely acknowledged that "Blacks were the major targets of scrutiny, and the passbook system allowed for comprehensive surveillance of their actions."[300] In fact, the South African government established Bewysburo – the Bureau of Proof – in order to create a central registration of the black population in the country; doing so would allow control over this population, and would also protect South Africa from "'foreign Black' invaders."[301]

Population management under the Apartheid government became more precise because of sophisticated computer systems. Each individual was assigned a 13-digit number (YYMMDDSSSSCAZ) which became their life-long identifier, and to which all other personal data was uploaded and referenced to (originally, this was done by punch-card tabulating equipment, but all data was eventually converted to digital tapes).[302] This digitization transformed South African society and population management at a globally unprecedented pace. The passbook system technologized bodies; all information on an individual – including any licences, certificates, and Race identity – were indexed in one place.[303] While every South African was registered in the pass system, it became a tool of white supremacy and "a mechanism of capricious policing, mass arrest and imprisonment."[304] The technologies used to support population documentation and management of movement were central to the Apartheid Project and the need to categorize Race and racial identity.

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[297] Bowker and Star, *Sorting Things Out,* 195–196.
[298] Breckenridge, *Biometric State,* 145.
[299] Breckenridge, *Biometric State,* 152.
[300] Bowker and Star, *Sorting Things Out,* 200.
[301] Edwards and Hecht, "History and the Technopolitics of Identity."
[302] Edwards and Hecht, "History and the Technopolitics of Identity."
[303] South Africa contracted IBM to create their database. The South African system was based after the Swedish system that indexed all public documents. However, the Swedish system did not index all information in a single place and did not include an induvial Race. Cf. Breckenridge, *Biometric State*.
[304]Breckenridge, *Biometric State,* 101.

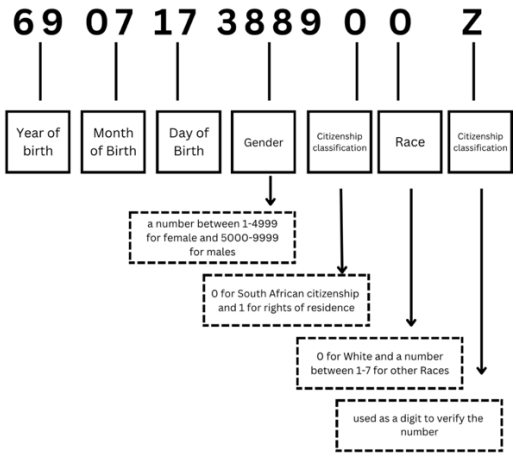

Figure 3: Example of how the identity number was determined.

4.4 Surviving the Apartheid

Race emerged from the Apartheid era as the primary form of identity organization. The consequences of colonial and Apartheid social divisions are still apparent in post-Apartheid South Africa (1994–present) and 'othering' is still deeply embedded in thoughts and practices.[305] The narrative in the country is now one of belonging to the Union (citizen – of any Race) or being an outsider (foreigner).[306] Understanding Apartheid history is essential for grasping the complex racial legacy that exists in the contemporary state[307] wherein citizenship is used to systematically exclude non-South Africans and to legitimize discrimination.[308] In post-Apartheid South Africa, there is an ethos in racial reconciliation, yet there remains a huge disparity in that the white population continues to maintain social and economic privilege. Also of interest is the rise of Afrophobia[309] in the country and the new form of racism that has manifested

[305] Cf. Marguerite Duponchel, "Who Is the Alien? Xenophobia in Post-Apartheid South Africa," in *Growth and Institutions in African Development*, ed. Augustin K. Fosu (London: Routledge, 2015), 297–330.
[306] Although, it is important to note that while black migrants are often considered to be a problem, white migrants are typically considered to be tourists and have not been targets of xenophobic violence.
[307] Maré, *Declassified,* 35.
[308] Michael Neocosmos, *From 'Foreign Natives' to 'Native Foreigners': Explaining Xenophobia in Post-Apartheid South Africa: Citizenship and Nationalism, Identity and Politics* (Dakar, Senegal: CODESRIA, 2006).
[309] The prevalence of anti-foreigner violence in South Africa has been studied extensively. Cf. Kenneth Hashi Tafira, *Xenophobia in South Africa: A History* (Cham, Switzerland: Palgrave Macmillan, 2018).

in "black on black" violence.[310] Since the end of the Apartheid there has been a noticeable differentiation of immigrants from other African countries.[311] South Africa has received a large number of refugees and economic migrants[312] principally from other countries on the continent[313] and this inflow has allowed the prevailing logic of the Apartheid to flourish.[314] The literature on xenophobia in South Africa has identified the country's history of institutional racial exclusion as the root of contemporary violence and discrimination and it has been noted that "the hatred against foreigners is replacing the divide between white and black South Africans."[315] South Africa demonstrates that anti-blackness and white supremacy can persist even under black leadership.[316] Thus, while the Apartheid logic may have shifted, it is still operating in terms of excluding those deemed 'foreigners.'

Race categorization, including use of the identity numbers[317] was retained after the end of the Apartheid with the purpose of having a consistent baseline to provide redress from the harms of the Apartheid regime. Many of the statisticians that had worked for the Apartheid government maintained their positions in the new democracy[318] and the Race-based categories established under the Apartheid continue to be used in the contemporary regime. The exception to this can be found in the Stats South Africa 2007[319] document where the term 'Race' has been replaced with 'population group,' defined as:

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[310] David Addae and Kofi Poku Quan-Baffour, "Afrophobia, 'Black on Black' Violence and the New Racism in South Africa: The Nexus between Adult Education and Mutual Co-Existence," *Cogent Social Sciences* 8, no. 1 (2022), https://doi.org/10.1080/23311886.2022.2130458.

[311] Identified by citizenship, appearance, language, culture, and so forth. However, it has also been noted that legitimate South African citizens have been 'othered' for not looking South African. Cf. Pervaiz Khan, "South Africa: From Apartheid to Xenophobia," *Race & Class* 63, no. 1 (2021): 3–22, https://doi.org/10.1177/03063968211020889.

[312] "Statistics South Africa, has estimated that a net 853,000 people migrated to the country over the 2016–21 period, a slight reduction from the net immigration of 916,300 over the 2011–16 period but a dramatic increase from the 491,700 in the 2001–06 period. Between 2016 and 2021, net immigration was highest among the African (894,400) and Asian (49,900) populations, but offset by a net emigration of nearly 91,000 White residents." Khangelani Moyo, "South Africa Reckons with Its Status as a Top Immigration Destination, Apartheid History, and Economic Challenges," Migration Policy Institute (November 2021), n.p., https://www.migrationpolicy.org/article/south-africa-immigration-destination-history.

[313] United Nations, "International Migrant Stock 2020: Destination and Origin," Department of Economic and Social Affairs – Population Division (December 2020), https://www.un.org/development/desa/pd/sites/www.un.org.development.desa.pd/files/files/documents/2021/Jan/undesa_pd_2020_international_migrant_stock_documentation.pdf.

[314] Cf. Neocosmos, *From 'Foreign Natives' to 'Native Foreigners.'* Cf. Malose Langa and Peace Kiguwa, "Race-Ing Xenophobic Violence: Engaging Social Representations of the Black African Body in Post-Apartheid South Africa," *Agenda* 30, no. 2 (2016): 75–85, https://doi.org/10.1080/10130950.2016.1222086.

[315] Janet McKnight, "Through the Fear: A Study of Xenophobia in South Africa's Refugee System," *Journal of Identity and Migration Studies* 2, no. 2 (2008), 21, https://e-migration.ro/jims/Vol2_no2_2008/JIMS_Vol2_No2_2008.pdf.

[316] Marzia Milazzo, *Colorblind Tools: Global Technologies of Racial Power* (Evanston, IL: Northwestern University Press, 2022).

[317] Albeit, the direct numeric reference to Race was removed.

[318] Maré, *Declassified,* 60.

[319] Cf. South Africa, *Concepts and Definitions for Statistics South Africa,* V01.01, Statistics South Africa, January 2007, https://www.statssa.gov.za/standardisation/Concepts_Definitions_StatisticsSA_V01.01.pdf.

> A group with common characteristics (in terms of descent and history), particularly in relation to how they were (or would have been) classified before the 1994 elections. The following categories are provided in the census: Black African, coloured, Indian or Asian, white, other.[320]

Race has turned into something of common sense, but is still contingent on Apartheid-era categorizations. The current approach to non-racism that is promoted by the African National Congress (ANC)[321] focuses on reversing the impact of Apartheid Race-based policies without challenging the use of the categorization of the population. The ANC method maintains the existing racial categories, even though these categories were often disputed, disrupted, and rejected.

In many ways, the ANC government has failed to confront the realities of Race in the country. The democratic government has not clearly defined Race, yet legislation continues its reliance on racial classification. The continued use of Apartheid categories strengthens racial distinctions by relying on the concept of Race developed by colonial governments. The current state is in a racial conundrum where the democratic government wants a non-racial society yet continues to rely on Apartheid-era racial categorizations.

Table 3: Contemporary Race Composition in South Africa, 2022[322]

Race	**Number**
Black African	50 485 026 (81,4%)
Coloured	5 052 299. (8,2%)
Indian/Asian	1 697 468 (2,7%)
White	4 503 780 (7,3%)
Other	247 353 (0,4%)

4.6 A brief explanation on an 'American' understanding of Race

Security studies have tended to use an American understanding of Race where the analytical categories are white or non-white. While this could also be considered a 'Western' framing of Race as literature

[320] Lee Stone and Yvonne Erasmus, "Race Thinking and the Law in Post-1994 South Africa," *Transformation* 79, no. 1 (2012): 119–143, https://doi.org/10.1353/trn.2012.0019.

[321] It is important to note that the ANC itself has engaged in racist sentiments at the highest level of politics. Cf. President Zuma anti-Boer or anti foreigners (Dubul' ibhunu). Grootes, Stephen. "'Kill the Boer': A Song Sung by So Few That Divides So Many." *Daily Maverick*, March 31, 2025. https://www.dailymaverick.co.za/article/2025-03-31-kill-the-boer-a-song-sung-by-so-few-that-divides-so-many/. Cf. Misago, Jean Pierre, and Loren B Landau. 2022. "'Running Them Out of Time:' Xenophobia, Violence, and Co-Authoring Spatiotemporal Exclusion in South Africa." *Geopolitics* 28 (4): 1611–31. doi:10.1080/14650045.2022.2078707.

[322] Information from South Africa, "Stats by Theme," *Census 2022*, Statistics South Africa, accessed March 31, 2025, https://census.statssa.gov.za/#/statsbytheme.

produced in the Global North tends to follow an American comprehension whereby individuals are either racialized or not, the American case is interesting because of its racial history that parallels South Africa's in some ways.[323] The American framing of Race is influenced by the one-drop rule that broadly classifies anyone with African ancestry as black. In South Africa, racial identity was shaped by colonialism and European powers that imposed racial hierarchies to justify control and economic exploitation. However, these hierarchies functioned differently from those in America, where Race was most significantly articulated under the Transatlantic Slave Trade and segregation. In South Africa, Race-based governance was tied to population management and economic systems, not just ancestry: Race was a category that was frequently articulated and rearticulated – it meant nothing, and it meant everything.

A non-Western perspective on Race, encompassing ethnicity, tribes, and geographic variations, provides a more comprehensive and nuanced framework for understanding racism globally. This perspective acknowledges that racism transcends skin colour and encompasses power dynamics, historical legacies, and social structures that differ across regions. In contrast to the prevalent Western binary of black and white, a South African approach recognizes the intricate mechanisms of oppression, considering factors such as colonial legacies, ethnic divisions, and economic disparities. Further, this understanding helps explain why racism is not just about discrimination based on skin colour but can also manifest in ethnic exclusion, xenophobia, and economic marginalization. An American framing of Race is overly simplistic, making it poorly suited to understanding racism globally, and specifically outside of the Global North; it is unable to account for the complex ethnic, regional, and historical variations that shape racial dynamics that exist in post-colonial states.

[323] Denis Binder, "Some Rough Historical Parallels between South Africa and the United States," *Journal of Comparative Urban Law and Policy* 1, no. 1 (2017): Article 16, https://readingroom.law.gsu.edu/jculp/vol1/iss1/16.

Box 2: On not explicitly theorizing Race

This dissertation is concerned with what Race *does* not what Race *is*. In other words, this dissertation is concerned with how Race operates, materializes, and produces effects within security infrastructures, rather than engaging in ontological debates about the nature or definition of Race itself. Ultimately, understanding how PNR functions as a racializing assemblage does not depend on an exhaustive definition of what Race *is*, but rather requires attention to how Race operates, materializes, and produces effects through data practices and mobility governance. This is not to suggest that theorizing Race is unimportant, but such an undertaking is beyond the scope of this project. Simply, understanding how bodies become marked by Race- and what Race does- does not necessitate an exhaustive theorization of what Race is.

That being said, the understanding of Race in this project is most closely aligned with the work of Simone Browne,[1] who understands Race not as a fixed biological category but a social construct that is actionable through surveillance, technology, and the management of mobile bodies. Browne's concept of racializing surveillance highlights how technologies historically and currently operate to classify, differentiate, and govern bodies along racial lines - making Race something that is performed, enforced, and materialized through systems like PNR, rather than something that simply *is*.[2] Race is understood not as a fixed biological reality but as a relational and structural system of differentiation**,** materially produced through histories of colonialism, capitalism, and white supremacy.[3] This dissertation, therefor, aligns with critical theories of Race that understand Race not as a fixed biological category, but as a socially constructed, historically contingent, and materially enforced system of differentiation. Drawing on the work of scholars such as Simone Browne, Adam Hochman,[4] and Stuart Hall,[5] this approach emphasizes that Race is not something individuals inherently are, but something that is continually produced, performed, and made actionable through institutional practices, surveillance technologies, and mobility regimes.

Race cannot be reduced to an abstract discourse; it is produced and made actionable through political decisions, institutional practices, and technologies of governance. In the context of PNR systems, data infrastructures do not simply collect information; they participate in the reproduction of racialized hierarchies under the guise of global mobility management. This is particularly true in South Africa where Race is, and has historically been, a socially and politically constructed system of classification without any consistence biological grounding (despite attempts of the Apartheid government), yet with very real material effects.[6] The case of South Africa shows that Race must be understood as both materially and historically produced, shaped through the intertwined dynamics of colonialism, biopolitics, and global systems of control. An examination of South African PNR exposes how racialization operates through material infrastructures, bodies, and technologies, requiring analyses for the ways Race emerges through these processes, rather than being treated as incidental to broader ontological debates.

Source: South African History Online. *The History of Apartheid in South Africa*. Accessed April, 2025. https://sahistory.org.za/article/history-apartheid-south-africa.

Description: A black-and-white photograph of an Apartheid-era warning sign. The sign features a skull-and-crossbones symbol under the large heading "DANGER!" It addresses "Natives, Indians & Coloureds," warning that if they enter the premises at night, they will be listed as missing, and that armed guards will shoot on sight while "savage dogs devour the corpse." The sign ends with the threat "YOU HAVE BEEN WARNED!" The language reflects the extreme racialized violence and intimidation used to enforce segregation and territorial control under apartheid.

[1]Simone Browne, *Dark Matters: On the Surveillance of Blackness* (Durham, NC: Duke University Press, 2015)
[2] Browne, *Dark Matte.*
[3] Marzia Milazzo, *Colorblind Tools: Global Technologies of Racial Power* (Evanston, IL: Northwestern University Press, 2022).
[4] Hochman, Adam. *The Race Illusion*. Cambridge: Cambridge University Press, 2023. Cf. Specifically, Race is better understood as a political and historical product, shaped by colonialism, slavery, and state power, rather than as an innate or merely discursive category.
[5] Hall, Stuart. *Selected Writings on Race and Difference*. Edited by Paul Gilroy and Ruth Wilson Gilmore. Durham: Duke University Press, 2021. Cf. South Africa exemplifies Hochman's claim that Race, while lacking biological reality, remains materially consequential- a system of categorization with deep roots in colonial and apartheid structures, continually rearticulated through contemporary security infrastructures.
[6] Hochman, Adam. *The Race Illusion*. Cambridge: Cambridge University Press, 2023.

4.7 Conclusion

Race in South Africa has long served a political function of population control and management. An explicit inquiry into current PNR use and practices helps to demonstrate that the remnants of the systems and logics that were developed during and for the Apartheid era are still in use. Further, such an inquiry can show how classification of Race is powerful and may be embedded in the contemporary PNR infrastructures – noting that although the classifications have become relatively invisible (black boxed), they are no less powerful.

Although the intention of this chapter was not to recount the history of Race in South Africa, a brief examination of the past was necessary to show how technology and Race became intimately connected. Race has occupied a central position in the formation of the South African state and in its politics and institutions. Specifically, during the Apartheid, technology was used to articulate Race and manage human differences; it was a political tool to manage populations and a means to regulate social organization. Technology provided the means for institutionalized, bureaucratic racism and racial classification.

The function of Race categorization and classification in South Africa was to manage the population by marginalizing the non-white population and maintaining the white-minority government.[324] The passbook system was a form of racialized surveillance, which is described as "when enactments of surveillance reify boundaries along racial lines, thereby reifying Race, and where the outcome of this is often discriminatory and violent in treatment."[325] The concept and categorization of Race was strengthened by technology and the technical registration and surveillance of all populations.[326] Apartheid was founded on the principle of *die swart gevaar* (the black danger) and the fear that the black population would eventually engulf South Africa politically, socially, and economically. Racial categorization existed "to divide and control in terms of access to political rights and economic resources and thereby maintain power and privilege."[327] The technolization of racial identities through the passbook system in South Africa created clear distinctions

[324] Amanuel Isak Tewolde, "Self-Identification in Post-Apartheid South Africa: The Case of Coloured People in Johannesburg, South Africa," *Social Sciences & Humanities Open* 9 (2024): 100866, https://doi.org/10.1016/j.ssaho.2024.100866.
[325] Browne, *Dark Matters,* 8
[326] Edwards and Hecht, "History and the Technopolitics of Identity."
[327] Martin West (1988) "Confusing categories: Population groups, national state and citizenship." In Emile Boonzaier and John Sharp (Eds.), *South African Keywords: The uses and abuses of political concepts* (Cape Town and Johannesburg, South Africa. 1988). 110.

in society, even if none would have existed otherwise, and permitted the state to exercise its sovereign power on its population.

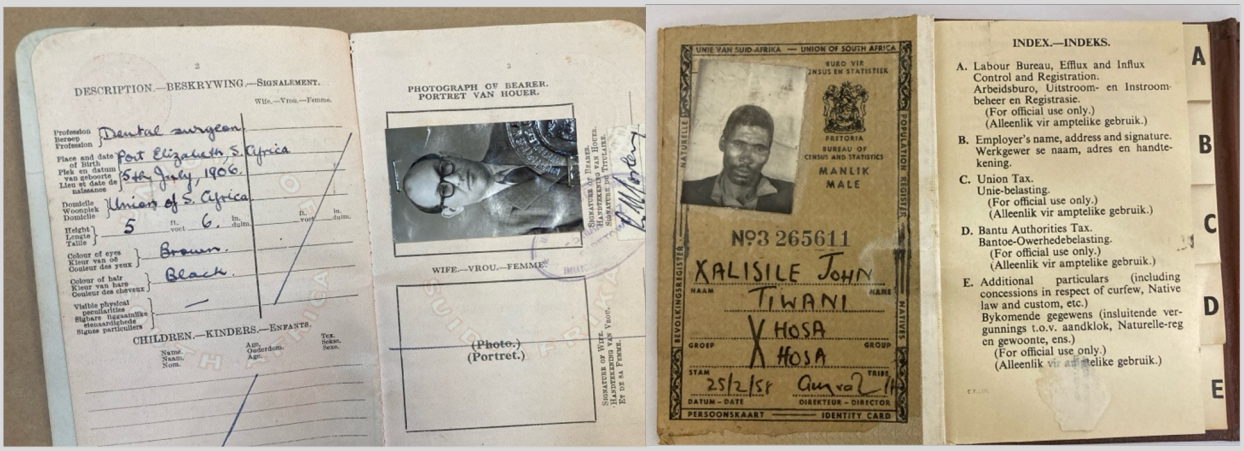
The technology that supported the creation and management of the passbook system in South Africa is significant because such practices have survived the fall of the Apartheid. The technical infrastructure that upheld racial segregation and which played a key role in shaping racial identity in South Africa has not completely vanished. In fact, Race continues to function as a pervasive system of categorization and recognition that influences all aspects of life in contemporary South Africa. Even basic demographic data is imbued with significant connotation, evaluation, and entrenched racial ideologies.[328]

As a result of its long-documented racism, South Africa is an important site of inquiry into how Race can be theorized and conceptualized. The complexity and neutralization of Race in South Africa makes it a powerful case to understand how decades of technological developments and policy decisions have accumulated in complicated, and often inaccessible, technological assemblages. An examination of South Africa's use of PNR demonstrates the necessity of drawing attention to neutralized categorizations in practices that often appear unbiased and purely technical. The categories of Race that continue to be used, and that are embedded in PNR, continue to be an important tool of political power.

[328] Maré, *Declassified,* 51.

Box 3: Depending on Documents

The South African state was built on the colonial effort of verifying individuals' identity with their data. Technologies and practices that would be used at the border post-Apartheid were perfected within the Apartheid state. The first reference of internal pass documents to manage mobile populations is dated 1797, "which aimed at excluding all natives from colonial territory."[1] This logic continued throughout the Apartheid era where identity documents were centralized and computerized.



L-1940 passport. R – 1958 Passbook BNS – 30/31 vol. 1-4

Description: A composite image comparing two South African identity documents: a 1940 passport issued to a white man, showing handwritten personal details and a portrait, and a 1958 passbook issued to *Xalisile John Twani*, classified as "Xhosa." The passbook includes his photograph, racial designation, official stamps, and an index outlining labour, tax, and movement-control requirements central to apartheid administration.

Sample Passport 2009, Department of Home Affairs

Documents to prove identity have not changed significantly since the 1940s in South Africa. The most notable change was the inclusion of the Identification number in the 1950s. The *Dumpas* (pass documents – literally dumb pass) were issued to control the non-white populations within South Africa, notably, making it possible to uphold the goals of Apartheid to "compulsory documentary order, biometric identifiers (fingerprints), the baroque taxonomy of racial identity, and the elaborate system of architectural zones and geographical and temporal borders."[2] Simply, these documents made the management of mobility possible within South Africa.

IBM computer technology made it possible to transform the paper-based index system in South Africa to a digitized project known as the Book of Life, whereby the personal data of all South Africans was computerized in the 1970s. The Book of Life project was inspired by population registration projects in Israel and Sweden;[3] however, where these projects were not centralized to prevent the repetition of data driven atrocities such as those seen under Nazi Germany,[4] the South African project developed in a singular centralized data base.[5] Interestingly, the centralization of the Book of Life mirrored that of the Immigration records and were located in Johannesburg, Cape Town, and Durban with the data centralized in Pretoria.[6]

The purpose of the Book of Life project was to provide surveillance over its citizens as well as ensure the security of South Africa.[7] It supplied the technical infrastructure for contemporary border management, expanding the practice of identity management of population control.

1Union of South Africa, *Report of the Inter-Departmental Committee on the Native Pass Laws*, SAB MBN 41, B25, 1920, page 2.
[2] Paul N. Edwards and Gabrielle Hecht, "History and the Technopolitics of Identity: The Case of Apartheid South Africa," *Journal of Southern African Studies* 36, no. 3 (2010): 625.
[3] Keith Breckenridge, "The Book of Life: The South African Population Register and the Invention of Racial Descent, 1950–1980," *Kronos*, no. 40 (2014): 225–240.
[4] Fred H. Cate, *Privacy in the Information Age* (Washington, DC: Brookings Institution Press, 1997).
[5] Breckenridge, "The Book of Life."
[6] Cate, *Privacy in the Information Age*.
[7] Breckenridge, "The Book of Life."

Chapter 5: PNR as a Technology of Race and Racialization

South Africa is not new to using technology to assist with the management of mobility. However, the introduction of new technologies, including PNR, has profound implications for the process and outcomes of those seeking to enter or exit the country. While humans still act on PNR data, decision making is increasingly occurring in a 'black box'; traditional border actors such as immigration officers are not obsolete, but are more frequently acting on technological decisions as opposed to being the primary decision makers. In other words, technology is influencing human decision making. Further, the technological elements of border management are often beyond human comprehension and oversight. This increased reliance on technology to 'know' mobile populations continues to alter the relationship between individuals and the state. Further, the use of technologies claims an ultimate fairness in mobility often implying the technologies such as PNR are depoliticized and cannot be biased.

This chapter argues that there is an inherent connection between PNR technology and racialization of mobile populations. The increased collection of data and reliance on sophisticated technology justified under the promise of security risk reinforcing the politics of exclusion at the border.[329] This is concerning because PNR technology operates in an opaque manner beyond intelligibility of governments and their legal protection. Given that technology is not developed in a vacuum, there is always the risk that it replicates the power hierarchies in society; where technology was originally developed or where the technology was trained. PNR technology may inherently be embedded with Eurocentric biases, but, if the technology is trained and implemented by South Africa, there is additional risk that biases unique to South Africa also become embedded in PNR practices. While PNR is used in South Africa, it is inherently global.[330] This is true in terms of technology development, global best practices, training data, global threats and watchlists, and the reality than no one is exempt from the practice – regardless of nationality or social status.

Research on the connection between technology and migration has begun to show the connection between human rights, privacy rights, and migration technology, yet there is still a gap in research on the disproportionate impact of these technologies on certain mobile populations and how certain populations

[329] Karen Hao, "Why AI Is a Threat to Democracy – and What We Can Do to Stop It," *MIT Technology Review*, February 26, 2019, https://www.technologyreview.com/2019/02/26/66043/why-ai-is-a-threat-to-democracyand-what-we-can-do-to-stop-it/.
[330] Cf. This dissertation Chapter 11

are at increased risk of becoming marked by Race.[331] While no mobile populations are excluded from PNR, not all passengers experience PNR and the South African border in the same way. This gap in research highlights the need to critically examine how PNR technologies may exacerbate existing racial inequalities at the border and their broader implications for migration policies.

5.1 Politics of Data at the Airport

PNR algorithms used by South Africa for the purpose of global mobility are classified. Algorithms are developed, and training data is refined beyond public scrutiny, leading PNR to operate in a 'black box.' It is incredibly difficult to identify how algorithms are making decisions and whether or not there is bias, even if it is accidental.[332]

Given the nature of PNR and the algorithms that sort mobile populations into risk categories, there is no way to explain how the algorithm makes a decision and, thus, no way to confirm that there is definitely racial bias in use at the border. However, there is sufficient evidence that bias should be considered a risk in the use of PNR, especially given the reality that PNR codes are not open to public scrutiny. Currently, neither South Africa, the ICAO,[333] UN GoTravel,[334] nor SITA[335] have any mechanisms in place to prevent bias in PNR use.[336] This is concerning because other security technologies developed in the Global North have been demonstrated to contain racial bias.[337] This issue is not localizable; however, technologies developed and deployed in the Global North have been particularly scrutinized, and it has been found that,

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[331] Rob Picheta, "Passengers to Face AI Lie Detector Tests at EU Airports," *CNN.com*, November 2, 2018, https://edition.cnn.com/travel/article/ai-lie-detector-eu-airports-scli-intl/index.html

[332] Proxies are particularly concerning; consider postal codes serving as a proxy for Race.

[333] Cf. This dissertation 10 and 11. The Internation Civil Aviation Organization (ICAO) is central to South Africa's PNR system. The ICAO provides the international standards that justifies and structures how passenger data is collected and shared. The ICAO framework (specifically Annex 9) integrates South African PNR practices into global security and border management efforts. The alignment allows the state to expand surveillance abilities under the guise of international compliance, while also linking South Africa to broader transnational data flows and mobility governance.

[334] Cf. This dissertation 11**.** The UN GoTravel software is a free, internal travel management platform available to any UN member state in order to facilitate the global adoption of PNR to assist in the management of mobile populations.

[335] Cf. This dissertation chapter 9. SITA **(**Société Internationale de Télécommunications Aéronautiques) is a central actor in the data infrastructure of global aviation . SITA has been contracted in South African management of mobile populations since the end of the Apartheid and has provided the infrastructure for the collection and use of PNR data in the country. SITA's systems enable the secure transfer of PNR information from airlines to state authorities, facilitating compliance with international standards like those set by ICAO. Through SITA's global network, South Africa integrates its PNR regime into wider transnational security and mobility governance structures, while relying on private-sector infrastructure to support state surveillance capabilities.

[336] Cf. This dissertation chapter 11

[337] Accounts of bias in technology can be found at https://racismandtechnology.center/theme/racist-technology-in-action/

for example, the Dutch VFS applications have made decisions unequally based on nationality,[338] and that Proctoring software employs facial recognition technology that tends to disproportionately disadvantage students of colour.[339] It should not be overlooked that the Netherlands have a portfolio of racially biased technology and, yet, have provided the UN GoTravel technology which, despite is dissemination globally, remains an incredibly covert technology open to misuse. It is not new knowledge that algorithmic decision making has a history of disproportionally effecting racialized individuals, and there is absolutely no evidence to suggest that PNR technology would be an exception.

PNR algorithms may be invaluable to assisting with the management of mobile populations, but cannot be isolated from politics more generally. Decision over entry and exit is a key feature of state sovereignty and "controlling who enters the state and who does not is one of the few remaining powerful attributes of national sovereignty."[340] Moreover, South Africa frequently associates immigration from non-Western countries as being associated with negative features of society like crime, unemployment, and illegality.[341] Because data used to train the PNR algorithm is inherently political and representative of the perceived threats to the South African state, technological impartiality is not obtainable.[342] PNR is naturally an extension of state sovereignty over borders and will always be reflective of the politics and societal features of the state.

In South Africa there is currently no legal oversight that would limit the risk of bias in PNR, nor are their binding legal documents that seek to regulate PNR technologies and their risks. In fact, in South Africa, PNR isn't even subject to the national data protection laws as is the custom in the EU and Canada.[343] While neighbouring countries have been blamed for illegal migration – specifically Zimbabwe[344] – South

[338] Hans de Zwart, "Racist Technology in Action: 'You Look Similar to Someone We Didn't Like' → Dutch Visa Denied," Racism & Technology Center, May 12, 2023, https://racismandtechnology.center/2023/05/12/racist-technology-in-action-you-look-similar-to-someone-we-didnt-like-→-dutch-visa-denied/.
[339] Naomi Appleman, "Racist Technology in Action: Proctoring software disadvantaging students of colour in the Netherlands," Racism & Technology Center, July 10, 2021, https://racismandtechnology.center/2021/07/10/racist-technology-in-action-proctoring-software-disadvantaging-students-of-colour-in-the-netherlands/.
[340] Ronaldo Munck, "Globalisation, Governance and Migration: An Introduction," *Third World Quarterly* 29, no. 7 (2008): 1238, https://doi.org/10.1080/01436590802386252.
[341] Cf. Bastien Drawta, "Xenophobia: A Pervasive Crisis in Post-Apartheid South Africa," *Georgetown Journal of International Affairs*, May 26, 2024, https://gjia.georgetown.edu/2024/05/26/xenophobia-a-pervasive-crisis-in-post-apartheid-south-africa/.
[342] Cf. Monique Whitaker, "Technological Bias, Illusory Impartiality, and the Injustice of Hermeneutical Obstruction," *South African Journal of Philosophy* 43, no. 4 (2024): 293–306, https://doi:10.1080/02580136.2024.2373610.
[343] Taplin, "South Africa's PNR Regime."
[344] Cf. Addae and Quan-Baffour, "Afrophobia, 'Black on Black' Violence and the New Racism in South Africa.".

Africa is a common destination for migrants on the continent.[345] Studies have shown that an increased number of migrants "mainly from Ethiopia and Somalia, only took flights to South Africa" and, that those with funds and documentation increasingly travel from an African country through the UAE then to South Africa.[346] This means that even with the use of PNR, an increased number of migrants are still accessing South Africa by air travel, even when PNR data allows authorities to pre-screen travellers before they board flights.

South African immigration, of which PNR is embedded, continues to operate within a "two-gate" policy: white immigrants continue to be considered desirable but African migrants are considered to be a national security risk.[347] This contributes to the widespread xenophobia in the country,[348] which is likely to extend to immigrant agents who have already been accused of operating carte blanche,[349] and it is likely that these beliefs further impact decisions made at the border. While it is suggested that the DHA is rampant with corruption (estimates suggest that up to 85 percent of the DHA is corrupt), the DHA claims that it is illegal migration that contributes to this corruption.[350]

5.2 PNR and Racialization: Beyond an American Understanding of Race

PNR algorithms risk perpetuating bias in border management due to feedback loops whereby algorithms learn from 'correct' decisions. As such, PNR algorithms can learn to rely disproportionately on certain data points that make bias more likely. The risk is that these algorithms make it unnecessarily difficult to gain entry, even with valid documents, because of reasons which may reflect nationality and Race. While PNR algorithms are unlikely to explicitly operate on the basis of Race because it is not an explicit field in PNR data, this does not mean there are not inequalities in how PNR operates. The concerning part of bias in PNR, especially in the case of South Africa, is that algorithms operating on racial lines are not an accidental problem in the technology, but rather a feature of it. In fact, interviews suggested that many

[345] Ottilia Anna Maunganidze, *Migration Policy in South Africa: Lessons from Africa's Migration Magnet for European Policymakers*, ed. Alia Fakhry and Victoria Rietig. German Council on Foreign Relations Report No. 18 (Berlin: Deutsche Gesellschaft für Auswärtige Politik, 2021), https://dgap.org/sites/default/files/article_pdfs/Report-SouthAfrica_18_2021_EN.pdf.
[346] Mixed Migration Centre, *Southbound: The Changing Migration Patterns in Southern Africa*, May 2023, https://mixedmigration.org/wp-content/uploads/2023/04/274_Southbound_Report.pdf.
[347] Cf. Maunganidze, *Migration Policy in South Africa*.
[348] Drawta, "Xenophobia: A Pervasive Crisis in Post-Apartheid South Africa."
[349] Mike Kgomotso Masemola and Phil Mpho Chaka, "(T)races of Terrorism Beyond Ports of Entry: A Retrospective Assessment of the Limits of Profiling in the Regulation of Airport Passenger Traffic during the 2010 FIFA World Cup," *Social Dynamics* 37, no. 1 (2011): 178–192, https://doi.org/10.1080/02533952.2011.570002.
[350] Cf. Maunganidze, *Migration Policy in South Africa*.

migrants travelling from neighbouring countries, with proper documentation, felt that they had experienced significantly more scrutiny at the border than their white counterparts.[351] Even with the proper documentation, there was the feeling that they "had to justify why [they] were coming to South Africa" and they felt that "white people [were] never questioned."[352] There was a feeling that only "black travelers [were] a security risk."[353] The perception of racial discrimination emphasises the need for a closer examination of how border control technologies and policies may perpetuate biases. This is especially true because bias risks being embedded and reinforced in PNR practices through the complex sociotechnical assemblage and in sophisticated, hidden ways that make it difficult to identify or to contest decisions.

Especially in South Africa, bodies marked by Race experience the border differently.[354] The concept of Race, in reference to PNR, cannot be understood through the American conception marked by a clear dichotomy of being white or not. This is not sufficient to capture how bodies interact with the South African[355] border or where issues of Race are far more complex; colonial history, tribalism, ethnic groups, colonial unification causing geographic difference, and religious divisions.[356] This is especially because of the continued prevalence of the Apartheid era racial classifications in the country that operate beyond the categorization of skin colour but also include elements such as ethnicity, language, and geography.[357] Bodies marked by Race in South Africa experience the border differently because PNR systems do not always account for the nuanced social realities and historic inequalities tied to identity or the biases held by human actors in the country – especially those known to be xenophobic. PNR systems rely on algorithms and risk profiling that may be more likely to treat individuals from certain racial or ethnic backgrounds as potential threats based on pre-existing biases embedded in PNR data and algorithms. Therefore, the South African experience of Race and border control is shaped by a far more intricate set of factors than what the American conception of Race can capture, making it inadequate to fully understand how these technologies might disproportionately affect populations interacting with the South African border – citizen or not.

[351] Anonymous, interview with author, Cape Town South Africa, December 13, 2022.
[352] Anonymous, interview with author, Cape Town South Africa, December 13, 2022
[353] Anonymous, interview with author, Cape Town South Africa, December 13, 2022
[354] Cf. This dissertation chapter 7
[355] This is not unique to South Africa. In general, an American understanding of Race is not sufficient.
[356] Cf. This dissertation chapter 7
[357] Cf. This dissertation chapter 7

PNR technologies, including those provided by SITA and UN goTravel, have no safeguards to protect against racial bias beyond the direct category. The introduction of these softwares, developed in the Global North with a very different history and experience of Race, risk exacerbating the inequalities that already exist in the region. This is particularly true when it comes to ease and speed of travel. Unless PNR technologies acknowledge the possibility of bias and the unique dynamics of Race in South Africa, PNR risks perpetuating harm in the name of national security.

Another compelling reason to be concerned about bias in the South African PNR regime is that this technology is proliferating; South Africa has invested in bordering states as well as in other states on the continent. This cross-border usage accentuates the importance of understanding the global implications of technologies. While the extent of South Africa's influence is currently undetermined, the case of South Africa shows the validity of examining the relationship between technology and the racialized experience to better understand the implications of technology. Understanding how technology, including PNR technology, intersects with marginalized populations enables a more complete understanding of how to prevent and mitigate racialized outcomes that emerge from their use. The desire to understand the consequence of these technologies is necessary if there is a desire to promote technologies that protect individual rights and freedoms.

5.3 Bodies as Data

As national borders increasingly operate through data, data allows for the border to be enacted and displaced from its territorial properties. Given that data is abstracted and processed separately to the physical body, the exact embodiment of technologies and how they operate in the materialization of bodies, and specifically Race, requires further attention. South Africa's obsession with documenting life has long been a form of technologizing bodies.[358] PNR acts first on data and then on the reconfigured bodies: this requires shifting attention exclusively from the physical body to the technical, social, and political sites that mutually materialize difference. The racialization of bodies, and the materialization of difference, in the case of PNR, occurs in an assemblage of which both human and non-human actants act. Simply, PNR algorithms complicate how the body is understood and reconfigured with data and how some bodies become marked by difference in the process. Data allows for a truth to be ascribed to a body, rather than a body claiming a truth. The fact that data moves the border transforms the materialization of

[358] Cf. This dissertation Chapter 4. Book of life, Nation Identity register, etc.

bodies.[359] The mobile body is now always a technologically readable body and part of technology itself.[360] For PNR to be designed and to operate, it needed data. This is to say that PNR is a technology that materializes bodies through determining what is true about them. Moreover, PNR is an assemblage of humans, technology, politics, law, and society that all entangle to produce claims of knowledge.

PNR seeks to render a body knowable. Decision making made through data fundamentally reshapes decision-making processes, transforming them into complex interactions between humans and data. Increasingly, technology and the body are always intertwined as opposed to being entirely separate. Rather, PNR[361] is always embodied,[362] and bodies are always technologized insofar as they are shaped by technology.[363] How Race becomes embedded in PNR is not just concerning knowledge (and knowing) or interaction, but both: ontological indeterminacy, which suggests that the boundaries and properties of bodies and technologies are not fixed but are instead created or enacted through practices that are material and discursive.[364] The connection between the body and PNR technology is not static but always emergent in particular contexts that are always changing.[365] Understanding PNR as a sociotechnical assemblage that interacts with bodies, encourages a focus on how the boundaries and properties of technology and the body emerge through specific material-discursive practices, rather than assuming stable or inherent distinctions between them.[366] In other words, the relationship between PNR and the mobile body is one that the relationship is contingent and performative rather than predetermined.[367] More than ever, "race is the kind of category about which no one is neutral": Race is a concept that has profound, material consequences.[368]

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[359] This is increasingly true when biometrics are considered. Borders become nowhere and everywhere. Truth is thought to come from within the body.
[360] Data collected by PNR systems will contribute to how PNR functions in the future. Further, PNR represents learning algorithms so the more data an algorithm processes, the smarted the algorithm becomes.
[361] As would a focus on other technologies. Cf. Josef Barla and Victoria Pitts-Taylor, "Technologies of Failure, Bodies of Resistance: Science, Technology, and the Mechanics of Materializing Marked Bodies," in *Mattering: Feminism, Science, and Materialism,* ed. Victoria Pitts-Taylor (New York: New York University Press, 2020), 159–172.
[362] They are always a part of the body.
[363] Not just PNR technology, but all technology.
[364] Barla and Pitts-Taylor, "Technologies of Failure."
[365] In the case of PNR, the more data that is acquired and the more human decision making is at 'risk,' means that PNR is always evolving and never static.
[366] Barla and Pitts-Taylor, "Technologies of Failure."
[367] Barla and Pitts-Taylor, "Technologies of Failure."
[368] Donna Haraway, *Modest_Witness@Second_Millennium.FemaleMan©_Meets_OncoMouse*™ (New York: Routledge, 1997).

5.4 In Way of a Conclusion

Successful PNR use relies on data classification. This is inherently political and risks enforcing prevailing values found in society. PNR algorithms turn data classification into productive infrastructures, making the invisible visible while contributing to the power of technology and making it increasingly ubiquitous.[369] The case of South African PNR is simply one example that illustrates how racialized bodies may be produced through material-discursive practices – practices that are not solely technological or technoscientific. The South African case shows that racialized bodies are not a natural phenomenon or purely social constructions but that racialized bodies are the effect of complex sociotechnical relations. The risk of racial bias in PNR shifts the risk of racialized bodies from being matters of concern to being matters of fact.

[369] Mirca Madianou, *Technocolonialism: When Technology for Good Is Harmful* (Cambridge: Polity Press, 2024).

Box 4: On the neutrality of PNR

Throughout this dissertation, there is a reference to the neutrality of PNR. Countries (such as South Africa) and International Institutions (specifically the ICAO and the UN) often fail to acknowledge that the processing of data is never neutral; it always reflects the technical, political, and institutional biases embedded in the systems that produce and govern it. A survey of UN and ICAO documents shows that PNR is only ever considered in terms of data standardization and security, addressing only technical integrity, privacy, and legal safeguards, but does not acknowledge any potential for racial, political, or structural bias in how data is processed or used. PNR is consistently presented as a technical mechanism designed to enhance security and streamline travel processes. While significant emphasis is placed on issues such as data transfer, storage protocols, and privacy protections, there is no recognition of how PNR systems may contribute to racialized outcomes or reinforce structural inequalities.

South Africa's approach mirrors global trends: PNR is framed as a neutral, technical tool for state security, with little to no acknowledgment of its deeper social or political implications. PNR in South Africa is framed in terms of international compliance (especially ICAO standards and obligations) and within border management and security (focusing on the prevention of terrorism and transnational crime).

There exists a substantial body of critical scholarship and civil society advocacy that has shown the risks of bias inherent in PNR systems. These inquiries reveal how, despite claims of neutrality, PNR data collection and processing can reproduce racialized and discriminatory outcomes, particularly through automated profiling, mobility control, and security practices.

- **Not hosted** by the UN (no access to API/PNR data);
- **Configured** in line with ICAO Standards, UN best practices, and Member States national legislation;
- **Users access** to sensitive data is restricted, and all actions are logged and require (legal) justification;
- **Oversight** by the National Data Protection Officer to ensure adherence to legal framework;
- **Data** masked and then deleted after the respective data retention periods in line with ICAO Standards, UN best practices, and Member States national legislation.

Cf. The 2024 UN goTravel Broacher. The document frames PNR as a counter terrorism tool and suggests that because sensitive data is restricted it is not bias.

The UN and ICAO frameworks emphasize that access to sensitive PNR data must be restricted, and legal justifications are required for data use. This language constructs an image of controlled, transparent data governance, reinforcing the perception that PNR systems are neutral. However, these safeguards are framed purely in procedural terms, with no consideration of how structural biases can still be reproduced, even within tightly regulated access environments. Limiting access does not prevent discriminatory outcomes-particularly when the design of PNR systems and their integration into broader security assemblages are still shaped by historical and geopolitical inequalities. As such, while not all airport discrimination is overtly or exclusively racial, Race often structures the underlying logic of mobility control, risk assessment, and surveillance.

Chapter 6: Colonial Code Models: A Material History of PNR in South Africa

6. Introduction

Passenger Name Records (PNR) have proven to be a powerful tool to manage mobile populations in Europe and North America.[370] However, the current PNR regime cannot be entirely understood without an explanation of the historical logics and practices that preceded the contemporary management of global mobility. South Africa has an extensive history of documentary state building,[371] which illustrates that neither the practices nor logic of PNR use are new but are in fact inherently connected to colonial state building and population management in the country.

The case of South Africa is beneficial to the study of PNR as a colonial legacy because population management practices in the country were first developed within a racialized context. The strict management of the South African border directly contributed to the development of 'whiteness' as an identity[372] and was developed to benefit those who already held a privileged position in the British Empire, namely, white Anglo Europeans. In other words, through an examination of the colonial legacies of population management, it is possible to demonstrate how PNR technology adopted and reinforced the racial tendencies of the empire and oppressed marginalized groups.

A study of South African management of global mobility from the formation of the Union to the end of the Apartheid era (1900–1994) provides a unique opportunity to understand not only the technical history but also the social implications of using PNR as a form of surveillance. The global study of PNR has thus far excluded the historical, technical, and political context from which it appeared, attributing it to a post-2001 security development. This chapter acknowledges the ways in which South Africa facilitated development of Race-based border management and how the contemporary use of PNR is situated within a specific historical social context. This is done by tracing the expansion and transition from maritime immigration to airborne immigration, demonstrating that current PNR practices and technology have a specific past related to racial border management. A failure to understand the original purpose and

[370] Kenneth Propp, "Avoiding the Next Transatlantic Security Crisis: The Looming Clash over Passenger Name Record Data," Atlantic Council, Issue Brief, July 1, 2021, http://www.jstor.org/stable/resrep33448; Didier Bigo and Stefan Salomon, "Passengers Name Records and Security," *Verfassungsblog*, no. 2366–7044 (2023).
[371] Cf. Breckenridge, *Biometric State*.
[372] Marilyn Lake and Henry Reynolds, *Drawing the Global Colour Line: White Men's Countries and the International Challenge of Racial Equality* (Cambridge: Cambridge University Press, 2008).

conditions of border management risks distorting the understanding of the contemporary use of PNR and the ways in which racial bias may continue to be embedded in its use.

PNR is approached as a practice that has always been an association and interaction between human (border agents, police, security professionals, etc.) and non-human (paperwork, infrastructure, technology etc.) actants that constitute the regime of population management. The practices and technologies that have assembled to form the contemporary PNR regime are situated in the historical practices of law (redrafting texts and negotiating practices), discussions, exercises, circulation, and the introduction and implementation of new technologies. The consequence of this is that the contemporary PNR regime – a highly technical project – cannot fully be distinguished from colonial-era developments and the paper-based technologies of population management. Since its inception in maritime immigration, PNR has been an expanding assemblage that mediates the governance of global mobility. Drawing primarily on archival records from South Africa,[373] it has been possible to trace the evolution of PNR in terms of both its logic and its practices. PNR has always been related to political motivations of class management at a bureaucratic level then 'translated'[374] into technical practices to fulfil the political motivations related to security and social concerns (internal security, migration, racial policy) entangled with technical developments.

6.1 Passenger Lists and Early Technopolitics

The management of mobility under the contemporary PNR regime in South Africa is an assemblage of historically situated technologies and practices. In fact, PNR has always been the product of heterogeneous actants and their entanglement in spaciotemporal social and political relations. Exploring passenger lists in colonial South Africa provides entry to understanding the social contexts, conceptual foundations, and the historical developments of modern PNR practices and technology.

Strict control of immigration was related to the need "to prevent the evils that must arise from an improper introduction of Strangers into [the] Colony."[375] In the case of colonial South Africa, any individual that did not bare whiteness (and until the formation of the Union in 1910, any individual who did not speak

[373] Cf. This dissertation chapter 2
[374] PNR, and security technology more generally, is always a negotiation between what technology is available and what governments want technology to do.
[375] Walter Harding, *Cape of Good Hope Government Proclamations from 1806 to 1825,* vol. 1 (Cape Town: A. S. Robertson, 1838), 11.

English) was considered to be a stranger, and therefore a threat to the colony.[376] As a result, there was a constant desire to categorize populations in order to exclude them.[377] The historical use of PNR represented a systematic and enduring form of restricted entry into the Union through the registration, surveillance, and control of those who would enter. Under the white minority government, the border became a site of enormous data-gathering[378] as this information allowed the colonial government to better understand and therefore control its population by creating a repository of data on mobile populations. Contemporary PNR use in South Africa developed within this racialized context where all non-white immigrants were accused of being uncivilized and therefore partook in subversive practices that were a threat to the colony, including "transmitting disease, undercutting wages, hoarding capital, fermenting crime waves, trafficking in illicit goods, spreading politically dangerous ideas and introducing deviant sexual mores."[379] The anti-alien sentiment that framed foreigners as a threat to the white colonial population was powerful in creating the legal and technical infrastructure to uphold racialized practices at the border.[380]

Passenger lists had been collected at all ports of entry in the territories that would constitute the Union of South Africa since 1846, but originally held little information beyond the dates, names, and ports of departure of passengers. As such, port agencies were required to make a decision of admissibility by trusting the passenger by their appearance and belongings as opposed to documentation.[381] By 1909, the logics of maritime immigration began to resemble contemporary PNR logics in their pre-emptive risk management of all passengers.[382] There was also a very clear effort by the South African government to establish a 'remote control' policy of stopping migrants before they reached the territory of South

[376] Interestingly, pre-Union, the British understood themselves to be "more civilized and culturally superior not only to Africans but also to Afrikaners…" of Dutch descent. Roger B. Beck, *The History of South Africa* (Westport, CT: Greenwood Press, 2000), 50.
[377] The first populations excluded were Asians and Coloured individuals, followed by poor Europeans, and then Africans North of the 22nd Parallel. Cf. Andrew MacDonald. "Forging the Frontiers: Travellers and Documents on the South Africa-Mozambique Border, 1890s–1940s," *Kronos* 40, no. 1 (2014), 154–177, https://www.jstor.org/stable/24341938.
[378] Pass laws in South Africa date back to 1709. Cf. Philip Frankel, "The Politics of Passes: Control and Change in South Africa," *The Journal of Modern African Studies* 17, no. 2 (1979): 199–217, http://www.jstor.org/stable/160715.
[379] MacDonald, "Forging the Frontiers."
[380] Early port control based on Race has been dated back to at least 1897 under British Rule in Durban. Cf. MacDonald, "Forging the Frontiers."
[381] During this period, the British wanted to populate their colonies with those that supported the British identity to help develop a *strong community.* Cf. Alan Lester, "Imperial Networks: Creating Identities in Nineteenth-Century South Africa and Britain," in *The New Imperial Histories Reader*, ed. Stephen Howe (London: Routledge, 2010), 139–146.
[382] Taplin, "South Africa's PNR Regime."

Africa.[383] By 1930, a visa requirement was already well established for those who sought entry into the country.[384] The visa could exclusively be obtained from consulates abroad before departure. Heavy fines were levied on those who brought migrants without the proper documentation; therefore, it became exceedingly difficult to obtain passage on a ship with South Africa as the destination without pre-departure authorization.

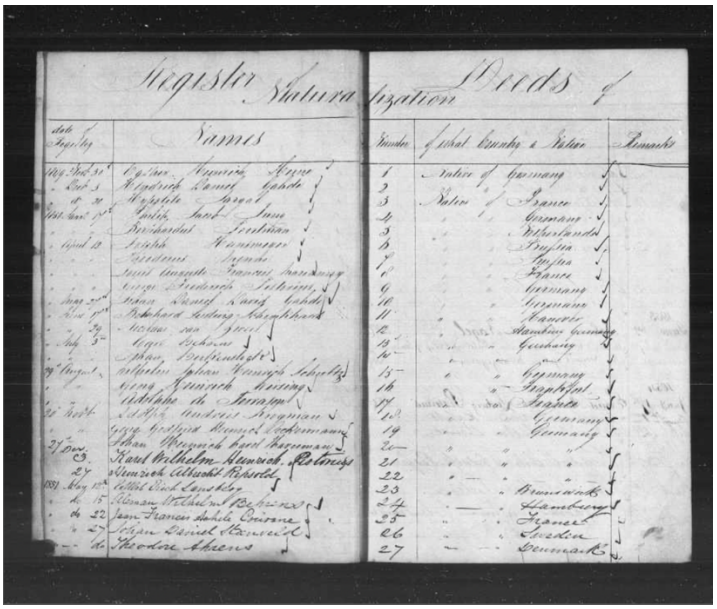
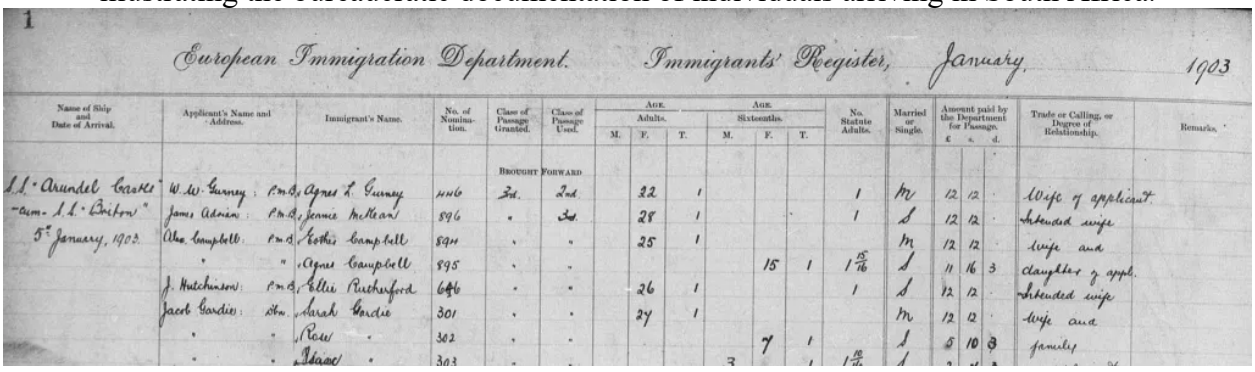


Figure 4: SAF 40–6–National Archives Depot Pietermaritzburg Natal – 1846-1883.
Description: A photographed page from a handwritten 19th-century register, listing names, dates, and countries of origin of Travelers. The entries record individuals from various European states—illustrating the bureaucratic documentation of individuals arriving in South Africa.



European Immigration Department. Immigrants' Register, January, 1903

Name of Ship and Date of Arrival.	Applicant's Name and Address.	Immigrant's Name.	No. of Nomination.	Class of Passage Granted.	Class of Passage Used.	Age. Adults. M.	F.	T.	Age. Sixteenths. M.	F.	T.	No. Statute Adults.	Married or Single.	Amount paid by the Department for Passage. £	s.	d.	Trade or Calling, or Degree of Relationship.	Remarks.
		BROUGHT FORWARD																
S.S. "Arundel Castle" -am- S.S. "Briton" 5th January, 1903.	W. W. Gurney	Agnes L. Gurney	1146	3rd.	2nd.		22	1				1	M	12	12		Wife of applicant.	
	James Adrian	Jessie McLean	896	"	3rd.		28	1				1	S	12	12		Intended wife	
	Alex. Campbell	Esther Campbell	894	"	"		25	1					M	12	12		Wife and	
	"	Agnes Campbell	895	"	"					15	1	1 15/16	S	11	16	3	daughter of appl.	
	J. Hutchinson	Ellen Rutherford	646	"	"		26	1				1	S	12	12		Intended wife	
	Jacob Gordie	Sarah Gordie	301	"	"		24	1					M	12	12		Wife and	
	"	Rose "	302	"	"					7	1		S	5	10	8	family	
	"	Adaire "	303	"	"				3		1	1 15/16	S					

Figure 5: Register of Immigrants (Assisted) for S.S. Arundel Castle, arriving January 1903, Natal.
Description: A page from the European Immigration Department's Immigrants Register (Arriving in South Africa) dated January 1903. The handwritten ledger records arriving immigrants, listing their ship of arrival, names, ages, marital status, class of passage, fees paid, and their relationship to the primary applicant. The increase in information from the previous century is clear.

[383] Andreas Fahrmeir, Olivier Faron, and Patrick Weil, eds., *Migration Control in the North Atlantic World: The Evolution of State Practices in Europe and the United States from the French Revolution to the Inter-War Period* (New York: Berghahn Books, 2003), 195–222.
[384] Cf. South Africa, *New Immigration Quota Act*, 1930

The practice of data collection and surveillance of those seeking entry into the Union began at gateways for maritime immigration into South Africa.[385] From 1910, every passenger that booked passage on ships destined to the Union was subject to a writing test, ideally applied in the home country before departure and[386] before embarking on the first port on their journey to South Africa.[387] Maritime ports in South Africa were strictly controlled, with the arrival of Europeans and African migrants alike being monitored and recorded in the records of the Department of the Interior.[388] By 1913, the modified *Aliens Act* institutionalized the use of passenger lists and passenger declaration forms. Notably, Passenger Records were required at each port of entry, a legal decision that led to an interconnectedness of geographically dispersed ports of entry, within South Africa, and at ports where ships were destined to South Africa.

The 1913 Immigration Regulations officially created the Department of Immigration in South Africa[389] and installed the criteria for entry into the country for all foreigners. This act also set the criteria for prohibited immigrants that would remain a key feature of the immigration department into the twenty-first century.[390] The failure to read or write in a European language would initially result in an individual being classified as a prohibited immigrant, however, the description was later expanded to include "any person or class of persons deemed by the Minister on economic grounds or on account of standards or habits of life to be unsuited to the requirements of the Union."[391] This specification on the class of a person enabled broad exclusion of groups of people, not only individual cases.[392] Decisions on entry were made by immigration officers at the port of entry, and by 1917, it was difficult for those considered prohibited to land at the ports of entry and gain access to the territory.[393] Permission to enter into South Africa was

[385] It is important to note that land borders were also developing strict immigration control. However, due to the length of the land border, the border remained porous.
[386] It is important to note that this is another way the category of Race, and the material structures, where connected, managed, and sustained beyond the South African national boundary.
[387] KAB/CCP *Records of the Cape Immigration Department,*1907, pg. 83. Cf. Immigration Acts of the Cape Colony (Act 47 of 1902 and Act 30 of 1906). After formation of the Union, the *Immigration Regulation Act* of 1913.
[388] MacDonald, "Forging the Frontiers."
[389] Sally Peberdy, "A Brief History of South African Immigration Policy," in *Transforming South African Migration and Immigration Policy*, ed. Jonathan Crush and Faranaaz Veriava (Cape Town: SAMP, 1998)
[390] Cf. Jonathan Crush and David A McDonald, "The Aliens Control Act of 1991," in "Introduction to Special Issue: Evaluating South African Immigration Policy after Apartheid," *Africa Today* 48, no. 3 (Fall 2001): 1–13, https://doi.org/10.2979/AFT.2001.48.3.1.
[391] Section 4(1)(a) of the *Immigrant Regulation Act*, No of 1913 (Act No 22 of 1913).
[392] Section 4(1)(a) of the *Immigrant Regulation Act*, No of 1913 (Act No 22 of 1913).
[393] MacDonald, "Forging the Frontiers."

almost exclusively determined by the perceived Race of the individual seeking entry. Further, every passenger was requested by:

> offices and agents in Europe to fill up and sign the Government Declaration form at the time of his booking, so that no passenger can now plead ignorance of the requirements of the Act. Formerly this declaration form was filled in by the passengers during the voyage, but, on the strong representations of the Immigration Authorities, our London Office agreed to the present system, although, seeing that we have some 2000 passenger agencies in Europe, it entails on the company a considerable expense and additional correspondence.[394]

A vessel arriving at the Port of Entry in South Africa was responsible for submitting a written report to the immigration officer at the port, which included the name and age of each passenger or other person on the vessel and any medical specificities.[395] This information was used by the Immigration Officer in decision making on admissibility and was used by the state for the risk management of mobile populations. Specifically, the state used the passenger lists to verify the identity of individuals entering the state, and ensured that the individual did not provide an economic, social, or health risk.

[394] KAB 2/2/2/43 – Minutes of Evidence Taken Before the Selection Committee on the Immigration Department - Cape Town, page 18.
[395] Insane, an idiot, epileptic, deaf and dumb, or dumb, blind or infirm, or suffering from any disease or injury known to exist by the Medical Officer of the ship. KAB 2/2/2/– page 18.

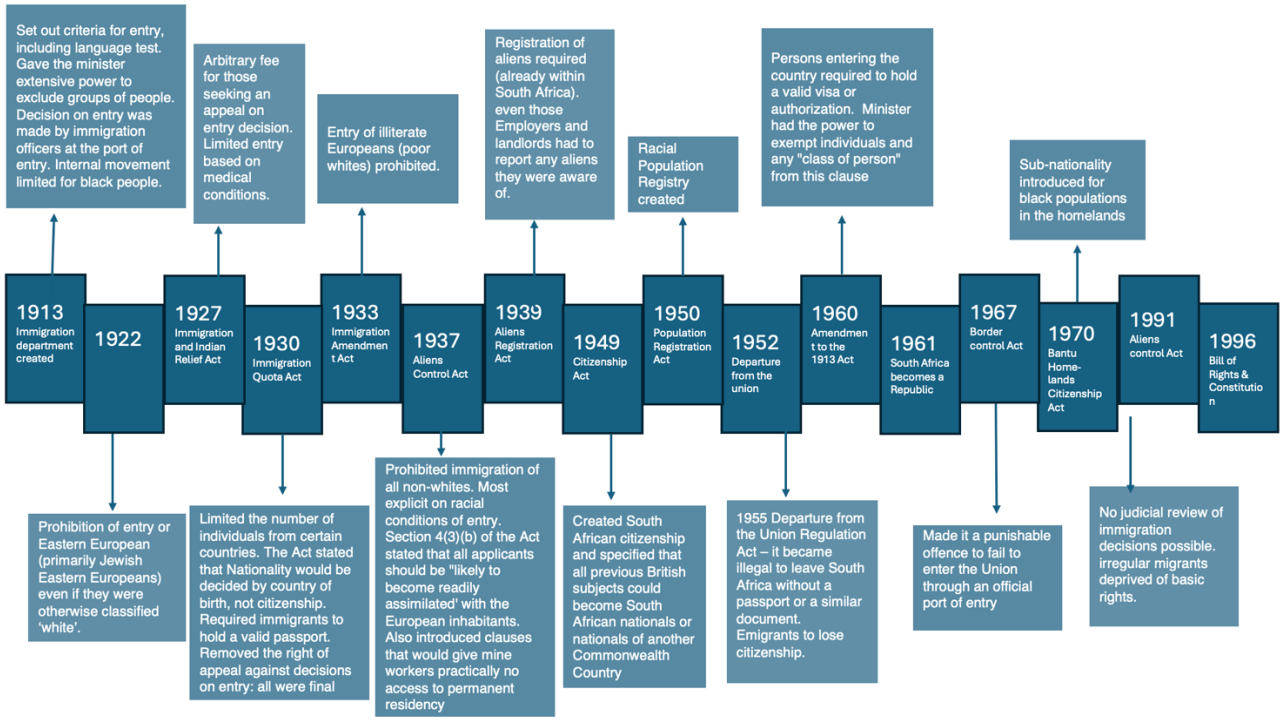


Figure 6: A history of South African immigration

Description: A timeline chart outlining key South African immigration laws from 1913 to 1996. Each legislative milestone is represented by a labelled block with a brief summary of its main provisions. The timeline highlights the increasingly racialized nature of immigration control—beginning with the 1913 Immigration Act and culminating in apartheid-era restrictions such as the 1937 Aliens Control Act, the 1950 Population Registration Act, and the 1967 Border Control Act—before ending with the post-apartheid reforms introduced by the 1996 Constitution. A full description can be found in Annex 3.

Passenger records provided formalities to manage mobile populations and mediate entrance to South Africa. However, surveillance of individuals at the border has never been uniformly applied to all passengers. There is considerable evidence to suggest that risk management of mobile populations was biased: notably, white Europeans who travelled in first class were not subject to the same immigration process and examination as the third-class passengers, as was noted by an immigration officer in 1907, "[b]ecause they are first class, and because they are paying a comparatively large sum for their passage."[396] Moreover, "it is only on very rare occasions that we come across any undesirable whites."[397] Passenger records provided the tools for social sorting and hierarchizing bodies through a system that was targeted

[396] KAB 2/2/2/43 – Minutes of Evidence Taken Before the Selection Committee on the Immigration Department - Cape Town, page 18
[397] SAB – M2 VOL 1 – 26. Transvaal Police.

at the control of specific populations. Simply, South Africa has long held a two-gate policy as it relates to immigration with a history of limiting immigration based on strict criteria related to racial and social prejudice.

Passenger records became connected to the way knowledge was produced and represented. The system of verifying identity and assessing risk is now inextricably connected to the internal operations of the South African society. There is a co-production where the governance of global mobility is connected to how knowledge is entangled in both technological and political practices; these political and societal concerns are embedded in the materiality of PNR as a technical system. The utility of passenger lists in the management of mobility in South Africa is demonstrated by the similarities between the information contained in historical Passenger Declaration and contemporary Passenger Name Record elements in the country.

Table 4: Comparison of Passenger Declaration (1913) and Passenger Name Record (2014)

Passenger Declaration – Immigration Regulation Act 1913	**Passenger Name Record – Immigration Regulation Act 2014**
Full Name	The first name and surname
Port of Embarkation	All travel itineraries for that specific passenger name record
Sex and marital status	Passport information including gender [martial status can be indicated in selected prefix Mr, Miss, Mrs…]
Age	Passport information including age
Birthplace	Passport information birthplace
Nationality	Passport information
Race	[Can be alluded to by passport image or through racial proxies such as postal codes]
If accompanied by wife and/or children	Other names on the passenger's name record
Last home address (in or outside of the Union)	The billing address
Period of previous residence in South Africa	
Proposed place of abode in the Union	
Occupation	[can be alluded to in prefix… Dr, Mrs, Mr,]
What European language can be written	
Have you previously been denied permission to enter/ deported from the Union	[in computer records]
Passport Number	Passport information including passport number
Place of passport issue	Passport information including place of issue
Date of issue	Passport information including date of issue
What means do you produce	All forms of payment information
Passenger class	The seat number and the ticketing field information

As noted, PNR in South Africa developed as an infrastructure of exclusion. There was an increased effort to tighten entry conditions at maritime gateways and a heavy reliance on identification of individuals based on identity documents.[398] Population management mirrored the South African state's ideology of who was civilized and who could contribute and maintain a specific identity of what social life ought to have been in South Africa. In understanding the foundations of PNR, it is important to note that South Africa "enforced a particularly virulent variety of paradigmatic Whiteness."[399] The development and use of PNR in South Africa was racist and was designed to systematically exclude non-white populations: mobility of the non-white populations was intensively surveilled and limited internally and externally.[400]

The data fields in contemporary PNR provide border agents with the necessary information to classify passengers and to verify identity. The limited change in required data shows the importance of understanding the historical context and shows that passenger records as a tool of surveillance developed in a specific context of the problematization of identity. The early collection of passenger name records represents one of the first times biographic information from all travellers was recorded, assessed for risk, and used to determine the right of passage: both data and documents were used to make a decision about a body.

Passenger records show how objects can facilitate networked relations between the state and mobile populations, and in many ways, reconfigured this networked space. With the introduction of new practices related to specific concerns of the South African State, the management of mobile populations was continuously reshaped. Paper documentation was central to the creation of the South African management of mobile populations and influenced the type of interventions that were possible by immigration officers on behalf of the state. PNR has always been a relationship between humans and non-human actants.

[398] Consider also the pass documents used in South Africa. Paper documents were used to prove identity, determine access to the Union, facilitate state control, and distribute rights to certain populations.
[399] Moses E. Ochonu, "South African Afrophobia in Local and Continental Contexts," *The Journal of Modern African Studies* 58, no. 4 (December 2020): 499–519, https://doi.org/10.1017/S0022278X20000543.
[400] Cf. This dissertation *Interlude on Race*

6.2 Passenger Lists and Aviation:[401] "White Man's Noisy Giant Bird"[402]

While contemporary PNR is a highly technical practice and reflects the realities of contemporary air travel, the information provided in 1913 is virtually the same as that provided a century later. The transition to include airborne immigration offers important insight into understanding the country's immigration policy and the regulation of passenger lists as a form of mobility management. South African aviation was considered advanced since its advent.[403] Aviation immigration was managed in the same way and by the same department as were the harbours,[404] meaning that the same biases and practices were implemented. It is important to note that in many ways aviation in South Africa reflected the project of colonialism; it was accessible to the elite, white population. In other words, the goals of PNR and mobility management did not change with the introduction of aviation; rather, the forms of population management that required control and surveillance changed.

Military aviation was formed in 1915 in South Africa.[405] By 1920, a Director of Air Services was appointed in the Union to create an independent air force from the military and formed the South African Air Force, making South African aviation the oldest in the British colonies.[406] Interestingly, the development of civil aviation in South Africa was strategically developed as a tool for colonial expansion.[407] The goals of commercial aviation were to ease communication on the continent between European colonies, to create and maintain loyalty and dependence to the Union of South Africa, and "to reinforce the sense of white community in probable conflict with nascent African nationalism."[408] By the 1930s, South African investment in aviation was justified by the possibility of protecting the white

[401] It is crucial to note that record keeping from this time is very sparse. At the end of the Apartheid, most technical records, and those related to security, were destroyed by the Apartheid regime. Cf. Verne Harriss, "'They Should Have Destroyed More': The Destruction of Public Records by the South African State in the Final Years of Apartheid, 1990–1994," in *Archives and Justice: A South African Perspective* (Chicago: Society of American Archivists), 305–336.
[402] Harry Klein, *Winged Courier* (Cape Town: Howard Timmins, 1955), 28.
[403] "Wherever I could, I studied aviation conditions and find that outside of the US none of the localities we visited are so advanced as South Africa." Letter to the Detroit Observatory, University of Michigan, July 1, 1931.
[404] Jonny Steinberg, "An Overview of South African Border Control: 1994–2004," Paper 103, Institute for Security Studies, April 2005, https://www.files.ethz.ch/isn/99202/103.pdf.
[405] Malcolm Abbott and Jill Bamforth, "Government Procurement Policy and the Establishment of Manufacturing: Aircraft Industry in Australia, Canada and South Africa 1918–39," *Journal of Transport History* 42, no. 1 (2021): 81–100. https://doi.org/10.1177/0022526620920789.
[406] Abbott and Bamforth, "Government Procurement Policy." Cf. David Becker, *On Wings of Eagles: South Africa's Military Aviation History* (Durban: Walker-Ramus, 1995); and David Becker, *The Eagles of Swartkop: South Africa's First Military Air Base* (Nelspruit: Freeworld Publications, 1996).
[407] Robert L. McCormack, "Man with a Mission: Oswald Pirow and South African Airways, 1933–1939," *The Journal of African History* 20, no. 4 (1979): 545, http://www.jstor.org/stable/181777. Cf. DFA, CGS Gp 2, Box 23.
[408] DFA, CGS Gp 2, Box 23.

populations against the native populations.[409] The development of civil aviation in South Africa was never a neutral endeavour, but one that reflected the larger racial politics in the country.

Civil aviation followed all the same immigration procedures as maritime travel.[410] Immigration officers were required to assess the admissibility of passengers based on their declarations under both immigration law and customs law.[411] Passengers were required to complete a general declaration that allowed immigration officers to determine the admissibility of those individuals arriving to South Africa by air. In fact, the 1936 Air Navigation Regulations, Chapter XVIII, strictly states that the I*mmigration Act 1913* and the *Immigration Quota Act 1930*[412] would apply in the same way to those arriving or departing the Union by air as if they were by sea.[413]

Table 5: Comparison of General Declaration (1946) and Passenger Name Record (2014)

General Declaration 1946	**Passenger Name Record – Immigration Regulation Act 2014**
Operator	Shown on passenger record
Date	Shown on passenger record
Departure airport	Shown on passenger record
Departure date	Shown on passenger record
Flight number	Shown on passenger record
Point of landing	Shown on passenger record
Full name	Full name
Permanent address	The billing address
Nationality	Passport information including nationality
Age	Passport information including age
Sex	Passport information including gender
Passport number	Passport information including passport information
Number of bags	The bag tag numbers; the number of bags

Despite already requiring passenger lists to be submitted upon arrival in South Africa (since the *Immigration Regulations of 1913*), in 1946 the practice was institutionalized when South Africa signed the International Civil Aviation Association (ICAO) Chicago Convention, Chapter V, Article 29, stating that every aircraft must contain a list of passenger names, place of embarkation, and destination. By 1947, South Africa sought to implement pre-emptive risk management in aviation by stationing Union customs

[409] DFA, CGS Gp 2, Box 62, Minutes of the 295th meeting of the Committee of Imperial Defence, 24th July 1933, page 2.
[410] 19/178/ 74 – 27 October 1932.
[411] 19/178.74 – M400 – 24, October 1932.
[412] This act formed the foundation of the 1937 *Aliens Act*. It took away the right of appeal regarding decisions of the Immigrants Selection Board.
[413] BNS 12/74 Vol 3 – 450.

officers outside of South Africa.[414] However, the commissioner at the time stated that "stationing of Union customs officers at airports beyond the borders of the union is not justified by [the] volume and frequency of traffic and would be complicated by the different duties and stopping places used by the various international airlines."[415] This shows early similarities to contemporary PNR logic wherein the majority of passenger sorting occurs before arrival in the physical territory of the state.[416]

The use of PNR in aviation in the pre-computer era helps demonstrate not only the bureaucratic practices of identity verification but also of surveillance. The use of passenger records for security purposes pre-dates computerized technology, but in all accounts provides the structures and conditions for the development of technologized practices. Passenger data was used to create risk assessments on an alien and the body was made readable by this data. While contemporary PNR is a machine-readable form of identity management, paper-based identity verification has impacted the technical imagination of computerized forms of population management.

[414] SAB-DEA – A12/5 – vol 2 – 229.
[415] SAB-DEA – A12/5 – vol 2 – 229.
[416] Taplin, "South Africa's PNR Regime."

Box 5: Technology, Mining, and Commercial Aviation

There is a direct relationship between contemporary PNR and colonial state-driven population registration. The relationship between aviation and mining has two notable points: first, the same technology that IBM used for early computerized PNR was used by mining companies in order to blacklist mine workers. The connection between mining and commercial aviation mirrors contemporary surveillance that is assisted by computerized social sorting and demonstrates that technology does not have an effect on the management of mobile populations on their own.

The South African population that had access to commercial aviation was strictly controlled until the end of the Apartheid. However, by the 1950s there was a requirement to begin a "coercive system of labour mobilisation, control and surveillance" of cheap migrant labour from neighbouring countries.[1] In 1951, flights were organized by the Witwatersrand Native Labour Association to airlift mine employees from Blantyre to Johannesburg.[2] The Labour Association effectively controlled the migration flow of labourer populations from neighbouring countries. The intention was to control the migrant population and ensure their return to their home country (and not overstay in South Africa). This forced mobility control represented a unique form of surveillance: the organized flights represented a new addition to the bureaucratic and physical control of the migrant's mobility.

Miners boarding flight to South Africa. Source: South African Airways Museum

Description: A group of miners stand in line to board a propeller plane on a rural runway. The scene reflects mid-20th-century labor migration to South Africa.

IBM supplied the computers and instruction for holding biometric information (including fingerprints) of mine workers and facilitated how to utilize the systems to monitor and track individuals. The purpose of this system was to provide expedited identification of populations. This gave the South African state control of migrants by way of controlling their migration to South Africa, the ability to track those within the state (specifically, those who broke contracts of employments), and instant access to the personal information of all mine workers.[3] Further, the development of computerized technologies by the 1980s made it possible to create 'blacklisting' of native labourers by the National Union of Mineworkers.[4] The 'blacklists' operated with remarkable similarity to 'no-fly lists,' allowing authorities (including the mine operators) to identify an individual as undesirable and have it marked on their digital file. The status of being 'undesirable' would remain on their file and appear when their file was searched (name, identity number, or fingerprint) by the state or mining authority. As such, the status of being undesirable was not limited to South African citizens or a specific geographic location within the state.

[1]Jonathan Crush, "Power and Surveillance on the South African Gold Mines," *Journal of Southern African Studies* 18, no. 4 (1992): 827, https://doi.org/10.1080/03057079208708340.
[2]UJ WNLA Unsorted, "History of Wenela Air Services," *Teba Times*, No. 2 (1977).
[3] Crush, "Power and Surveliance."
[4] UJ WNLA Unsorted, "History."

6.3 Computers, Population Management, and the Apartheid Regime

Contemporary PNR regimes use a highly technical practice of "collecting and analysing passenger data and processing it through algorithms as well as cross checking it with national and international databases."[417] The computerized practice of surveillance and social sorting central to the logic of contemporary PNR emerged in South Africa in the mid-1960s[418] when the state institutionalized the use of computers to improve the monitoring of its populations.[419] IBM computer services in South Africa facilitated a move from paper-based PNR to a computerized one that supported ambitions of the predictive policing of mobile populations.[420] The inclusion of computerized systems in passenger management emerged from the conditions set under paper-based systems and proliferates the need to understand the relationship between scientific and political sites as well as social and material actants. It is important to explicitly note that the 1970s immigration system was still based on the 1913 *Immigration Act*. The information collected in PNR remained nearly identical to that of 1913, but the practices available to sort these populations grew more sophisticated with the incorporation of computerized technology: computers allowed a larger scale of social sorting and increased speed and effectiveness. However, the populations which the government of South Africa considered desirable and undesirable did not change significantly.[421]

The transformation to computerized immigration management in South Africa is not explicitly clear. Immigration policy during the Apartheid was racialized with heavy control and surveillance of immigrants in the country.[422] Apartheid, at its core, was a technological project[423] that was built on the premise of inequality between 'developed' European whites and the uncivilized 'native populations.'[424] Such logic underpinned the Apartheid policies of social control suggesting that the introduction of new technologies during this period reinforced logics of the racial management of mobility. Political imaginations shaped

[417] Taplin, "South Africa's PNR Regime."
[418] ICAO began managing machine-readable passenger documents in 1968 with the establishment of the Air Transport Committee of the Council, of a Panel on Passport Cards. Cf. International Civil Aviation Organization (ICAO), *Machine Readable Travel Documents: Doc 9303, Part 1 – Introduction,* 8th ed. (Montreal: International Civil Aviation Organization, 2021), https://www.icao.int/publications/Documents/9303_p1_cons_en.pdf.
[419] Cf. Keith Breckenridge, "The Book of Life: The South African Population Register and the Invention of Racial Descent, 1950–1980," *Kronos*, no. 40 (November 2014), 225–240.
[420]Michael Kwet, "Surveillance in South Africa: From Skin Branding to Digital Colonialism," in *The Cambridge Handbook of Race and Surveillance*, ed. Michael Kwet (Cambridge University Press, 2023), 97–122.
[421] Cf. Milazzo, *Colorblind Tools*, 262.
[422] *Aliens Registration Act* 1939.
[423] Cf. 1950 *Population Registration Act*.
[424] Edwards and Hecht, "History and the Technopolitics of Identity."

the infrastructure and the technology was developed to process mobile populations on a large-scale as well as the construction of standards and practices of categorization of populations based on what the South African state had envisioned as the ideal subject to be governed.[425] However, this management of populations has always been a nexus between what the state requires and what technology permits; PNR shows that there is always a co-production of technological and social order.

When considering the development of PNR practices with the assistance of computerized technology it is important to emphasize that the populations that these technologies were implemented to control were specifically undesirable populations – and in the case of South Africa – non-white populations. The immigration system based on the exclusion of non-white populations was imperative to the maintenance of the Apartheid state and was a tool to manage mobile populations internally and externally. Technopolitics were used by the South African state to articulate and maintain the South African identity and expanded the apparatus of power of the Apartheid government in determining who was included and excluded in the state.

IBM was the largest computer supplier to South Africa during the Apartheid era.[426] These computers stored, and made retrievable, the personal information of more than 16 million individuals that helped maintain and administer the Apartheid state through the Book of Life project[427] (a surveillance project that included the entire population of South Africa being categorized as black, colored, Indian, or white).[428] As noted previously, each individual in South Africa was required to carry a pass, akin to an internal passport, that would include an identity number, biometric information (including Race classification and citizenship), marital status, education, health information, and permits to leave the country and the date of departure and return to South Africa – all facilitated by IBM computers.[429] This technology made the automation of the South African population possible: categorizing, segregating, and denationalizing native

[425] Cf. Bowker and Star, *Sorting Things Out.*
[426] AllAfrica. "South Africa: IBM, ICL Accused of Apartheid Collaboration." 14 November 2002. https://allafrica.com/stories/200211150560.html
[427] It is important to note that the South African management of native populations was used as a reference elsewhere in the world. South Africa is recognized for informing the Canadian government on the management of Indigenous populations and both countries embraced IBM computer technology in the process. The implementation of pass laws in South Africa served as a model for controlling movement based on identity, influencing similar practices in other colonial contexts. The logic behind pass laws – limiting mobility based on Race and perceived security risks – was later echoed in contemporary visa regimes, border management systems, and risk-based traveller assessments globally. Cf. "Pass System in Canada," *The Canadian Encyclopedia*, https://www.thecanadianencyclopedia.ca/en/article/pass-system-in-canada.
[428] Cf. Breckenridge, "The Book of Life."
[429] American Committee on Africa, "I.B.M. in South Africa," Fact Sheet, November 1971, http://kora.matrix.msu.edu/files/50/304/32-130-DA5-84-al.sff.document.acoa001004.pdf.

populations.[430] This is significant because IBM also built the first computerized PNR system for commercial aviation – Sabre.[431] Sabre was originally heavily invested in by American Airlines, and allowed travel agents real-time access to information related to flights. Today, Sabre works with 225 airlines and 700 other customers, and it is described as a data-driven solution for the travel industry.[432] Sabre provides a range of services related to software and data specifically for airlines, including management of airline reservation systems.[433] While it is unclear exactly when the partnership between Sabre and South Africa began, it was during the Apartheid era and it is difficult to ignore the legacy of the relationship between IBM and the Apartheid management. Simply, if IBM computers could facilitate the large-scale management of populations within South Africa (internal population management), it was capable of facilitating a similar racial function at the South African border.

The first recorded use of IBM computers for commercial airlines in South Africa was in 1971 by South African Airways. The SAAFARI system was a fully automated reservation system that connected all South African cities with a centralized computer system in Johannesburg.[434] This provided instant access to information related to all passenger bookings. The centralization is of interest because by 1974 all passenger lists were forwarded to one of three immigration offices located in Pretoria, the Orange Free State, or Cape Town.

IBM was instrumental in supporting PNR and the Apartheid government's racialized immigration policy. South African Airways was one of the first African national airlines in 1934,[435] and would spend $8.4 million on a "new fully automated, integrated passenger reservations and message-switching system."[436] This system became operational in 1971 and connected all South African cities (as well as New York and Rio), providing instant passenger information. IBM technology brought new capacity to the Apartheid state as well as a new network of instantaneous information. Beyond the material novelty of these computerized systems, they introduced a new way of knowing and of knowledge acquisition on mobile

[430]Michael Kwet, "The Apartheid in the Shadows: The USA, IBM, and South Africa's Digital Police State," *CounterPunch*, May 3, 2017, https://www.counterpunch.org/2017/05/03/apartheid-in-the-shadows-the-usa-ibm-and-south-africas-digital-police-state/.
[431] Sabre Corporation, "Sabre History," accessed March 15, 2018, https://www.sabre.com/files/Sabre-History.pdf.
[432] Sabre Corporation, "Airline Solutions," accessed March 15, 2018, https://www.sabre.com/our-businesses/sabre-airline-solutions/.
[433] Sabre Corporation, "Airline Solutions."
[434] American Committee on Africa, "I.B.M. in South Africa."
[435] Northwestern Libraries, "Independence in the Air: African Aviation in the 1960s," accessed March 1, 2025, https://sites.northwestern.edu/independenceintheair/.
[436] American Committee on Africa, "I.B.M. in South Africa."

populations. Further, the social and political concerns that formed the basis for risk management of mobile populations influenced the development of computerized infrastructure.

PNR as a technological infrastructure in South Africa contained many elements of population classification that were both visible and not; as the process continued to be computerized, the elements of data connection and assessments on an individual's desirability became increasingly invisible. The introduction of technology allowed for the continuation and intensification of the "infrastructure of exclusion."[437] Despite knowing that the Apartheid government was a racist state, the invisibility of the PNR infrastructure made the visualization of this infrastructure difficult. Decades of classification of populations and ideologies relating to hierarchies of populations became deeply embedded into the working infrastructure of PNR, making it is easy to see how racial prejudice could become 'black boxed' as bias became both powerful and more difficult to identify. Simply, PNR developed and became technologized through decades of a racialized documentary system of absolute surveillance of mobile populations.

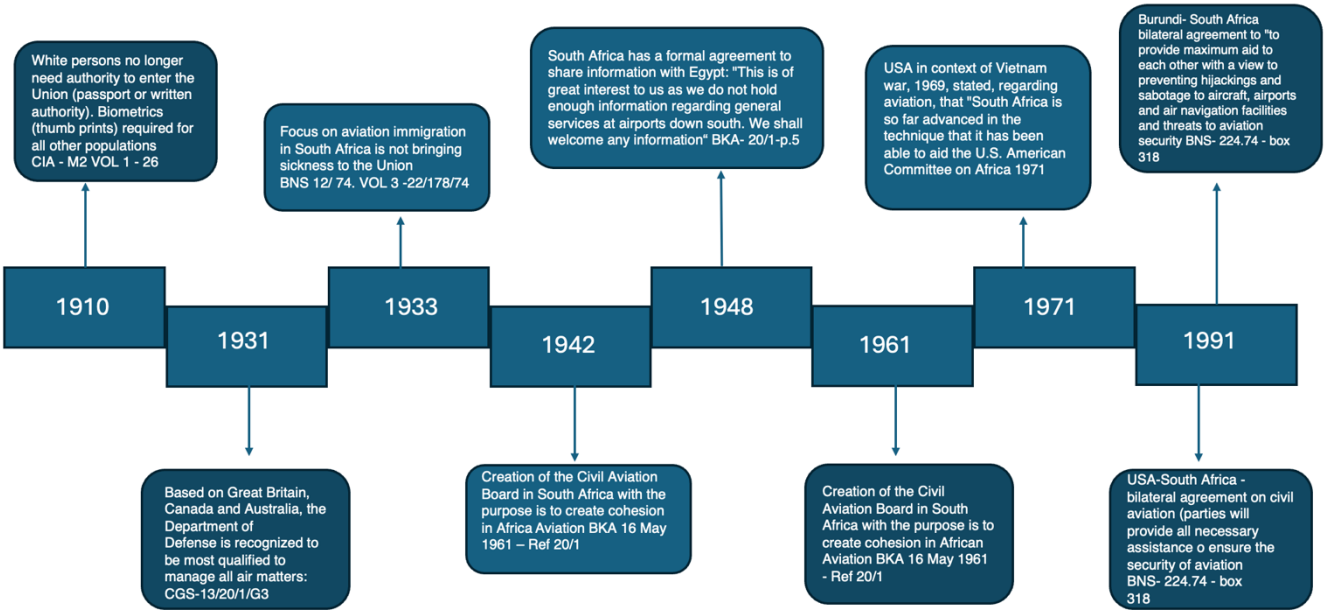


Figure 7: Circulation of aviation practices

Description: A timeline tracing how South Africa developed and adopted aviation practices between 1910 and 1991. It highlights the racialized regulation of mobility—such as early biometric requirements for non-white travelers—as well as the growing influence of British,

[437] MacDonald, "Forging the Frontiers."

Canadian, American, and later African models on South African aviation governance. The figure also shows the emergence of international cooperation, including information-sharing agreements and bilateral aviation security arrangements aimed at preventing hijacking and safeguarding airports and air navigation systems. A full description can be found in Annex 5.

6.4 Conclusion

Many of the techniques originally used under the Apartheid government persist as remnants within the contemporary border security regime. Specifically, the use of the technology providers IBM and Sabre. South Africa's historical use of these technologies accentuates the continued circulation of surveillance expertise between the Global South and Global North, and how colonial and racialized approaches to mobility control may be embedded in contemporary systems. This is significant because the precursors of contemporary PNR emerged in South Africa during a period when racism was central to the idea of national sovereignty, and because the technological infrastructure of the Apartheid regime was also based on racial hierarchies. Modern technological practices of population management did not change the logics present under colonial rule; rather, they reinforced them. This is especially important because computer security experts note that what poses the most risk with sophisticated PNR technology and computing is "not new biases but [the] biases we have always had."[438]

A historical examination of PNR reveals how the coordination of immigration and the control of mobile populations have been achieved through historically complex technopolitical practices. The early appearance of passenger name records by colonial governments suggests that modern PNR practices can be traced back to the colonial context, especially given the consistency in required data fields. Passenger lists have facilitated the control of mobility in South Africa, making it possible in many ways, while also influencing the technological direction that led to the development of the physical infrastructure of the contemporary PNR regime. Contemporary collection of PNR data and no-fly lists reflect similar logics of pre-emptive risk management and threat detection as was practised in colonial and Apartheid South Africa. Understanding the historical roots of PNR in South Africa helps to engage with the geopolitically situated question of Race and the ways in which knowledge production related to surveillance is intertwined with colonialism and Race.

The Apartheid itself was a technopolitical project involving technologies for surveillance and control. The post-Apartheid state has continued to use similar techniques as those of the colonial and Apartheid eras to

[438] Computer scientist working on AI automation, interview with author, Ottawa, Ontario, April 23, 2022.

prohibit certain foreigners from entering the Union.[439] As such, it is necessary to consider the histories and methodological tools developed within a racial context. Focusing on the historical relationship between PNR and Race helps identify how the racist infrastructure has been naturalized over time and has long been a structure that forcibly marginalizes and surveils certain populations. This chapter contributes to the field by emphasizing the need to understand technology not only in its contemporary setting but also through the historical technoscience that preceded it. Tracing the historical roots of PNR reveals the variety of actors and historical uses that have shaped contemporary PNR practices, and illustrations how the contemporary South African regime continues to function, socially and politically.

[439] Loren Landau, "Loving the Alien? Citizenship, Law, and the Future in South Africa's Demonic Society," *African Affairs* 109, no. 435 (2010): 221, https://doi.org/10.1093/afraf/adq002.

Chapter 7: PNR as a Sociotechnical Assemblage

7. Background

Despite the institutionalization of PNR in South Africa for more than a century,[440] the contemporary PNR regime established in South African aviation is constituted of, and constituted in, the process of increased digitalization of border security. The data of mobile populations is extracted and used by the state to produce knowledge and risk assessments that are then used to govern mobile populations and international mobility. The contemporary PNR regime is dependent on immense digital data that, through sophisticated algorithmic technology, is used to expose and represent identities[441] and therefore the intentions of mobile populations[442] interacting with the South African border. The data collected in PNR for security purposes is collated, stored, analyzed, updated, and used by authorized personnel,[443] and is trusted to generate truth and knowledge on risk associated with mobile subjects. PNR use globally is part of the data-driven effort to assign risk to mobile populations and is central to the effort to "sort out threatening elements, hamper the travels of poor, racialized, and alienated subjects" while also facilitating the ease of low-risk trusted travellers.[444] However, to understand how Race may become embedded in the practice of PNR use it is necessary to examine the infrastructure of the South African PNR regime as a sociotechnical assemblage of heterogenous actants. The association of these actants permit the South African PNR regime to act as a powerful technical system that supports security and the governance of mobile populations.

This chapter is attentive to the fact that sociotechnical systems emerge from specific sociopolitical contexts and, as such, tend to reflect and risk reproducing inequalities that already exist in the society in which they emerge, resulting in a situation where these sociotechnical assemblages often "exceed or escape the intentions of system designers."[445] This is particularly important in the case of South Africa because its PNR regime was originally implemented by a racist Apartheid government to control the movement of mobile populations. Focusing on the technical system provides the necessary foundation to present the sociotechnical reality of South Africa's PNR regime as inherently entangled with Race.

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[440] Technologized for at least four decades. See this dissertation chapter 6.
[441] Populations are determined to pose or not pose a risk to South African security and the South African state.
[442] Including citizens, tourists, migrants, criminals, refuges, and so on.
[443] Specifically, immigration agents, aviation personnel (specifically those at airline gates for flights within, destined to, or embarking from South Africa), police, international security agencies such as INTERPOL, and state officials.
[444] Georgios Glouftsios, *Engineering Digitised Borders: Designing and Managing the Visa Information System* Singapore: Palgrave Macmillan, 2021), 2. .
[445] Frank I. Müller and Matthew Aaron Richmond, "The Technopolitics of Security: Agency, Temporality, Sovereignty," *Security Dialogue* 54, no. 1 (2023): 3, https://doi.org/10.1177/09670106221141373.

This chapter will demonstrate that there is sufficient reason to suggest that Race is embedded in the design of the algorithms that support South African PNR, and thus, there is a risk of automating the racialization of mobile populations. Further, this chapter shows how Race is already embedded in PNR in ways that exceed human intentionality. As advanced algorithms increasingly enable pre-emptive data-driven risk analysis, there is a necessity to examine the black boxed and undetectable ways in which Race is embedded into algorithmic decision-making practices. This chapter proceeds in three steps: First, PNR is introduced as a sociotechnical assemblage. This is necessary to explore the ways in which PNR algorithmic tools have been created, advanced, and deployed to improve border management and, most importantly, decision making at the border. Second, South African PNR use is examined in terms of its output and known consequences. Third, the design of South Africa's PNR algorithm is considered in order to determine if Race could be more deeply embedded in algorithms than typically acknowledged. This chapter concludes by proposing that PNR should be considered a racializing assemblage that provides a unique material condition of possibility for the management of mobile populations: PNR is an infrastructure that, beyond human intentionality, ascribes and marks certain bodies with Race. This racialization is made possible through algorithmic infrastructures that are a sociotechnical assemblage.

7.1 PNR as a Sociotechnical Assemblage[446]

PNR is rooted in the global practice of intense digitalization of borders and border security. While the South African PNR system was originally deployed at marine ports of entry, contemporary mobility is heavily aviation based. The 1980s saw the introduction of PNR in aviation and has been increasingly technologized since. However, the international implementation of PNR for security purposes most frequently recognizes PNR as used and implemented by airlines for commercial purposes.[447] Regardless of its origin, PNR data has been collected in South Africa by Customs and Excise since the early 2000s[448] for security purposes. The PNR information collected by South Africa includes:

> (a) the date of reservation; (b) the dates of intended travel; (c) the first name and surname; (d) other names on the passenger name record; (e) all forms of payment information; (f) the billing address; (g) the contact telephone numbers; (h) all travel itineraries for that specific passenger name record; (i) the

[446] This is a reiteration of PNR as presented in this dissertation, chapter 1.
[447] Taplin, "South Africa's PNR."
[448] This will be expanded upon in this dissertation chapter 8 and 9

> frequent flyer information, limited to miles flown and addresses; (j) the travel agency; (k) the travel agent; (l) the split or divided passenger name record information; (m) the ticketing field information; (n) the ticket number; (o) the seat number; (p) the date of ticket issuance; (q) no show history; (r) the bag tag numbers; (s) the number of bags; (t) the record locator; (u) the weight of the bags; (v) the no show information; (w) the seat information; (x) whether the tickets are one-way tickets; (y) any information collected as contemplated in subregulation (2); (z) standby; and (aa) names of passengers who have been taken off the flight.[449]

In South Africa, PNR must be submitted with API data (biological data found on a government issued document page):

> (a) family and give names; (b) date of birth; (c) sex; (d) travel document type; (e) nationality; (f) travel document number; (g) issuing state; (h) expiry date; (i) passenger or crew indicator; (j) flight/vessel identification; (k) direction, whether in bound or outbound; (l) port of departure or arrival port in the Republic; (m) date of departure from or arrival in the Republic; and (n) time of departure from or arrival in the Republic.[450]

API and PNR are collected at once under the title of Advanced Passenger Processing (APP). The information collected by PNR facilitates the automated processing of passengers and allows for a risk assessment to be assigned to all mobile populations destined to, or departing from, South Africa. However, the reality is that officials in South Africa have kept PNR out of public discussion, and thus it remains an "invisible setup of data collection for risk governance."[451] However, only 10 percent of customs functions are performed on South African territory;[452] the majority of customs functions are performed pre- and post-border, outside of the physical territory of South Africa.[453] The use of PNR for risk analysis falls under this category of activities that are detached from the physical territory of the state; that is to say, the pre-examination of passengers takes place before they reach South African territory. South African PNR fits in the global trend of border security that operates on an individual's data (as opposed to the material body) and is as much a tool of surveillance as it is a tool of projection.[454]

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[449] South Africa, Government Gazette 37679, *Immigration Act, 2002*.
[450] South Africa, Government Gazette 37679, *Immigration Act, 2002*.
[451] Leese, "On Security, Once More," 68.
[452] South Africa, *Summary of the Customs Value Chain and the Proposed Role for the BMA*, Department of Home Affairs, Confidential, 23 September 2016, pmg.org.za/files/161018OVERVIEW_OF_THE_SARS_CUSTOMS.docx.
[453] South Africa, *Summary of the Customs Value Chain and the Proposed Role for the BMA*.
[454] Amoore, "Politics of Possibility."

It is important to note that although intended as a tool to facilitate commercial air travel, "PNR are mainly used as a criminal intelligence tool rather than as an identity verification tool."[455] PNR sorts mobile population risk while also cross-checking personal data against specific information such as addresses, credit cards, and local and international no fly lists. PNR is fundamentally related to border security and the management of mobile populations and is part of the "'laboratized' borders"[456] because the technoscientific practices involved in designing the system impacts the decisions that are made at the border. Increasingly, the past four decades in South Africa, have seen computerized infrastructure that refines the process of generating, storing, profiling, and communicating information on mobile populations.

7.2 Using PNR Data

Technology enables the projection of surveillance beyond the physical border in terms of security infrastructure and law enforcement and now blurs the distinction between internal and external security. PNR technology[457] then transforms passengers' personal data into a means to identify threats, particularly of the transnational nature, and represents a source of knowledge creation. The use of PNR is characterized by its pre-emptive and real-time risk management and is used to add to and create new criteria for risk assessment, "establishing the prerequisites for making sense of large amounts of information via algorithmic exploitation and the data-driven creation of profiles as temporary hypotheses."[458] As such, PNR is designed to anticipate, and is embedded with, a wide-range of generalized security rationales and potentialities.

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[455] Eur-Lex, "Communication From The Commission on the global approach to transfers of Passenger Name Record (PNR) data to third countries, COM/2010/0492 final, http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52010DC0492.
[456] Glouftsios, *Engineering Digitised Borders,* 27.
[457] The specific technology – computer and cloud infrastructure – is not disclosed. However, it is assumed to be advanced and suitable to process and transfer large amounts of data. The original copy of the PNR is stored on the CRS, and both airlines and the government can access the PNR from the CRS/GDS. Regardless, it is the CRS as opposed to the airline that forwards PNR data to the state. Given the number of actors involved with PNR, identifying where PNR data and CRSs are physically located is difficult. There are currently four major GDSs, which are Amadeus, Galileo, Sabre, and Worldspan. The various airlines in South Africa use Amadeus and Sabre, as well as lesser-known GDSs called AeroCRS and KIU. All of these platforms collect personal data that may be used for services, site management, and marketing purposes. Although each CRS/GDS has regulations on the use of personal data and data protection, there is no evidence of oversight. Thus, it is not clear how these private companies use the data or protect it, especially as the boundaries have become blurred between the public and private entities that influence and perhaps have access to South Africa's PNR records. It is important to note that while international institutions such as the G8, UN, INTERPOL, IATA, and ICAO contribute to setting international norms related to airport security and contribute to the justification of the South Africa PNR regime, they do not necessarily have access to PNR data.
[458] Leese, "The New Profiling," 495.

Data-driven analytics such as PNR algorithms attempt to identify the (rational) unknown, compared to previous methods of profiling, which required more tangible knowledge about individuals possibly involved in terrorism and serious crime.[459] This means that with each passenger processed, the database 'gets smarter' in terms of categorizing individuals as 'safe' and those who may pose a 'risk,' because:

> The larger the database, the better the chances of detecting patterns that reveal correlations between individual characteristics and consumer behavior – allowing for targeted advertising, custom-tailored services, and individual offers.[460]

As previously mentioned, algorithms can be used to find significance in PNR data, which is rationalized by the "law of large numbers."[461] PNR data then becomes very useful for security screening purposes through the mining of large databases to identify possible threats based on statistics.[462] It is significant that PNRs are used not only to identify known threats, but also potential threats. The use of data mining allows for the identification of those who are statistically more likely to be terrorist or criminals, or to become one in the future.[463] Essentially, PNR data can be used to create groups with shared characteristics that are viewed as a potential security threat, and this can lead to some individuals being wrongly categorized for sharing some of these characteristics.

PNR is understood as a complex sociotechnical assemblage and looks at how technologies 'act' in a way that may appear to be autonomous, but which are not. While PNR can exceed human intentionality, it remains that it cannot operate without a complex network of human and technical elements. PNR software must be developed, implemented, maintained (and updated), and acted on by humans: thus, PNR is not autonomous but rather acts with and alongside humans in a heterogeneous network of actants, or in other words, a sociotechnical assemblage.[464] In terms of PNR, "humans and technologies enable each other in

[459] Leese, "The New Profiling," 506.
[460] Leese, "The New Profiling," 502.
[461] Leese, "The New Profiling."
[462] Douwe Korff and Marie Georges, *Passenger Name Records, Data Mining & Data Protection: The Need for Strong Safeguards* (Strasbourg, France: Council of Europe, Directorate General of Human Rights and Rule of Law, 2015).
[463] There have been several cases in the media that have identified that South Africa has refused entry of some individuals into the country because of cross-checks with the INTERPOL database, or, in other circumstances, because of suspicion based on passengers' PNRs and statistics – specifically, the combination of nationality, country of origin, and support of extremist views as identified by South African intelligence.
[464] Hoijtink and Leese, *Technology and Agency.*

order to create an impact in the world."[465] The main elements of PNR then include both humans and technology (material and non-material).[466]

PNR data is actualized through the development of specific algorithms because PNR is inherently about transforming passengers' personal data into actionable data to be used to identify threats, particularly of transnational nature. This use of PNR enables action to be taken against unknown risks, while representing them as knowledge. PNR aims at minimizing false negatives (Type II errors) – that is, a traveller who is dangerous but was not classified as such – however, is prone to presenting an exaggerated number of false positives (Type I errors) in efforts to minimize the 'worst case scenario' in aviation which is an individual incorrectly deemed not to be a risk. The intention of states that use PNR is to make decisions on passengers based on risk/no- risk and to "connect the dots without any human analyst oversight."[467] Increasingly, the PNR regime is a complex computerized system of which many elements remain 'black-boxed'[468] and the logic behind the computational generation risk predictions is difficult to identify.

The use of PNR for security purposes seeks to identify potential threats amongst mobile populations. PNR, as an assemblage, therefore, interacts with hardware and software. Algorithms translate security requirements, regulations, and laws, and the technical outputs are translated into action. Thus, PNR always represents a complex assemblage of heterogenous actors (public and private, national and international)[469] in the design but also in the use and maintenance of PNR as a practice. Understanding PNR algorithms as actants in a sociotechnical assemblage allows for a critical analysis of their role in structuring racialized and exclusionary border practices. Instead of being neutral arbiters of risk, PNR functions as a tool of governance, reinforcing social hierarchies while operating under the appearance of technological proficiency and neutrality.

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[465] Hoijtink and Leese, *Technology and Agency.*
[466] A non-exhaustive list of the human and non-human actants can be found in this dissertation in chapter 1
[467] Nicole Lindsey, "Does Predictive Policing Really Result in Biased Arrests?" *CPO Magazine*, April 9, 2018, www.cpomagazine.com/2018/04/09/does-predictivepolicing-really-result-in-biased-arrests/ : n.p
[468] 'Black-boxed' refers to a model where the input and output are known; however, the inner workings, the process whereby data is turned into actionable information, is beyond human understanding.
[469] Cf. This dissertation Chapter 11

7.3 PNR, Race, and Algorithms

PNR algorithms cannot simply be understood as a tool to sort big data analytics and to identify risk profiles based on patterns in data. The PNR algorithm that is developed by a state is political because before a software developer creates an algorithm, a state must have intention and a specific purpose for using the algorithm.[470] PNR is closely related to the digitalization of border security, which risks enacting "the colonial continuities of racist discrimination and partition"[471] but also creates new possibilities for the racialization of border security that was not previously possible.[472]

The relationship between Race and PNR begins before the algorithm is created. The PNR algorithm is designed based on what the country believes to be a risk, and the datasets that the state creates and provides to software engineers for PNR technology creation and use, is based on what the state understands to be a threat – or who the state is seeking to deny entry. Pre-existing datasets shape the predictive capability of PNR while also validating any discriminatory foundations of this data. As was discussed previously, but which deserves repeating is that states already have preconceived notions of what risk means to them and, as such, they modify their algorithms to align with pre-existing databases because "without historic data you can't train an algorithm."[473] Algorithms represent an assemblage of both human and non-human actors that will determine how algorithms are implemented, but also what they will find. While algorithm decision making may become autonomous, the creation of the algorithm itself is dependent on human decision making and action: humans decide what data to include and must work with technology to actualize it.[474] As a result, it is necessary to consider both the human and non-human elements that influence PNR algorithms, and, more importantly, how the non-human actors function in the assemblage that is shaping and hierarchizing bodies at the border.[475] Technological tools used in border management

[470] Kaufmann, "Who Connects the Dots?"
[471] Louise Amoore, "The Deep Border," *Political Geography* (March 2021): 7, https://doi.org/10.1016/j.polgeo.2021.102547.
[472] These classifications are not neutral but informed by historical biases, geopolitical agendas, and the strategic interests of the state that is implementing the system. This predictive logic mirrors colonial-era practices that aimed to pre-emptively regulate undesirable populations, thereby perpetuating well-established structures of power and, consequently, determine who is recognized as a legitimate traveller and who is designated as a potential threat, reinforcing racial hierarchies under the pretense of technological objectivity and efficiency.
[473] Kaufmann, "Who Connects the Dots?," 147.
[474] Kaufmann, **"**Who Connects the Dots?"
[475] Ezekiel Dixon-Román, "Algo-Ritmo: More-Than-Human Performative Acts and the Racializing Assemblages of Algorithmic Architectures," *Cultural Studies, Critical Methodologies* 16, no. 5 (October 2016): 482–490, https://doi.org/10.1177/1532708616655769.

have the potential to reinforce and exacerbate existing systemic biases and discriminatory practices embedded in society.[476]

The data that is provided to create the algorithms will influence the knowledge that is produced by the algorithm because these datasets decide what an algorithm will do.[477] Data, for the specific purpose of designing the PNR algorithm, is "collected, readied for the algorithm, and sometimes excluded or demoted."[478] Any potential data that is selected in the process of the creation of algorithms will necessarily be a limited representation of the social world; there is a high chance that the data contains direct or indirect biases that will shape the frequency of specific populations being overly represented in the final product. Similarly, bias can occur if certain populations are missing from the data or if they are under/overrepresented.[479]

The European Parliament has acknowledged that while good datasets are required to train PNR algorithms, some can be unreliable – specifically data obtained from third countries – and there is no evidence to suggest that this would be different for the case of South Africa.[480] Simply, when building a PNR algorithm, it is unlikely that countries would use exclusively national data because it is not reflective of the international nature of travel. However, PNR algorithms trained on unreliable data may produce flawed or biased results, potentially leading to misidentification, biased profiling, or security risks. Machine learning algorithms, including PNR algorithms, have a high risk of discrimination – intentional or not.[481] Despite the fact that South Africa does not currently directly collect data such as Race or religion in their PNR data, the algorithms used to process PNR and those managing mobile populations can establish correlation between these data points. For example, PNR algorithms can identify patterns and correlations between various pieces of information, making it possible to deduce racial identity indirectly: postal codes and addresses may be predominantly associated with specific racial or ethnic groups because of historical segregation, economic or social factors; mobility patterns of travel to specific regions, especially those

[476] Mirko Forti, "Addressing Algorithmic Errors in Data-Driven Border Control Procedures," *German Law Journal* (2024): 1–11, https://doi.org/10.1017/glj.2023.102.
[477] Kaufmann, "Who Connects the Dots?" 147.
[478] Tarleton Gillespie, "The Relevance of Algorithms," in *Media Technologies*, ed. Tarleton Gillespie, Pablo J. Boczkowski, and Kirsten A. Foot (Cambridge, MA: MIT Press, 2014), 169.
[479] This is very important to consider in the case of South Africa because Africans were, and continue to be, overrepresented in the criminal systems. Moreover, the country has continued to see other Africans as a threat to South African security.
[480] Costica Dumbrava, "Artificial Intelligence at EU Borders," European Parliament (July 2021). https://www.europarl.europa.eu/RegData/etudes/IDAN/2021/690706/EPRS_IDA(2021)690706_EN.pdf.
[481]Dumbrava, "Artificial Intelligence at EU Borders."

historically linked to particular racial groups, may indirectly signal a traveller's racial identity; names may be associated with specific racial groups; special preference related to meals or language can be an indication of Race or ethnicity; and historical profiling can be reflective in historical data used to train PNR.[482]

The directions that the state provides to create PNR algorithms is structured[483] to train the algorithms, but there is still potential for algorithms to have biases built into them;[484] data structures affect the performance and effectiveness of algorithms. Data structuring moves the focus from the data content to the more obscure condition whereby data is organized and made acquiescent for users. In other words, the process where data is structured allows for the algorithm to turn data into knowledge[485] and "allow[s] algorithms to operate *on* something."[486] Bias in the structuring part of the development of a PNR algorithm can be biased because of the data provided but also because of the reality that algorithms are value driven (they are a product of available data and also the decisions that are made at different stages of the development). Algorithms can be embedded with often unconscious biases that humans who are involved in the process (at any stage of the design) bring to the machine learning lifecycle, or bias may come through the black-boxed process associated with the function of the algorithm. Simply, while biased data will lead to a biased algorithm, bias can also emerge in the structuring of data.

A crucial element of the final PNR algorithm is the cleaning of data: this represents the identification and correction of 'bad' data.[487] Essentially, in the data cleaning process, it is possible to make certain variables visible and others invisible to all parties, including the creator of the algorithm.[488] Data cleaning is where data is refined based on the type of insight the algorithm is designed to look for; the better the algorithm, the better the data. The ultimate goal in the cleaning process is to remove 'noise' and errors in the training

[482] Benjamin Wiggins, "Proxies," in *Calculating Race: Racial Discrimination in Risk Assessment* (New York: Oxford Academic, 2020), 78–96.
[483] Data structuring in algorithm development involves organizing and formatting data so that it can be effectively processed by algorithms. Proper structuring is needed to ensure that the PNR algorithm can analyze and interpret data accurately and efficiently, enabling it to make informed decisions and predictions. For example, structuring data may involve categorizing information into specific field and ensures each set of data follows the same formatting.
[484] Kaufmann, **"**Who Connects the Dots?"
[485] Mikkel Flyverbom and John Murray, "Datastructuring – Organizing and Curating Digital Traces into Action," *Big Data & Society* 5, no. 2 (2018), https://doi.org/10.1177/2053951718799114.
[486] Bellanova and de Goede, "The Algorithmic Regulation of Security," 107.
[487] For example, data is not structured correctly for the models; that is, if data was not entered in the Latin alphabet (consisting of twenty-six letters) but instead in the Cyrillic script, the algorithm may not be able to work effectively.
[488] Kaufmann, **"**Who Connects the Dots?"

data.[489] Even at the early stages of algorithm development it is clear how biases may be reflected not only in the selection of data but also in the cleaning of the dataset, which may be designed and organized to reflect social structures and antecedent beliefs.[490] The human element in the cleaning process is again evident, insofar as humans must structure and categorize the dataset, and much of this work and data management is manual.[491]

The final algorithm that is designed to process PNR data will always be constitutive of the data that is provided to train the algorithm. Human selection of datasets and the cleaning of these datasets are necessary for training algorithms because algorithms can only act based on learning from a human-created dataset and instructions: "Anything that an algorithm finds and presents as results, it knows because it either sits in its formal instructions or the datasets it analyzes."[492] Humans teach algorithms how to think based on the instructions they provide in the 'training' of the algorithms.[493] For algorithms to learn to predict, they have to be taught; this is done by 'supervised learning' whereby the algorithm tries to identify patterns in data "via parameters in a dataset" where the relevant risk profiles are known by the programmer but not yet by the algorithm.[494] The algorithm is considered effective at the stage that it is capable of predicting past 'errors' based on the datasets provided. However, it is important to note that algorithms do not stop learning and are constantly adjusted as new data is provided. Once the algorithm is established, it autonomously tests new patterns and continues to learn.

Algorithms are considered operational at the point that they are more efficient than humans[495] and this often means that the majority of the human population will not understand the ways in which algorithms produce knowledge. In fact, "design decisions, encoded and encapsulated in complex nests of logical and control statements…enact (in millions of lines of source code) our supposed choices based on complex relational conditions, which after many iterations of 'bug fixing' and 'tweaking' even the programmers

[489] Rajmadhan Ekambaram, "Active Cleaning of Label Noise Using Support Vector Machines" (PhD diss., University of Florida, 2017).
[490] Alan Rubel, Clinton Castro, and Adam Pham, "Agency Laundering and Information Technologies," *Ethical Theory and Moral Practice* 22, no. 4 (August 2019): 1017–1041, http://search.proquest.com/docview/2320920169/.
[491] Kaufmann, **"**Who Connects the Dots?"
[492] Kaufmann, **"**Who Connects the Dots?," 151.
[493] Kaufmann, **"**Who Connects the Dots?"
[494] Kaufmann, **"**Who Connects the Dots?," 152.
[495] Leese, "The New Profiling."

no longer understand."[496] Part of the complexity of algorithms comes from the fact that they combine datasets and provide their decisions, not explanations; thus, it requires advanced digital literacy to understand how the algorithms combine the data or draw correlations from the data, and to fully understand the result.[497] This also means that it is harder to question the "patterns if these parameters are not visible or accessible."[498]

Risk is found in every category of the PNR dataset because the pre-emptive categories into which individuals fall are "collapsing back into the informational stream as databases are constantly updated and thus changing the population and possible patterns of correlation that can be found therein."[499] Algorithms in which PNR data is connected "are made and remade in every instance of their use because every click, every query, changes the tool incrementally."[500] It is no longer about the individual, but rather whether or not that individual is assigned the 'right' status to be granted access to a territory in the case of PNR. PNR algorithms permit decisions to be made about mobile populations automatically by data. The use of PNR is a surveillance technique that facilitates risk management: it effectively sorts individuals based on their calculated risk. The PNR regime does this by using algorithms to find significance in the data, which is rationalized by the law of large numbers.[501] While this rationale assumes objectivity, it can reinforce existing biases if the underlying data or algorithmic logic reflects historical inequalities or implicit prejudices.

What is interesting about the use of PNR assessments of passengers is that where humans have inherent biases, "the truth of the machine lies in the seemingly objective algorithmic calculations and the results it produces based on the available data."[502] Since the PNR database is constantly being updated and knowledge is constantly produced, the "data-driven profiles are no longer static categories but a fluid phenomenon, coming into being as 'spontaneous germination.'"[503] Race becomes embedded in PNR because algorithms are typically considered to be neutral and unbiased. Bias can either enter the algorithm

[496] Leese, "The New Profiling," 505. Original quote by *Introna LD (2013) Algorithms, performativity and governability. Paper presented at the conference 'Governing Algorithms: A Conference On Computation, Automation, and Control', New York University, 16–17 May*
[497] Leese, "The New Profiling."
[498] Kaufmann, **"**Who Connects the Dots?", 155.
[499] Leese, "The New Profiling," 506.
[500] Gillespie, "The Relevance of Algorithms," 173.
[501] Leese, "The New Profiling."
[502] Leese, "The New Profiling," 502-3.
[503] Leese, "The New Profiling," 503.

in the selection and cleaning of a dataset, which reflects social or institutional bias, through algorithmic learning during its training, or once it is semi-autonomous. This occurs because even if an algorithm is designed without any bias, the dataset can become discriminatory and self-enforcing "with feedback loops, as datasets are constructed that disproportionately contain data about certain people, leading to over monitoring and over-policing of those groups."[504] A feedback loop[505] is a system where the output of a process influences the input, creating a cycle that can either reinforce or counteract the original effect. The feedback loop is important because even if the algorithms were not originally biased or embedded with Race, as data is collected and humans act on the algorithmic decisions, these real-world responses feedback into the algorithms. The result is that the feedback loop can reinforce and perpetuate racial discrimination in PNR decision making.

While bias can appear in the data and design of an algorithm, there can also be bias in its use. Bias can appear in the PNR technologies whereby biases that the algorithms may contain are amplified. The most visible part of the PNR algorithms is the output; decisions made about an individual's mobility. The decisions made by, and acted on, can create more data that will continue to affect the decisions of an already biased system. In short, through feedback loops, bias decisions made in the past become the foundation for future decisions and biased outputs subsequently risk being used to justify existing biased practices. As such, algorithms "may be mathematically optimal but ethically problematic."[506] The threat is amplified by the tendency of human actors to wholly trust, and rely on, automated decisions.

PNR use can invisibly project racial bias and it can displace human intentionality and responsibility, so it must also be understood to have agency. PNR acts beyond human intentionality and in ways that humans cannot fully control or predict. Decisions made by algorithms have a significant role in how "action is constituted and how meaning is produced" from the data that is willingly provided by passengers.[507] However, agency is multiple and takes place by both humans and non-humans, and these actants influence each other: the algorithms cannot be made without humans, but decision making based on PNR cannot be

[504] Mann and Matzner, "Challenging Algorithmic Profiling," 2.
[505] A positive feedback loop strengthens existing patterns by reinforcing prior outcomes. In algorithmic bias, if a PNR system consistently labels certain groups as 'high risk,' the system incorporates this data into future assessments, deepening the bias over time. A negative feedback loop works to correct or reduce an effect. For example, if biases in an algorithm are detected and adjustments are made, the system can produce more balanced and equitable results moving forward.
[506] Simon DeDeo, "Wrong Side of the Tracks: Big Data and Protected Categories," in *Big Data Is Not a Monolith*, ed. Cassidy R. Sugimoto, Hamid R. Ekbia, and Michael Mattioli (Cambridge, MA: MIT Press, 2016), 1.
[507] Hoijtink and Leese, *Technology and Agency*, 2.

made without technology. Agency as it relates to PNR is co-constitutive of the human and non-human actants. In fact, the design and deployment of PNR, and the broader technology that supports the algorithmic models, demonstrates par excellence the reality that technology is always already connected to the wider context in which it is situated, including the technical infrastructure, social, legal, and political elements, human actors, security cultures, and so forth.[508] This is very significant for the case of PNR developing out of post-Apartheid South Africa because there cannot be technology without social context; they co-produce meaning. Bias found in the algorithms that support PNR processing for data purposes may be exposed to, or learn from, the racial realities that already exist in South Africa.

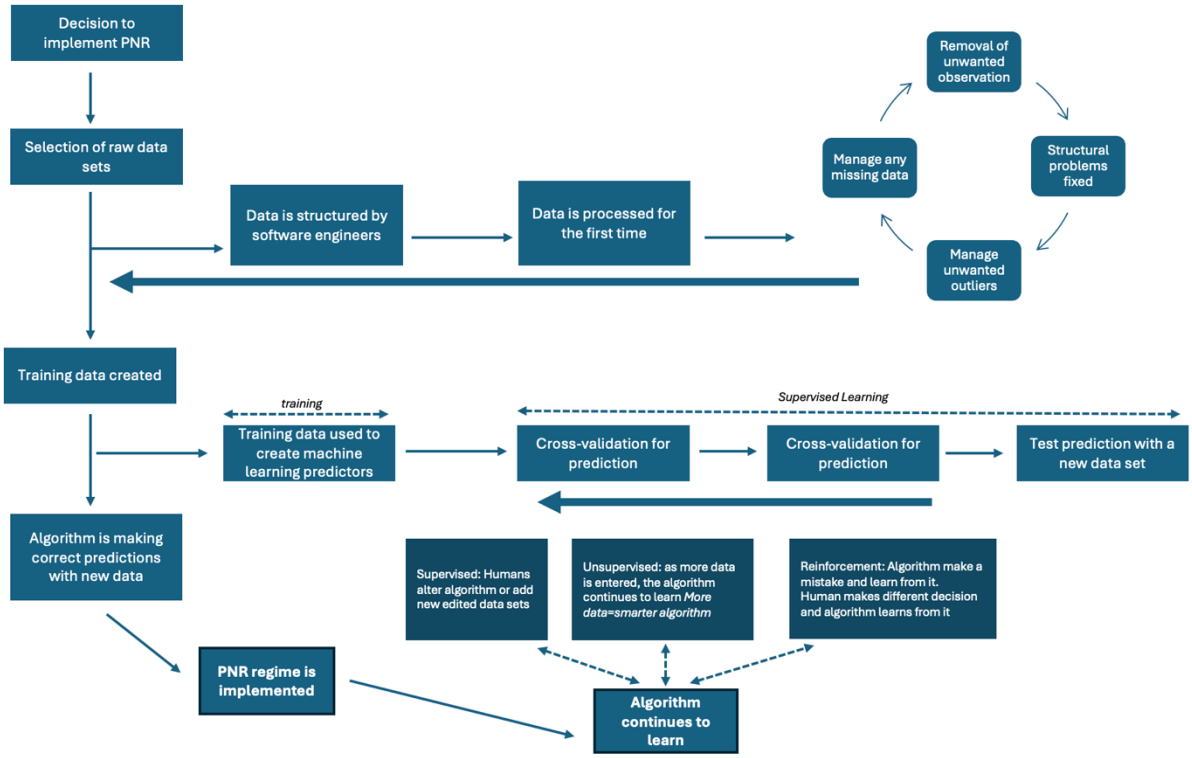

Figure 8: Design of PNR algorithm

Description: This image shows the development and operation of the Passenger Name Record (PNR) algorithm. It shows how raw data is selected, cleaned, and structured before being used to train machine-learning models. The figure outlines the steps of supervised, unsupervised, and reinforcement learning, and demonstrates how the algorithm is continually refined through cross-validation and new data inputs until it makes accurate predictions and the PNR regime is implemented. A full description can be found in Annex 6.

[508] Cf. John Law, "Introduction: Monsters, Machines and Sociotechnical Relations," *The Sociological Review* 38, no. 1 (May 1990): 1–23, https://doi.org/10.1111/j.1467-954X.1990.tb03346.x.

7.4 PNR as a Racializing Assemblage[509]

In considering how Race may be embedded in PNR, particularly in the case of the South African PNR regime, it is important to understand Race as the end product that came to matter through the process of racialization, as opposed to being reduced to an undisputed truth of a pre-existing racial identity.[510] PNR is a process that materially inscribes differences, potentially Race, on mobile populations and, as a practice, PNR infrastructure is embedded in the wider history and practice of managing mobile populations.[511] It is therefore useful to consider the relationship between PNR and Race as one of a racializing assemblage. This is to say that Race comes to matter through the relationship of heterogenous actants. Mobile populations become racialized when certain populations become marked as different due to any range of characteristics; however, this process tends to reflect colonial encounters. When examining how Race becomes embedded in PNR, it is helpful to consider Race as a sociotechnical process that differentiates and excludes certain humans. Simply, PNR can be understood as a racializing assemblage because it functions as a sociotechnical system that categorizes, sorts, and assigns risk levels to travellers based on patterns in data.[512]

Bias, and specifically racial bias, can occur throughout the entire lifecycle of the algorithmic models used for PNR – and how or where the bias tendencies become embedded are often difficult to identify: this is

[509] It is important to note that Alexander Weheliye (2014) has put forward a theory of *racializing assemblages*, whereby Race is the product of sociopolitical processes that categorize humans into full humans, not-quite-humans, and nonhumans. Weheliye presents a powerful case situated within the contexts of Western liberalism and challenges traditional understandings of biopolitics, especially those rooted in the work of Michel Foucault and Giorgio Agamben. He argues that these Eurocentric theories often overlook or marginalize Race and racialization as central to the workings of modern power. However, this account does not consider how Race operates beyond the West. While Weheliye offers a compelling critique that expands biopolitical theory and challenges Eurocentrism, the concept of the racializing assemblage proposed in this dissertation focuses specifically on technology. Technology cannot be fully isolated from the political and social context in which it is developed; it marks bodies by Race in complex sociotechnical ways—perhaps beyond the direct intentionality of humans. Thus, in understanding PNR technology as a racializing assemblage, it is possible to capture the reality that the technology is not a neutral infrastructure. Simply, Race can be made without any direct human intentionality. For example, recently Ruha Benjamin (2019) has shown that Race is produced and maintained structurally, materially, and technologically, regardless of direct intentionality. Alexander G. Weheliye, *Habeas Viscus :Racializing Assemblages, Biopolitics, and Black Feminist Theories of the Human* (Durham, NC: Duke University Press, 2014).

[510] This is helpful in considering Race in South Africa because it has never been only a biological or cultural classification but has also been the result of social, technical, and political processes. Cf. This dissertation, chapter 4

[511] As well as the circulation of people, ideas, technology, practices, and knowledge.

[512] PNR not only reflects but also actively constructs and institutionalizes racialized frameworks of mobility, surveillance, and security. By embedding racial markers within risk assessment models and border control mechanisms, PNR operates as a racializing assemblage that sustains and legitimizes global racial hierarchies under the pretense of technological objectivity.

because of the complexity of the algorithm as well as the nature of the design and use, all occurring beyond public scrutiny. Currently, in South Africa there is an acceptance that AI technologies can be embedded with bias[513]but that "it is not [their] problem because there are people in the West who are working on it."[514] Despite the technological nature of PNR, and its appearance of neutrality, there remains the question of potential discrimination. PNR should be considered a racializing assemblage that can be embedded with, and can perpetuate, social inequalities. PNR is situated in international security arrangements and surveillance that have already been demonstrated to have "everything to do with 'social sorting.'"[515] The treatment of mobile populations is related to their classification; and "[p]eople from suspect countries of origin or with suspect ethnicities can expect different treatment from others."[516] Simply stated, PNR is embedded in the wider practice of surveillance; a practice which is well accepted to have biased systems of social sorting and potential for social sorting.[517]

A significant shortcoming of the contemporary PNR regime is the prevailing belief that "the data contained in PNR is not sensitive and cannot be biased."[518] This assumption overlooks how data collection, processing, and algorithmic analysis can encode and reproduce existing social and racial inequalities, ultimately shaping security outcomes in ways that reinforce systemic discrimination. Even without racial data being explicitly collected, and with the designers of algorithms purposefully removing sensitive variables that may reveal racial indicators, PNR data can still be indicative of Race because of the way the system was 'trained.'[519] The data points collected in PNR data[520] can serve as a proxy for other

[513] The assumption that AI bias is solely a Western concern and not a domestic issue for South Africa is highly problematic. This perspective absolves local institutions of responsibility, thereby allowing biases in AI systems to persist without scrutiny or intervention. Moreover, it reinforces a reliance on Western technological governance rather than fostering domestic expertise and oversight. AI bias is not exclusive to the West; rather, it reflects and amplifies pre-existing social and historical inequalities within any given context. In South Africa, AI systems trained on non-representative or historically biased data risk perpetuating racial and economic disparities, particularly in critical domains such as border management, law enforcement, and financial regulation. A failure to address these concerns may lead to the entrenchment of systemic discrimination under the guise of technological neutrality. To mitigate these risks, a more engaged and locally informed approach to AI ethics and governance is necessary, ensuring that these systems are designed and implemented with fairness, accountability, and contextual awareness.
[514] PhD student in computer science, interview with author, Pretoria, South Africa, October 2, 2022.
[515] David Lyon, "Surveillance, Security and Social Sorting: Emerging Research Priorities," *International Criminal Justice Review* 17, no. 3 (2007): 162, https://doi.org/10.1177/1057567707306643.
[516] Lyon, "Surveillance, Security and Social Sorting,"162.
[517] Cf. Saher Selod, *Forever Suspect : Racialized Surveillance of Muslim Americans in the War on Terror* (New Brunswick, NJ: Rutgers University Press, 2018), 54.
[518] Former INTERPOL employee, interview with author, digital, September 19, 2023.
[519] In fact, Barocas and Selbst have demonstrated that the removal of sensitive variables is not sufficient in preventing bias in machine learning models. Solon Barocas and Andrew D. Selbst, "Big Data's Disparate Impact," *California Law Review* 104, no. 3 (2016): 671–732, https://doi.org/10.15779/Z38BG31.
[520] And in API.

discriminatory factors. A proxy is an element in the algorithmic system that can be used to represent a feature of an individual and can be discriminatory. A proxy can, therefore, be used as a tool of discrimination because it correlates (directly or indirectly) with an element such as income, Race, ethnicity, or socioeconomic status, and may lead to the algorithms making biased decision. [521] Discrimination can occur each time a proxy reinforces a specific bias. Thus, even an algorithm designed to be neutral can reinforce existing inequalities in society; and most significant to the study of PNR in South Africa, proxies can serve as a problematic substitute for Race.[522] This is crucial because of the black-boxed[523] reality of PNR algorithms that continue to learn from each decision made, and thus, continue to incorporate new patterns, and the humans who act on these algorithms do not know how or why the algorithm has generated its decision.[524]

Table 6: PNR data points and proxies

PNR data point	**Proxy when considered in isolation**
Postal code	Income, Race, socioeconomic status
Name	Race, ethnicity
Phone number	Income, socioeconomic status
Nationality	Race, ethnicity, socioeconomic status
Frequent flier miles	Socioeconomic status
Seat number	Socioeconomic status
Place of birth	Ethnicity
Special requests / General remarks	Race, religion

[521] Cf. Anya E. R. Prince and Daniel Schwarcz, "Proxy Discrimination in the Age of Artificial Intelligence and Big Data," *Iowa Law Review* 105, no. 3 (2020): 1257–1318, https://ilr.law.uiowa.edu/sites/ilr.law.uiowa.edu/files/2023-02/Prince_Schwarcz.pdf.

[522] It is interesting to note that most developed democracies – Canada, EU GDPR countries, South Africa, etc. – recognize the risks Algorithms can pose and have institutionalized the use of algorithmic impact assessments. The author has worked with the Government of Canada's algorithmic impact assessment for immigration and conducted research on global best practices and notes that these assessments tend to focus on privacy compliance but not on potential bias. As such, these assessments can help ensure that processes are of a high standard when it comes to privacy but that does not mean the algorithms are not biased.

[523] PNR algorithms are referred to as 'black boxes' due to their lack of transparency, complexity, and limited understanding of how they arrive at certain decisions. This derives from the fact that PNR systems do not allow public access to the underlying decision-making logic or risk criteria. Additionally, South Africa PNR employ machine learning, which adapts based on large datasets and human decisions, making it difficult even for the developers to predict or explain specific outcomes. This means biases can be embedded in the system without being explicitly visible. Moreover, the reliance on automated processes diminishes human oversight, giving the illusion of impartiality while making it hard to challenge algorithm's decisions.

[524] Lee Rainie and Janna Anderson, "Code-Dependent: Pros and Cons of the Algorithm Age," Pew Research Center, February 8, 2017, http://www.pewinternet.org/2017/02/ 08/code-dependent-pros-and-cons-of-the-algorithm-age.

The algorithms that support PNR for security purposes are based on mathematical calculations that help establish correlations between data points and that process the datasets: however, the computer cannot explain the logical causations.[525] As such, actions can depend on a false result of the algorithm, especially when the PNR algorithms make a prediction of an individual's mobility based on group data. Thus, using PNR for mobility management can turn the border into "data-driven filters that limit access to fundamental rights according to potentially discriminatory factors such as race, ethnicity, language, nationality, and religion."[526] Algorithms can learn to detect similarities between data profiles that help produce certain outcomes while also concealing the specific elements that led to specific decisions. The algorithm looks for patterns in information; the PNR "algorithm does not use the same causality-oriented logic as humans" but "looks for statistically significant relationships (correlations)" in the data.[527] An algorithm may find correlations that seem unrelated: for example, a correlation between terrorism and late bookings, or crime and seat selection.[528] Where these elements may not appear causally related to humans, for the algorithms that process PNR data, it can serve as a correlation between mobility and risk assessment. The use and reliance on technology has shaped and changed, and continues to do so, the relationship between mobile populations and the state.[529] Examining how Race may become embedded in PNR explains that the automated processes that classify populations cannot be separated from their development and use; they cannot confidently be unbiased or separated from the society and culture in which they emerged.[530] This is important because, as stated previously, regardless of the attention paid to training unbiased algorithms, correlations in data can still wrongly categorize mobile populations by identifying false positives or negatives. In fact, PNR systems in general have been found to be particularly prone to false positives. The issue with this is that the opacity in which PNR algorithms work make it difficult for humans to understand why the algorithms make the decision they do,[531] and the impact of the decisions may not be seen by states/state actors, but only by those who belong to the individual/group affected by the decision.

[525] Forti, "Addressing Algorithmic Errors."
[526] Forti, "Addressing Algorithmic Errors,"102.
[527] Janneke Gerards, "Machine Learning and Profiling in the PNR System," *Verblog*, May 8, 2023, n.p.
[528] Gerards, "Machine Learning."
[529] Cf. Louise Amoore, *The Politics of Possibility Risk and Security Beyond Probability* (Durham, NC: Duke University Press, 2013).
[530] As will be demonstrated in the forthcoming chapters, PNR technology reifies ideas of Race and nationality (specifically, belonging) that emerged under colonial rule.
[531]Osman Gucluturk, "How to Handle GDPR Data Access Requests in AI-Driven Personal Data Processing," OECD.AI, February 22, 2024, https://oecd.ai/en/wonk/gdpr-data-access-requests.

The case of South Africa's use of PNR data for national security purposes demonstrates the need to consider its PNR system as a potential source of racialization. Without deliberate effort to consider the potential for the embeddedness of Race in PNR, it is inevitable that it will continue to reproduce and perpetuate racial hierarchies and division. This is especially the case because PNR algorithms are constantly changing and adapting to instructions or decisions that are made, even without human intentionality. The PNR system as an assemblage of actants – human and non-human – used for the governance of mobile populations in a material system that enables the categorization of mobile populations and enables racial categories of difference to be inscribed therein.[532]

The use of PNR is a powerful tool to support both national and international security. However, the failure of states and international organizations pushing for the implementation of these technologies without providing proper oversight is irresponsible. Examining how Race is embedded in PNR is telling of the relationship humans ought to have with technology and security. Rather than considering bias at the border, and specifically racial bias, as a real possibility, regulatory efforts are focused on little more than risk management.

It is evident that bias in PNR can occur in three main ways:

1) Bias in data: Any training data presents a limited understanding of the social world. This data is likely to have direct bias (stereotypical language, limited data) and indirect biases (frequency of occurrence that does not reflect reality). In terms of PNR training data designed for security, there is a risk that certain data types are missing or are overrepresented based on perceived need. Moreover, there is always risk related to the availability of training data and how it was selected.
2) Bias in the design and development: Bias that may be present in the training data can be amplified during data processing; algorithms will always reflect the values and decisions of the people involved in their design and creation: conscious and or unconscious. Biases can also be found in the surreptitious process of algorithmic function. PNR algorithms reflect the biases

[532] It is important to note that this process extends beyond administrative efficiency; it inscribes racialized distinctions within mobility governance, reinforcing categories of difference that have historical and political significance. By embedding racial logics into algorithmic decision making, the PNR system contributes to the broader mechanisms of border control that sustain and reproduce global hierarchies of mobility and exclusion. As a technological system, it does not merely process data neutrally but actively participates is the racialization process.

in the training data and the developers who create them, but also of those who interact with the systems every day.

3) Bias in use: Technology evolves, and biases are reproduced. Bias can be exacerbated when PNR systems with learning algorithm technologies are used, as existing biases will be amplified. Border agents act on the outputs that technology generates, potentially creating more data based on the decisions of an already biased system. Biased outputs from technology may also be used to justify ongoing biased practices. Border agents act on the outputs technology generates, potentially creating more data based on the decisions of an already biased system. Users of PNR technologies may find themselves in negative feedback loops that affect future decisions.

It is important to account for how humans interact with PNR technology. When it comes to bias in PNR, technical solutions alone cannot eliminate bias. To tackle algorithmic bias, it is necessary to fundamentally change discriminatory attitudes. Even during the design phase, strategies to reduce bias need to be integrated into how programmers consider initial modelling parameters. It is also important to examine the technology companies and the non-governmental organizations that dominate PNR use and development, as their political interests influence design choices. Changing this requires addressing and altering the biases ingrained in cultures and professions that play a crucial role in PNR design and PNR algorithm learning. At minimum, this requires an acknowledgment by the South African government, the ICAO, and the UN that there is a real possibility that racial bias exists in conventional PNR use.[533]

7.5 Conclusion

Although achieving a completely unbiased PNR algorithm is unattainable, the widespread assumption that "the data contained in PNR is not sensitive and cannot be biased" ought to be considered problematic.[534] It is necessary to reiterate that although PNR processing does not explicitly collect data on Race, the potential for bias cannot, and should not, be determined as definitively insignificant. Bias can be introduced at multiple stages, including the design, implementation, and application of PNR systems, whether through societal influences, human judgment, or technological frameworks. Moreover, there is

[533] Cf. This dissertation chapter 11
[534] Former INTERPOL employee, interview.

limited transparency regarding the specific risk criteria South Africa employs when analyzing PNR data. PNR processing functions whereby "passenger flow becomes slowed down for the purpose of thorough scrutiny and regulation of access to the secured sectors of the airport,"[535] however, this sorting takes place by comparing profiles against what has been deemed as the norm. PNR then transforms passengers' personal data into a means to identify threats, particularly of a transnational nature, and represents a source of knowledge creation. The use of PNR is characterized by its pre-emptive and real-time risk management and is used to add to and create new criteria for risk assessment, "thus establishing the prerequisites for making sense of large amounts of information via algorithmic exploitation and the data-driven creation of profiles as temporary hypotheses." [536] This use of PNR and large-scale analytics enables action to be taken against unknown risks, while representing them as knowledge.[537]

In analyzing the potential embedding of Race within PNR algorithms, it is necessary to consider how the South African state has historically utilized personal data as a means of distinguishing between populations deemed safe and those perceived as threats. The decisions on mobility that can be attributed to PNR are a result of not only border guards but also of all those involved in the design, infrastructure, and utilization of PNR. As such, Race is materialized through the complete lifecycle of PNR – from its design and through its operation. The coming chapters expand on how Race may materialize through PNR and are attentive to the reality that any exploration of algorithmic bias ought to consider the social, political, and technical realities in which it emerged and is situated. To do so, it is necessary to take seriously the human and non-human actants that participate in the categorization of mobile populations and the production of risk categories: how these technologies that are deployed at the border reshape power relations and identity. Conceptualizing PNR as a racializing assemblages makes it easier to understand how Race becomes embedded in PNR as a sociotechnical assemblage in ways that may be unintended or overlooked- often not through overt intention, but through the entanglement of data practices, institutional logics, and historical inequalities- PNR does not merely reflect racial bias, but actively participates in the construction and governance of racialized identities.

[535] Leese, "The New Profiling."
[536] Leese, "The New Profiling," 495.
[537] As mentioned previously, the goal is primarily to minimize Type II errors or false negatives (dangerous travellers who are not classified as so) and, thus, the risk assessments at the airport are rigid to the point that there is risk for an exaggerated number of Type I errors or false positives (travellers incorrectly classified as dangerous).

Chapter 8: PNR as Security Legacy of the 2010 FIFA World Cup

8. Introduction

Surveillance technology used to monitor mobile populations[538] may have been largely institutionalized in the West following the events of 9/11, but the current South African regime of global mobility, and the logic and practices that are fundamental to it, is a legacy of colonial systems of control. The implementation of Passenger Name Record (PNR)[539] regimes globally for national security purposes is often conceptualized as a response for the need for all states to prevent terrorism and serious crime[540] in the 'Global War on Terror.'[541] However, an examination of the case of South Africa shows that its use of PNR for national security purposes was already well established by the state prior to the events of 9/11. In fact, the later advances and sophistication of the South African PNR regime were not a consequence of 9/11, but were instead a security legacy of the 2010 FIFA World Cup, which can be understood as a mega-event.[542] The rapid modernization of South Africa's PNR system in preparation for hosting the FIFA World Cup necessitated substantial investments from both domestic and international stakeholders across public and private sectors. This significant financial and infrastructural commitment played a pivotal role in shaping the country's broader PNR regime. Interestingly, despite South Africa's history of racially motivated PNR use, there is very little evidence to suggest that South African or global actors considered potential biases in the urgent modernization of the country's PNR regime. This is significant because the integration of advanced data analytics and risk assessment tools reinforced existing surveillance practices and further embedded automated decision making into border security. PNR modernization in South Africa should be attributed to hosting the World Cup, not the terrorist events of 9/11.

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[538] For the purpose of this discussion, mobile populations are understood as individuals, irrespective of citizenship, movements across international borders for any length of time or purpose.

[539] As mentioned previously, South Africa's PNR is joined with API, falling under the title of Advanced Passenger Processing (APP), and, in the advent of the World Cup, South Africa was one of the first states globally to implement such a practice.

[540] In North America, PNR was implemented to enhance border security in the aftermath of 9/11 terrorist attacks. Franziska Boehm, "Tit for Tat – Europe's Revenge for the Canadian and US-American PNR Systems? The Envisaged European Model of Analyzing Flight Passenger Data," *ERA-Forum* 11, no. 2 (2010): 251–261, https://doi.org/10.1007/s12027-010-0159-7. Cf. European Union, "Use of Passenger Records to Prevent Terrorism and Serious Crime," *EUR-Lex*, April 13, 2016; last updated September 28, 2022, https://eur-lex.europa.eu/EN/legal-content/summary/use-of-passenger-records-to-prevent-terrorism-and-serious-crime.html.

[541] Global West or Western here refers to North America and Europe.

[542] The International Federation of Association Football World Cup is a men's football tournament that is hosted every four years in a state that wins the bid to host the event. South Africa won the bid to host the event in May of 2004, just one decade after the first democratically elected government (of Nelson Mandela) in the country.

This chapter mobilizes ANT to bring attention to the racially oriented practices developed in the context of PNR use for commercial air travel. By putting Race in the centre of the analysis, this chapter reconsiders the sites and networks of how Race may influence decisions made when using PNR for national security purposes. To understand how Race may be embedded in South Africa's PNR system, it is necessary to consider the political and social conditions in which their contemporary PNR regime emerged. This analysis therefore includes an examination of the relevant security actors that contribute to South Africa's PNR system as a complex sociotechnical assemblage that spans from the local to the international levels. The development of PNR from the early 2000s to the country's hosting of the 2010 FIFA World Cup is of particular significance with reference to Race because PNR risks being used as a tool of racialization.[543] This concern exists because surveillance technologies, including PNR, have historically been used in South Africa as a way to manage mobility of Races that the state deemed undesirable. Simply, the modernization of South Africa's PNR regime may have occurred in a way that risks strengthening the management of mobile populations using a system built on structural racism as opposed to actively ensuring that these technical systems minimize or eliminate bias.

PNR is presented as a sociotechnical assemblage and, thus, this chapter focuses on the role of domestic and international actants and explores the ways in which the securitization of the FIFA World Cup as a mega-event shaped PNR development in South Africa. In doing so, this chapter presents an overview of the security legacies specific to PNR as a result of the World Cup in South Africa. The implementation of PNR technology during South Africa's hosting of the FIFA World Cup illustrates how surveillance infrastructures are shaped by both human decision making and technological agency. PNR is understood as having the capacity to influence the management of mobile populations without direct human intent, giving it a form of agency; however, it does not function in isolation. To examine how Race becomes embedded within the assemblage of human and non-human actants, it is essential to consider the interplay between technological systems and human actors. The expansion of PNR for the purpose of the World Cup – driven by heightened security demands and international collaboration – reinforced existing mechanisms of population management, shaping how Race was categorized and how risk was assigned in transnational mobility control. This co-constitution of human oversight and algorithmic processing not only determined who was scrutinized but also contributed to the production of racialized meanings within South Africa's evolving border security framework.

[543] Cf. This dissertation chapter 5 and 6

8.1 Significance of the FIFA World Cup in South Africa

South Africa successfully hosted a world class mega-event with the 2010 International Federation of Association Football (FIFA) World Cup. A mega-event can be understood as a "large-scale cultural (including commercial and sporting) event which has a dramatic character, mass popular appeal and international significance."[544] The key feature of mega-events is the size and international nature; the FIFA World Cup required particular attention because it was the first time an event such as this was hosted on the African continent.[545] These events are global in nature and the unique spaciotemporal reality contributes to how they are securitized and how mobile populations are managed. The South African World Cup involved a wide range of actants that contributed to the securitization of the event but also to the creation of a security regime that extended past the local (national) context into the international level.

The significance of hosting a mega-event on the world stage is that the host country must transfer some governance power to the sports federation that owns the event.[546] In the South African case, it was required to commit to, amongst other things, the improved capacity of South African aviation,[547] and to adopt legislative measures that granted exclusive privileges to FIFA and its affiliated corporations.[548] When the circulation of global security practices, knowledge, and expertise is considered, it is important to consider this temporary limitation of state sovereignty and the rigidly imposed "operational security template" that host countries were required to implement.[549] In fact, the planning and delivery of the South African World Cup, specifically in terms of security, was considered to be significantly more rigorous than preceding FIFA events.[550] As a result, the FIFA Corporation was a notable actor in the securitization of the 2010 World Cup and its resulting security legacy in South Africa.

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[544] Maurice Roche, *Mega-Events and Social Change: Spectacle, Legacy and Public Culture* (Manchester, England: Manchester University Press, 2017), 4.
[545] Chris Bolsmann, "Thoughts on the First African World Cup: Football, Representation and Exclusion," *Journal des anthropologues*, no. 124–125 (2011): 359–371, https://doi.org/10.4000/jda.5914.
[546] Renan Petersen-Wagner and Jan Andre Lee Ludvigsen, "Between Global Events and Local Reverberations: Globalization, Local Media Framing and the 2014 FIFA World Cup," *Global Networks* 24, no. 4 (October 2024): e12477, https://doi.org/10.1111/glob.12477.
[547] South Africa, *Aviation Strategy for the FIFA 2010 World Cup*, Version 0.3 (Pretoria: Department of Transport, 2007), https://www.gov.za/sites/default/files/gcis_document/201409/aviationstrategyforfifa20100.pdf.
[548] Petersen-Wagner and Ludvigsen, "Between Global Events and Local Reverberations."
[549] Scarlett Cornelissen, "Mega Event Securitisation in a Third World Setting: Glocal Processes and Ramifications during the 2010 FIFA World Cup," *Urban Studies* 48, no. 15 (2011): 3223, https://doi.org/10.1177/0042098011422392.
[550] Cornelissen, "Mega Event Securitisation."

The 2010 World Cup was unique for a number of reasons: because of its location on the African continent, because it was the first time the event had been held by a middle-income economic state, and because South Africa had existing high rates of crime and violence.[551] Notwithstanding the fact that while mega-events are accompanied by a project to secure the state, these events also risk bringing a high level of new crime to the host country.[552] Due to the size and scope of such an event, "adequate security…thus become[s] one of the most important organisational tasks for hosts."[553] In short, South Africa hosting the 2010 FIFA World Cup "constituted a major test case" for the securitization of major international sporting events.[554]

The legacy of the 2010 FIFA World Cup included the implementation of Advanced Passenger Processing (APP) as a surveillance technology and general securitization of ports of entry to South Africa, and the reality that there were myriad state and non-state actors involved in the process. The modernization of PNR was embedded in APP: the South African government implemented a joining of API and PNR, which collectively fell under the title of APP, in 2009.[555] The World Cup represented an assemblage of public-private and local and global actors in the securitization and governance of the South African international airports. Still, there was significant doubt from the international community, specifically Western states, about South Africa's ability to host the event securely,[556] particularly because of "the country's reputation for violence."[557] The uncertainty of South Africa's ability to securely host the event was not completely unfounded; however, many concerns "c[a]me from a place that, if not exactly racist, at least [fell] into the category of thinking of Africans as somehow incapable of handling a global event such as the World Cup."[558] These views persisted despite South Africa having spent much of the twentieth century being an incredibly technically advanced country (especially in terms of population management).[559] The narrative from the international community regarding the securitization of South Africa remained one of concern. This is of interest when considering how Race may be embedded in South Africa's PNR regime because it represents a complex assemblage of local and global actants.

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[551] In 2010, South Africa was considered to be one of the most dangerous countries in the world, excluding war zones.
[552] Cornelissen, "Mega Event Securitisation."
[553] Cornelissen, "Mega Event Securitisation," 3224.
[554] Cornelissen, "Mega Event Securitisation," 3224.
[555] This dissertation chapter 1 and 7
[556] Derek Charles Catsam, "The Death of Doubt? Sport, Race, and Nationalism in the New South Africa," *Georgetown Journal of International Affairs* 11, no. 2 (2010): 7–13.
[557] Catsam, "The Death of Doubt?," 10.
[558] Catsam, "The Death of Doubt?," 10.
[559] Cf. Breckenridge, *Biometric State.*

8.2 APP and PNR Before the 2010 World Cup

Unlike many Western nations[560] where PNR systems were rapidly expanded in response to the events of 9/11 as part of counterterrorism efforts, South Africa's PNR development was not primarily a consequence of these events; South Africa already had a PNR regime in 2001. Instead, its implementation and modernization was driven by domestic and regional security concerns, as well as the logistical demands of hosting the 2010 FIFA World Cup. The urgency to enhance border security, manage high volumes of international travellers, and meet global security standards shaped South Africa's PNR system in ways distinct from the counterterrorism-driven models seen in the Global North. To illustrate this, this section examines the evolution of South Africa's PNR system from the post-Apartheid era to the 2010 World Cup.

In the aftermath of the Apartheid, South Africa maintained many of its border security practices in terms of technology; however, there was a need to comply, at least on paper, with international norms with respect to how mobile populations were profiled for risk. South Africa needed to implement border policies that were not overtly racially motivated. The first changes made to the border policies were providing the South African Police Services (SAPS) Special Border Police with functions at the ports of entry.[561] The functions were largely decentralized and were managed provincially – leading to inconsistency in how the South African border was managed.[562] While the National Interdepartmental Structure (1997) was established through the National Crime Prevention Strategy (1996), and provided a means to develop the South African border and the philosophy related to the management of mobile populations, it has been criticized for its general ineffectiveness because actors protected their own interests at the expense of other institutions and border management more generally.[563] The Department of Home Affairs (DHA) eventually emerged as the department that would oversee the movement of mobile

[560] Specifically Canada, the United States, and EU member states.
[561] Ettienne Hennop, Clare Jefferson, and Andrew McLean, *The Challenge to Control South Africa's Borders and Borderline* (Pretoria: Institute for Security Studies, 2001), 15, https://issafrica.s3.amazonaws.com/site/uploads/Mono57.pdf.
[562] It is interesting to note that at the end of the Aparthied, South Africa had thirty-two international airports. These were reduced to just ten by 2001.
[563] Anthony Minnaar, "Border Control and Regionalism," *African Security Review* 10, no. 2 (2001): 89–102. cf. Anthony Minnaar, "Private-Public partnerships: Private Security, Crime Prevention and Policing in South Africa," *Acta Criminologica*: *Southern African Journal of Criminology* 18, no. 1 (2005): 85–114.

populations; however, the management of the border did not become centralized until the establishment of the Division Protection and Security Services in 2004, the same year in which the DHA replaced the SAPS as the main governmental organization that took the lead for border security and immigration.[564] This centralization of border security under the Department of Home Affairs in 2004 laid the foundation for more systematic data collection and traveller monitoring.

The first evidence of PNR use in post-Apartheid South Africa was in 1995 with the implementation of the SITA Operation Manager.[565] SITA (Société Internationale de Télécommunications Aéronautique) is an air transport information technology and communications service that was founded in 1945 to provide a communication network between European airlines, and it is now responsible for building one of the largest related data networks globally.[566] In 1995 SITA was implemented in South African airports and was used to facilitate the collection and processing of data by allowing information to be accessed in a single dataset, while also allowing for the timely processing of the data before the arrival of passengers at the South African border.[567] It should not be overlooked that the digitalized passenger processing system first implemented in South Africa is now used in more than ninety airports globally.[568] In addition, when PNR was first implemented in post-Apartheid South Africa for the management of mobile populations, Apartheid-era immigration laws were still in place.[569] Documentation from the post-Apartheid era suggests that technology was employed by immigration officials to unofficially apply racial criteria in the immigration policy, and to make immigration easy for desirable 'Europeans' and difficult for undesirable 'Africans' who were considered to more likely be an issue to law and order in the country.[570]

The key actors in the development of technology for passenger processing in the post-Apartheid government were the South African Revenue Service (SARS), which was responsible for customs functions and reported to the Ministry of Finance, and the DHA, which was responsible for immigration and reported to the Ministry of Home Affairs. The SARS was established with the SARS Act of 1997 and

[564] Although, this was reversed in 2010, the same year as the world cup, and the border was reverted to provincial structures.
[565] SITA, *SITA Airport Management*, SITA at Airports, 2020, 2, https://www.sita.aero/globalassets/docs/brochures/sita-airport-management-brochure.pdf.
[566] SITA, "About Us," accessed March 31, 2025, https://www.sita.aero/about-us/.
[567] SITA, *SITA Airport Management*, 2.
[568] SITA, *SITA Airport Management.*
[569] Apartheid-era immigration laws survived until 2003. Cf. The *Aliens Control Act* 1991.
[570] Cf. Loren B. Landau and Aurelia Wa Kabwe-Segatti, eds., *Contemporary Migration to South Africa: A Regional Development Issue* (Washington, DC: World Bank/Agence Francaise de Developpment, 2011), 37–38.

was responsible for all customs administration since that time. Of interest is that while "the collection and handling of passenger information [was] for customs purposes and [was] protected under Section 4 of the Customs and Excise Act,"[571] South African PNR data was used for law enforcement practices. This is to say that while both SARS and DHA have historically been responsible for passenger processing, the increased digitalization of border processes benefited both organizations.

In 1998, a primary goal of SARS was to continue implementation and improvement of digital supporting technologies.[572] The focus of SARS at airports of entry was customs, and the illegal movement of people and 'things' (undeclared items, drugs, currency) and, notably, South Africa had received risk profiling/assessment training from the United Nations.[573] By the year 2000, South Africa had implemented data informed risk-based inspections at ports of entry.[574] Specifically at airports of entry, passenger risk profiling was developed with the "use of pre-arrival information"; however, the primary goal of this system seems to have been the detection of customs violations instead of security explicitly.[575] Interestingly, the increased focus on the development of computerized systems in the early 2000s seems to have been related to the signing of "asymmetrical reciprocal preferential trade agreements with the European Union," legislation which required that South African Customs and Excise services improve "electronic import and database systems" and the connection of "21 offices to capture export declarations and certificates of origin in real time."[576] In addition, South Africa noted that the digitalization of Customs department was also motivated by several trade agreements with World Customs Organizations (WCO) and by regional trade dialogue.[577]

In the year 2000, automatization was already a priority of the South African government and a passenger profiling system to process and profile the pre-arrival of mobile populations had already been

[571] Anonymous SARS employee, email message to the author, January 9, 2018.
[572] Customs at this point was assisted by the British government, and Her Majesty's Customs was an example of such support. SARS Annual Report 1998-1999, 2, https://www.sars.gov.za/wp-content/uploads/Enterprise/AnnualReports/SARS-AR-01-Annual-Report-1998-1999.pdf.
[573] South African Revenue Service (SARS), *Annual Report 1999-2000* (Pretoria: South African Revenue Service, 2000), 24, https://www.sars.gov.za/wp-content/uploads/Enterprise/AnnualReports/SARS-AR-02-Annual-Report-1999-2000.pdf..
[574] South Africa, *Annual Reports 2000-2001* (Pretoria: Department of Home Affairs, 2001), 6, https://www.gov.za/sites/default/files/gcis_document/201409/0annualreports200020010.pdf.
[575] South Africa, *Annual Reports 2000-2001*. cf. The South African Revenue Service Act No. 34 of 1997, which mandated that the DHA's focus "Provide a customs service that will maximise revenue collection, protect our borders as well as facilitate trade," page 1.
[576] South Africa, *Annual Reports 2000-2001*, 25.
[577] South Africa, *Annual Reports 2000-2001*

implemented; although, greater internal co-ordination of governmental departments responsible for border control in South Africa needed further development.[578] It is important to recognize that in the year 2000, South Africa was already employing a "total solution" that included scanning and imaging technology, automated risk profiling and assessment, data warehousing and data mining – all before the events of 9/11 in the United States.[579]

Passenger processing in the early 2000s in South Africa was risk based at all border posts.[580] SARS notes that using pre-arrival information to assess the risk of all individuals arriving in South Africa had "led to greater travel facilitation, while intelligently leading to higher detection of customs violations" but that it also had "underlined the need for greater co-ordination among the government departments responsible for key functions in border control."[581] It is also interesting to note that in this process of developing pre-arrival risk assessment of passengers, South Africa specifically liaised with the "UK, Canada, USA, and the UAE" to ensure that the country was implementing security processes aligned with the highest international standards.[582] While this pre-emptive risk management process was already well established prior to the events of 9/11, the events in the United States contributed to South Africa renewing and "changing focus on national security" and "highlighting the need for a balanced trade facilitation/trade regulation role for Customs."[583] While the Customs department in South Africa recognized the significance of the 9/11 attacks, surprisingly, the South African DHA made no further references to the events of 9/11, and reference to passenger processing was not made again until the 2006/2007 fiscal year, after the country had already won its bid to host the 2010 FIFA World Cup.[584] It is unclear if the DHA did not value the use of digital passenger data prior to the World Cup bid, or if this reflects the inconsistency in the management of the South African border at the time.

[578] South Africa, *Annual Reports 2000-2001*, 52.
[579] South Africa, *Annual Reports 2000-2001*.
[580] *South Africa, Annual Reports 2000-2001*.
[581] South Africa, *Annual Reports 2000-2001*, 52.
[582] South Africa, *Annual Reports 2000-2001*, 52.
[583] South African Revenue Service, *Annual Report 2002–2003* (Pretoria: South African Revenue Service, 2003), 66, https://www.sars.gov.za/wp-content/uploads/Enterprise/AnnualReports/SARS-AR-05-Annual-Report-2002-2003.pdf..
[584] Department of Home Affairs, *Annual Report 2007–2008* (Pretoria: Department of Home Affairs, 2008), https://www.dha.gov.za/files/Annual%20Reports/Annual_Report_2007-2008.pdf.

The 2003 SARS annual report makes the first direct reference to Advanced Passenger Processing and its implementation in South Africa.[585] Specifically, it is clear that by 2003 all passenger information was electronically captured and processed to allow advanced profiling of mobile populations; however, as much as this process was implemented for Customs purposes, the data was also clearly stated to be used by the South African National Intelligence Agency (NIA), although the exact purpose remains ambiguous.[586] Use of APP provided several South African government organizations with data on mobile populations, and provided access to historical passenger movement and information.[587] By 2006, a Passenger Processing System (PPS) was implemented to help improve the effectiveness of passenger processing at ports of entry while also "optimising risk-profiling and control functions."[588] It is made explicit that the PSS system was developed from the old system and includes making passenger information more accessible.[589] However, very little additional information is available on this system, and interviews to request clarifying information provided no results.

While the post-Apartheid era saw a large financial investment in technology, firsthand reports suggest that despite "enormous sums spent" by the South African state to implement advanced surveillance technologies, the technology did not improve border security because immigration officers were unable to use the technology.[590] A closer look at why this occurred reveals that the implementation of advanced technology to govern borders did not include computer literate staff.[591] It has been noted on this topic that South Africa had:

> one of the best systems in the world. And if you use it properly it is incredible what you can do with it. But they do not know that. Most of them don't have access to it. They have never bothered to get the access, because they have never been trained.[592]

The post-Apartheid era has been criticized for the reality that the DHA was mismanaged and politicized and that the allocation of individuals to new roles was done through the "forced redundancies of senior staff."[593] The transition from the Apartheid to the new democracy was plagued with incompetent and

[585] South African Revenue Service (SARS), *Annual Report 2003–2004* (Pretoria: South African Revenue Service, 2004), 55, https://www.sars.gov.za/wp-content/uploads/Enterprise/AnnualReports/SARS-AR-06-Annual-Report-2003-2004.pdf.
[586] SARS, *Annual Report 2003–2004*, 55.
[587] SARS, *Annual Report 2003–2004.*
[588] SARS, *Annual Report 2003–2004*, 72.
[589] SARS, *Annual Report 2003–2004*.
[590] Landau and Wa Kabwe-Segatti, eds., *Contemporary Migration to South Africa*, 108.
[591] During this time, the immigration officers employed by DHA were only required to have the equivalence of a Grade 10 education.
[592] Landau and Wa Kabwe-Segatti, *Contemporary Migration to South Africa*, 117.
[593] Landau and Wa Kabwe-Segatti, *Contemporary Migration to South Africa*, 108.

inexperienced staff,[594] in part because individuals were employed for 'equality' at the expense of knowledge and skills but also because the structures of the governmental departments were weak.[595] The DHA,[596] during the period of transition, had been described as fragmented and ultimately incapable of fulfilling its mandate.[597] The DHA, also referred to as the Department of "Horror Affairs,"[598] was one of the "most corrupt and dysfunctional government bureaucracies in South Africa."[599] During this period it is reported that the DHA had been enforcing South African immigration laws inconsistently and that DHA officers made immigration decisions "on their own."[600] In fact, these issues with the DHA have been recognized as a threat to South African security. Specifically, the US government had publicly reported that the South African DHA was a threat to global security because of "poor administration, lack of institutional capacity, and corruption."[601] As such and in consideration of the widespread xenophobia in South Africa at the time, it is reasonable to infer that DHA employees applied immigration laws in a way that could have been racially inconsistent.[602]

The 2006/2007 fiscal year was when South Africa most clearly – or publicly – included the APP in state documentation. South Africa explicitly noted that it was looking to acquire an API system – as opposed to developing a system of its own.[603] While it is unclear how South African PNR systems would be developed and implemented, there was a risk that South Africa would also import biases with the importation of technology developed elsewhere. In 2008, South Africa reported spending R50 million (South African rand, worth approximately US$5.3 million) on an Advanced Passenger Processing System, although the specifications of this system or where and how it was developed were not disclosed.[604] The

[594] Landau and Wa Kabwe-Segatti, *Contemporary Migration to South Africa*.
[595] Aurelia Wa Kabwe-Segatti, Colin Hoag, and Darshan Vigneswaran, "Can Organisations Learn without Political Leadership? The Case of Public Sector Reform among South African Home Affairs Official," *Politique Africaine* 128, no. 4 (2012): 121–142, https://doi.org/10.3917/polaf.128.0121.
[596] DHA has been the governmental department responsible for controlling the movements of all populations (South African and foreigners) into the territory. DHA maintained control over mobility in the post-Apartheid era.
[597] Wa Kabwe-Segatti, Hoag, and Vigneswaran, "Can Organisations Learn without Political Leadership?"
[598] Colin Hoag, "The Magic of the Populace: An Ethnography of Illegibility in the South African Immigration Bureaucracy," *Political and Legal Anthropology Review* 33, no. 1 (2010): 6–25, https://doi.org/10.1111/j.1555-2934.2010.01090.x.
[599] Hoag, "The Magic of the Populace," 6.
[600] Landau and Wa Kabwe-Segatti, *Contemporary Migration to South Africa,* 108.
[601] U.S. Department of State, Office of the Coordinator for Counterterrorism. *Country Reports on Terrorism 2008*, "Chapter 2: Country Reports: Africa Overview," April 30, 2009, https://2009-2017.state.gov/j/ct/rls/crt/2008/122412.htm.
[602] Wits School of Governance, "Xenophobia and Problems Related to It," University of Witwatersrand, 2005. https://www.xenowatch.ac.za/wp-content/uploads/2019/08/Xenophobia_in_South_Africa_and_problems.pdf
[603] South Africa, *Annual Report: Building the New Home Affairs 2007–2008* (Pretoria: Department of Home Affairs, 2008), 24, https://www.dha.gov.za/files/Annual%20Reports/Annual_Report_2007-2008.pdf.
[604] South Africa, *Annual Report: Building the New Home Affairs 2007–2008,* 31.

following year, and during a period where South Africa was under international scrutiny concerning its capacity to successfully host the 2010 FIFA World Cup,[605] the country allocated R630 million to the development of technological immigration systems, and an additional R3 million was spent on the ports of entry at the three main international airports located in Johannesburg, Cape Town, and Durban.[606] While little information on the original system is available, it was stated that South Africa downloaded and stored passenger data on a SITA[607] mainframe, and that government departments such as the DHA were able to access this information directly.[608] The substantial financial investments in preparation for the 2010 FIFA World Cup, illustrates the role of global events in expediting the implementation of surveillance and border security technologies. The limited transparency surrounding the technical specifications of these systems raises concerns the extent to which externally developed technologies may perpetuate existing racialized mechanisms of mobility control.[609] Furthermore, the consolidation of passenger data within a SITA mainframe (which was also used by the Apartheid government) and its accessibility to various government agencies reflect broader trends in the centralization of data and the increasing inter-agency coordination in border security operations.

The South African government refers to the 2010 World Cup as a key moment in the strategic initiatives of the DHA.[610] Specifically, that the DHA was required to meet certain guarantees that included the active

[605] A pervasive racial bias underlined the global concerns regarding South Africa's ability to host a secure World Cup event. Western media outlets and institutions, such as FIFA, often portrayed African nations as unstable or inherently prone to disorder, despite the absence of a history of football hooliganism within South African fan culture. This apprehension was unfounded, as it mirrored colonial legacies and stereotypes associating black spaces with chaos or danger.
[606] Sport & Recreation South Africa (SRSA), *2010 FIFA World Cup Country Report*, accessed April 29, 2025, https://www.gov.za/sites/default/files/gcis_document/201409/srsacountryreport2013-withcovera.pdf.
[607] Regarding the World Cup, Khodr Akil, SITA regional vice-president for Africa, noted, "The key to success in handling large passenger flows is to have the most suitable technology in place before the main event, making sure that all systems are tested and that staff are trained. ACSA and ACS are well advanced in this and, with SITA's support, will be well and truly ready by June 2010." *South African Airports Get Set For FIFA World Cup 2010* , https://www.airport-technology.com/contractors/data//pressreleases/press31-6/
[608] South African Migration, *South African Statistics, October 2008* (Johannesburg: South African Migration, 2008), https://www.samigration.com/downloads/South_African_Statistics_October_2008.pdf.
[609] This is concerning regardless of if the biases were unique to South Africa or the EU/US. Following 9/11, airport security measures in the United States and the EU became increasingly racialized, and known to have disproportionately targeted Muslim, Arab, and South Asian travellers. Policies such as the PATRIOT Act in the US and the establishment of the Department of Homeland Security institutionalized racial profiling through watchlists, no-fly lists, and expanded data collection. These measures, framed as neutral security protocols, have systematically linked race, religion, and perceived threat, embedding discriminatory practices into the management of global mobility.
[610] South Africa, *Repositioning Programme: Turnaround and Modernisation Strategy* (Pretoria: Department of Home Affairs, 2017), 9, https://static.pmg.org.za/170519dharepositioningprogramme.pdf.

management of risks at the South African border.[611] The APP system used for the event was officially implemented in November of 2009, just over six months prior to the official opening of the World Cup.[612] However, this system was enigmatic, especially in terms of whose data influenced the risk profiling system. The South African government claimed to have developed a "generic Advanced Passenger Processing (APP) interface," despite evidence that the country was already working with SITA, and a number of other actors to develop the system.[613] During this period, APP was associated with keeping "undesirable elements" [614] out of South Africa, and on the "crackdown on foreigners…and the prevention of conveyers assisting passengers to enter the country illegally."[615] Of note is that the system was often referenced as a way to stop the movement of "Hooligans."[616] In fact, one of the unique elements of the 2010 World Cup PNR system was that it not only cross checked local and international databases but also cross checked personal data against FIFA's own hooligan[617] blacklist.[618] This is significant in the modernization of South African PNR because of the fact that FIFA, a non-state entity, was granted access to and given influence over border security mechanisms traditionally managed by sovereign states. By integrating FIFA's hooligan blacklist into South Africa's PNR system,[619] the event blurred the lines between private governance and state security functions. This arrangement illustrates how mega-events can expand the authority of non-state actors in surveillance and mobility control.

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[611] The guarantees included an enhanced movement control system (eMCS) and better integration with Justice, Crime Prevention and Security (JCPS). South Africa, *Repositioning Programme*.

[612] South Africa, *Annual Report 2009/10* (Pretoria: Department of Home Affairs, 2010), https://www.dha.gov.za/files/Annual%20Reports/Annual_Report_2009-2010.pdf.

[613] South African Revenue Service, *Annual Report 2010–2011* (Pretoria: South African Revenue Service, 2011), https://www.sars.gov.za/wp-content/uploads/Enterprise/AnnualReports/SARS-AR-15-Annual-Report-2010-2011.pdf.

[614] Clayton Barns, "Plan to Weed Out World Cup Undesirables," *Independent Online (IOL) News*, December 10, 2009, https://www.iol.co.za/news/south-africa/plan-to-weed-out-world-cup-undesirables-467398.

[615] Department of Home Affairs (South Africa), *Annual Report 2009–2010,* https://www.dha.gov.za/files/Annual%20Reports/Annual_Report_2009-2010.pdf.

[616] Barns, "Plan to Weed Out World Cup Undesirables."

[617] 'Hooliganism' lacks direct racial origins but is associated with racism, especially in UK football hooliganism, where some hooligans exhibit racist behaviours. Research suggests this association has been used to conceal the extent of racism in football. Cf. Ben Jones, "Casual Culture and Football Hooligan Autobiographies: Popular Memory, Working-Class Men and Racialised Masculinities in Deindustrialising Britain, 1970s–1990s," *Contemporary British History* 38, no. 1 (2023): 95–117, doi:10.1080/13619462.2023.2278534.

[618] Greg Duncan, "App to Save DHA, Airlines Millions," *defenceWeb*, December 2009, https://www.defenceweb.co.za/security/civil-security/app-to-save-dha-airlines-millions/.

[619] Dider Bigo shows how European security has become intertwined with the EU's external security collaborations and shifting threat concepts. These threats include immigration, terrorism, criminality, and even football hooliganism, framed within the discourse of insecurity and its transnational mobility. Bigo identifies diverse actors, including professionals managing threats and producing security knowledge, who cooperate and compete over defining security issues. Authority in this field isn't derived from coercive capacity but from the power to define insecurity and propose legitimate responses. The collaboration of FIFA and the sharing of data with states and INTERPOL is important because it represents new, non-state, security actors. Didier Bigo, and Anastassia Tsoukala, *Terror, Insecurity and Liberty : Illiberal Practices of Liberal Regimes after 9/11* (Routledge, 2008).

Briefly, it is important to note that there is no history of hooliganism in South African football. FIFA's apprehension was unfounded and mirrored colonial legacies and stereotypes that associate African spaces with chaos and danger. Notwithstanding, FIFA was also concerned about European hooligan groups travelling to South Africa for the tournament. Ironically, this meant South Africa – without a history of hooliganism – was required to prepare for the violent behaviour of foreign European fans. FIFA applied a one-size-fits-all model of security, shaped by European experiences with hooliganism and this overlooked the fact that South African football culture was radically different. As such, FIFA 2010 represents a case[620] whereby Western institutions did not engage within local contexts. FIFA's fear of hooliganism in South Africa had less to do with local conditions and more to do with racist anxieties and Eurocentric security frameworks.

South Africa has stated that the main purposes of the APP system was to shift border control operations offshore; accelerate border processing times; verify passengers' entry eligibility before boarding a flight; assess/determine passengers' travel intentions; identify undesirable populations by using information beyond the travel document; detect unknown suspects through profiling; and to identify connections between passengers (e.g., reservations, seating arrangements).[621] This implies that PNR was being used for struggles that were still South African, and was not likely a direct implementation of a Western APP system. However, SITA also supported the development and implementation of the American Advance Passenger Information System (APIS). This is significant because the Western shift in the international security environment post-9/11 changed the expectation of security at mega-events in terms of how they were planned and how they were to be governed.[622] Due to the international nature of these events, those actors that were considered as a 'risk' were framed not only from a South African perspective but also that of the Global North; this had an impact on the security legacy of the technology used but also more generally in terms of those populations considered to be a risk. Interestingly, the APP system that was in place during the 2010 FIFA World Cup was always considered as a means to "serve the broader interests

[620] Or, *another* case where Western institutions fail to engage with the local context.
[621] Cf. R Marten, "Machine Readable Travel Documents (MRTDs): Key Challenges for the Future," International Civil Aviation Organization (ICAO), November 2, 2011, https://www.icao.int/Meetings/AMC/MRTD-SEMINAR-2011-DOHA/Documents/25_Marten.pdf.
[622] Cornelissen, "Mega Event Securitisation."

of [South Africa] and as part of the legacy of the 2010 World Cup."[623] The development of international security expectations for mega-events resulted in a risk assessment framework that was shaped not only by South African security concerns but also by the broader geopolitical priorities of the Global North.[624] This multifaceted response to risk classification had enduring consequences, both in terms of the technological infrastructure implemented during the 2010 FIFA World Cup and the populations disproportionately subjected to heightened surveillance.

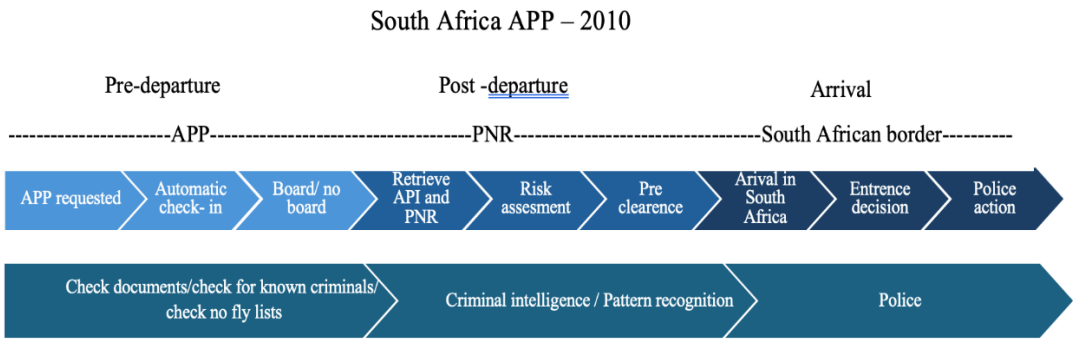

Figure 9: South African us of PNR data from pre-departure to arrival.

Description: This figure shows the sequence through which South Africa uses Advance Passenger Processing (APP) and Passenger Name Record (PNR) data from pre-departure through to arrival at the border. Before departure, APP triggers automatic checks on passenger documents, criminal records, and no-fly lists. After departure, PNR data is retrieved and analysed for risk, enabling pre-clearance decisions. On arrival, border officers make entrance decisions and, where necessary, police intervene. The lower band illustrates how criminal intelligence and pattern recognition support policing throughout the process.

Despite scrutiny from members of the South African government over the funding of the PNR system,[625] the South African government was able to meet all FIFA terms for aviation[626] and overall security for the

[623] Leon Morris, "Most Airlines Now App-Compliant," *defenceWeb*, July 2010, https://www.defenceweb.co.za/aerospace/aerospace-aerospace/most-airlines-now-app-compliant/.
[624] Specifically, the heightened risk of terrorism post-9/11, especially with the event's high-profile nature and global attention. Cf Anneli Botha, "The Threat of Terrorism to the 2010 Soccer World Cup in South Africa," *Counterterrorism Center at West Point* 1, no. 11 (October 2008), https://ctc.westpoint.edu/the-threat-of-terrorism-to-the-2010-soccer-world-cup-in-south-africa/?
[625] South African Revenue Service, *Annual Report 2010–2011*, 139.
[626] This is significant because despite concerns over the financial costs of modernizing their Passenger Name Record (PNR) system, the South African government successfully met FIFA's rigorous security standards. This underscores the pressure on

2010 World Cup.[627] The security legacy of the event included an enhanced aviation security environment, specifically the implementation of an updated PNR system. This is reflected in the reality that South Africa was the first country on the continent to implement an APP system that linked API and PNR, and was one of only thirteen states globally to do so.[628] With the implementation of a joint API and PNR system, South Africa became a leader in the international movement towards increased civil aviation security.[629]

The sophisticated PNR regime in South Africa is a security legacy of the 2010 World Cup. A security legacy is understood as the "range of tangible and intangible security strategies, structures and impacts (positive and negative) created for and by a sport mega-event that continue to have significance beyond the life of the event itself."[630] Specifically, the South African PNR regime is a 2010 World Cup security legacy in terms of technological infrastructure and practices; international cooperation and public-private partnerships; and governmental legislation.[631] The modernization that occurred in South Africa's PNR regime became permanent foundational elements of border management. The World Cup influenced the continued use of surveillance technologies in the country, influencing the governance of mobile populations long after the event. By incorporating global standards of data collection and risk profiling, the PNR system reinforced South Africa's alignment with international security practices and institutions. While the security context post-9/11 certainly placed security as a central issue, the advancements seen in South Africa's security landscape, and specifically its advancements with PNR, were not a direct response to the event of 9/11,[632] but rather of its bid to host the 2010 FIFA World Cup.

The South African government recognized the benefits of using PNR for national security purposes, including pre-emptive risk assessment; increased time to inquire into positive hits (and ensure that they are not false positives); profiling using PNR and APP data to identify previously unknown threats;

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host nations to conform to international security expectations. By fulfilling FIFA's aviation and security requirements, South Africa not only established itself as a capable actor in managing large-scale international events but also demonstrated how such events catalyze the rapid adoption of advanced surveillance technologies. The implementation of these systems under financial constraints reflects the broader geopolitical pressures involved in securing global events.

[627] Sports and Recreation South Africa, *South Africa's Report on the Implementation of the United Nations Convention Against Corruption (UNCAC)*, 2013, https://www.unodc.org/documents/treaties/UNCAC/CountryVisitFinalReports/2013_05_09_South_Africa_Final_Country_Review_Report.pdf

[628] Taplin, "South Africa's PNR," P1-2.

[629] Taplin, "South Africa's PNR," P1-2.

[630] Holger Preuss, "The Conceptualisation and Measurement of Mega Sport Event Legacies," *The Journal of Sport Tourism* 12, no. 3–4 (2007), 207–228, https://doi.org/10.1080/14775080701736957.

[631] Cf. Richard Giulianotti and Francisco Klauser, "Security Governance and Sport Mega-Events: Toward an Interdisciplinary Research Agenda," *Journal of Sport and Social Issues* 34, no. 1 (2010), 49–61, https://doi.org/10.1177/0193723509354042.

[632] As seen in the United States, for example.

comparison to no-fly lists; denial of boarding to 'undesirable' individuals before they depart to South Africa; additional security to passengers; and faster clearance of passengers. In addition, the government notes that APP data allows South Africa to focus its efforts on high-risk travellers while permitting low risk passengers to move quickly with limited formalities. APP, and specifically PNR, provide South African authorities with information on what individuals are doing – not just who they are. Further, it is noted that the system also provides access to "phone numbers, credit cards, full itinerary, history, associations with others, baggage (e.g. for interception by Customs), and other data repository for investigation of travelers who come under suspicion."[633] The detailed data found in PNR makes it possible for authorities to not only gather information on individuals (behaviours, personal relationships, medical history, religion, etc.) but it can also indicate what individuals might do in the future. Given the amount of information that PNRs provide, they have been increasingly sought by states as a tool for security and crime management, particularly against terrorism, making it possible to identify both individuals known to be a threat as well as those who may be an unknown threat.[634]

8.3 Global Data Circulation

The implementation of a PNR regime in South Africa prior to the World Cup in 2010 was part of an international security assemblage.[635] The period before the 2010 World Cup represents one where South Africa, with the assistance of FIFA, created a temporary security regime where external actors determined the security criteria for the event. It is important to note that while 9/11 did not directly influence South African PNR practices, it did clearly impact the perception of security by global actors and how mega-events were surveilled and secured.[636] Specifically, PNR is one of the tools that states can use to avoid the intelligence failure that led to the events of 9/11; specifically, the failure of intelligence agencies to connect the dots. In addition to using PNR, a key feature in preventing such security failures has been greater sharing of information between national and international agencies.[637] It is therefore not surprising

[633] State Information Technology Agency (SITA), "Electronic Border Management Overview," 2016, https://www.icao.int/ESAF/AFISECFAL/Documents/Afisecfal-Rasfalg-Afi%202016/SITA%20Electronic%20Border%20Management%20Overview%202016.pdf. 7.
[634] Enerstvedt, "Russian PNR System."
[635] Cf. Sophie Body-Gendrot, "Cities Security and Visitors: Managing Mega-Events in France," in *Cities and Visitors: Regulating People, Markets, and City Space*, ed. Lily M. Hoffman, Susan S. Fainstein, and Dennis R. Judd (New York: Blackwell Publishing, 2003), 39–52.
[636] Chad Whelan, "Surveillance, Security and Sports Mega Events: Toward a Research Agenda on the Organisation of Security Networks," *Surveillance & Society* 11, no. 4 (2014): 392–404, https://doi.org/10.24908/ss.v11i4.4722.
[637] Cf. Most countries now compare PNR data to INTERPOL lists.

that modernization of passenger processing and aviation security was a priority for the FIFA administration in the 2010 World Cup.

The securitization of the 2010 World Cup in South Africa was successful;[638] the country effectively shared the spaciotemporal management of a mega-event. The South African government had received assistance from the FIFA administration as well as from the organizers of the German 2006 FIFA World Cup to do so. The main form of assistance received was by way of building information and intelligence capacities, including the implementation of intelligence sharing agreements.[639] These efforts resulted in the creation of a centralized intelligence committee to share and co-ordinate intelligence with agencies outside of South Africa.[640]

In 2009, South Africa formally implemented Advance Passenger Processing (APP) to collect data on passengers before they arrived in South Africa.[641] For the lead up to the World Cup, Airline Liaison Officers (ALOs)[642] were incorporated and located at airports abroad to assist in the risk assessment screening of travellers who were departing for South Africa[643] – notably, these hubs were located in "Nairobi, Hong Kong, Amsterdam, Dubai, Frankfurt, Lagos, London and Mumbai." [644] This was considered to be a very successful endeavour whereby if a discrepancy was detected in a traveller's visa or passport, the passenger was denied a check-in.[645] In the implementation period prior to the World Cup, the South Africa government noted that 4,492 passengers were prevented from boarding. However, of the passengers who were denied a check-in, the majority were South African citizens returning to South Africa.

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[638] What remains ironic about the 2010 FIFA World Cup is the need for the Global South to perform state security in very visible ways to prove their modernity and competence. South Africa had been using PNR for at least two decades prior to the 2010 World Cup, and the Apartheid was key to the development of technologies of population management – there is room to suggest that perhaps the overt need to *show* a Western model of PNR was related to the fact that South Africa no longer has a white European government.

[639] Anonymous interview with author, Cape Town South Africa, December 13, 2022.

[640] South Africa Government. "Security Forces: National Joint Operational Centre Activated for the 2010 FIFA World Cup." May 2010. https://www.gov.za/news/media-statements/security-forces-national-joint-operational-centre-activated-2010-fifa-world.

[641] Department of Home Affairs (South Africa), *Repositioning Programme: Turnaround and Modernisation* Strategy (Pretoria: Department of Home Affairs, 2017), 9, https://static.pmg.org.za/170519dharepositioningprogramme.pdf.

[642] ALOs were not used after the World Cup because of budget constraints.

[643] Department of Home Affairs, *Repositioning Programme*.

[644] Government Communication and Information System (GCIS), "Government Assessment of the 2010 FIFA World Cup™," GCIS, July 14, 2010, https://www.gcis.gov.za/content/newsroom/media-releases/media-releases/government-assessment-2010-fifa-world-cup™.

[645] GCIS, "Government Assessment of the 2010 FIFA World Cup."

While the ALOs were discontinued prior to the end of the World Cup, the remaining elements of the DHA's measures developed for the World Cup, as well as the APP and the Movement Control system, have continued to play a key role in South African security. The success of the 2010 World Cup was at least in part because of the transfer of expert knowledge and practices between countries in the Global North and South Africa. There was an increase in the growth of security networks, and South Africa became privy to greater sharing of knowledge and security expertise.

For example, prior to the World Cup in June and July of 2010, South Africa signed an official agreement with INTERPOL to provide copies of their PNR data to the organization.[646] South African documentation alludes to the fact that the same data shared with INTERPOL would also be used by the DHA and South African Intelligence, and it would be cross checked with the SAPS 'hit-list functionality.'[647] The South African government also maintained a 'dangerous names' database – which primarily contained information on known hooligans and criminals – developed specifically for the World Cup that was developed with the assistance of INTERPOL and the International Football authorities. FIFA also provided a watchlist of undesirable individuals to INTERPOL.[648] In addition to APP information being cross checked against INTERPOL data, it was also "checked against Interpol's most dangerous persons list and the Scotland Yard database"[649] with commitments that "if positive we [DHA] will red-flag the passenger and advise airline staff not to board the person."[650] South Africa also signed a number of security-related and information-sharing Memoranda of Understandings (MoU) with the neighbouring countries[651] of Lesotho and Mozambique to assist with border management.[652] The World Cup security relationships and agreements that were created also led these countries, and others on the continent, to implement machine readable travel documents that were compatible with South African systems, including interconnected technical systems, notably PNR.

[646] South African Revenue Service, *Annual Report 2010–2011*.
[647] From all accounts, this is a general list of 'undesirable' personnel. The DHA 'no-fly list' is referred to as the Black List.
[648] Departure Control Systems (DCS Aero), "South Africa Advance Passenger Information," accessed March 31, 2025, https://dcs.aero/product/south-africa-api/.
[649] Barns, "Plan to Weed Out World Cup Undesirables."
[650] Barns, "Plan to Weed Out World Cup Undesirables."
[651] GCIS, "Government Assessment of the 2010 FIFA World Cup."
[652] There is no clear date to indicate when this MoU began or ended.

There are also several international corporations that South Africa has outsourced to help manage its borders and with which it shares information; these include iBorders and interVISTAS. iBorders is a service provided by SITA, the air transport IT and communications specialist. InterVISTAS played a significant role in the development of the PNR regime in South Africa in preparation for the 2010 World Cup.[653] InterVISTAS also assisted the South African DHA in the processing of passengers: an expert in the field, Aaron Beeson, was contracted through SITA to consult for the government on border management and international practices.[654] While it is impossible to identify the exact level of influence these actors have, they demonstrate the way in which PNR (and the processing of personal data and creation of knowledge) creates new spaces of governing where the distinction between public authorities and private authorities is increasingly indistinguishable.

The implementation of PNR and intelligence sharing for the 2010 FIFA World Cup represent very well the accumulation of security knowledge and practices that became part of the post-World Cup legacy. In addition to the physical security technology, the agreements with non-state organizations such as INTERPOL have continued up to today.

8.4 A Reflection on PNR and Race during the FIFA World Cup

The 2010 FIFA World Cup made an already established passenger processing regime (used for security purposes) more elaborate; even prior to the mass implementation of computer technology, PNR records were being used to extract personal data from the physical body upon, or prior to arrival on South African territory. The implementation of PNR in the context of the 2010 World Cup represents a sophistication of the racializing process that includes profiling and an illusion of equal inclusion. There is a strong connection between Race, identity, and security practices. While PNR techniques apply to all passengers indiscriminately, PNR also provides the illusion of non-discretionary inclusion. However, when looking at technologized security practices, it is important to consider that the non-discriminatory application of

[653] Anonymous interview, Cape Town South Africa, November 7 2025. Cf. Future Travel Experience. "Passenger Pre-Screening: Is the Best Defence a Good Offence?" June 2011. https://www.futuretravelexperience.com/2011/06/passenger-pre-screening-is-the-best-defence-a-good-offence/

[654] InterVISTAS, “South Africa Department of Home Affairs Border Management Consulting Services.”

PNR does not mean non-discriminatory security practices. Such practices may reinforce biases, especially given that racism and xenophobia is and has been prominent in South Africa.[655]

It is important to consider that the racialization process that may be embedded in contemporary PNR is connected to the historical use of PNR as part of the colonial project, and. specifically, the politics of population control. The colonial use of PNR to control mobile populations consolidated the states' racial categories.[656] The legacy of PNR as a colonial infrastructure constituted the material and technical condition of colonial rule, but there was little changed in the post-colonial era. This was especially the case because South Africa had a century-long history of "remote control" border management[657] and the period of transition to a new democratic government after the Apartheid inherited this logic. The modernization of the country's PNR system for the World Cup was not extraordinary because the country was already using data to manage mobile populations pre-emptively, and customs officers were understood as a secondary border to safeguard South Africa's security, and to manage immigration.

In the case of PNR in South Africa, and specifically during the pre-World Cup preparations, changes were influenced by Western ideas, interests, and values; these ideas and expertise were imported to South Africa with little scrutiny as to how they would operate outside of the context in which they were developed. There is little evidence that there was any consideration as to how PNR systems would interact with South African issues and problems[658] and if they were fit to do so. There is evidence, however, to suggest that racialized bodies moving through the South African border were treated with additional suspicion, and that border security measures were more strictly enforced than on white bodies.[659] As such, there was a risk that bodies were reduced to only a security threat, and that Race became a signifier of risk. This logic persists to this day because, in South Africa, white foreigners are thought of as investors whereas African foreigners are viewed in terms of potential competitors for resources.[660]

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[655] Kgomotso Michael Masemola, "The Airport Geography of Power as Site and Limit of NEPAD's Transnational African Assemblage," *Africa Development* 43, no. 3 (2018), 129, https://www.jstor.org/stable/26645583.
[656] Cf. This dissertation chapter 6
[657] Cf. This dissertation chapter 6
[658] Specifically, there was little evidence to show any concern over the reality that South Africa has historically been disproportionally concerned with immigration from other African countries. Even in the post-Apartheid era, governmental policies and public attitudes have continued to exhibit a heightened concern over individuals from other African nations.
[659] Cf. Masemola, "The Airport Geography of Power"; Jeff Handmaker and Caroline Nalule, "Border Enforcement Policies and Reforms in South Africa (1994-2020)," *ISS Working Paper Series / General Series* 686 (2021): 1–37, http://hdl.handle.net/1765/135642.
[660] Cf. Shepherd Mpofu, ed., *Interrogating Xenophobia in South Africa: Migration, Identity, and Media Representation* (Lanham, MD: Lexington Books, 2022).

Interestingly, the justification for the implementation of PNR and supporting surveillance practices for the World Cup were based on of a threat of terrorism; that is, as "part of a global security creep, and the reality of the post-9/11environment," which led to terrorism playing a major role in FIFA security planning.[661] The concerns emanated from "a history of terror attacks across different parts of the African continent that intensified in the post-9/11 context."[662] This justification was problematic because of the generalization of the African continent; specifically, South Africa was almost five thousand kilometres from the closest country on the continent that had experienced terrorism, and had a unique political, social, historical, and economic reality.[663] Simply stated, the suggestion that South Africa would be at risk of terrorism because it is located on the same continent as other countries that had experienced terrorism is poorly founded. While mega-events represent a risk of terrorism, at the time of the 2010 World Cup, the South African government asserted that there was "no known specific terror threat against the 2010 FIFA World Cup."[664] During this period there was no evidence of any significant threat of terrorism in South Africa – and, since the late 1990s, South Africa had played an active role is the global effort against Islamic extremism.[665] This inconsistency is important because PNR has been conceptualized as being situated within "intensification of practices of security with the last decade defined by the 'Global War on Terror'" despite the fact that much of the logic and related practices were developed in colonial population management.[666] Simply, the logic of South Africa modernizing and intensifying its PNR in wake of the World Cup within the absence of clearly defined threats seems to suggest that it did so simply to primarily fulfil the requirement of the international community. This is to say that the FIFA organization's focus on the threat of terrorism and its surveillance measures to contradict threats were more a reflection of Western insecurities related to terrorism and the standardization of practices in Western developed countries. The focus on terrorism by the World Cup organization demonstrates how framing sports mega-

[661] Kristine Toohey and Tracy Taylor, "Managing Security at the World Cup," in *Managing the Football World Cup*, ed. Stephen Frawley and Daryl Adair (London: Palgrave Macmillan, 2014), 180, https://doi.org/10.1057/9781137373687_10.
[662] Cornelissen, "Mega Event Securitisation," 3226.
[663] Prior to the World Cup, the most significant signs of terrorism were in Tanzania and Kenya.
[664] South Africa, "No Known Terror for the 2010 FIFA World Cup," Press Release, May 30, 2010, https://www.gov.za/news/media-statements/no-known-terror-2010-fifa-world-cup-30-may-2010.
[665] Scott Firsing, "South Africa, the United States, and the Fight Against Islamic Extremism," *Democracy and Security* 8, no. 1 (2012): 1–27, https://doi.org/10.1080/17419166.2012.653736.
[666] Berda, "Managing Dangerous Populations," 627.

events as terrorism targets creates artificial risk zones based on perception rather than concrete threats, thereby justifying expanded surveillance and security measures.[667]

SITA played a crucial role in enhancing border security during the 2010 FIFA World Cup by facilitating the use of PNR systems, which were integrated with global security measures aimed at preventing terrorism. Although the South African government denied any specific terror threat to the event, the adoption of rigorous security protocols, including advanced passenger profiling and use of global and local no-fly lists, reflected global post-9/11 security trends. It is important to emphasize the reality that mega-events like the World Cup often led to heightened surveillance, driven by perceived risks as opposed to actual threats.

SITA was crucial to facilitating and managing the South African PNR system, which was crucial to the World Cup security infrastructure, and contributed to South Africa being able to meet the security demands of FIFA. The public discourse related to SITA on the implementation of PNR in South Africa is one that placed the emphasis on public safety. The explanation provided by SITA[668] is one not of national security, but passenger safety[669] – especially, in light of the events of 9/11: "Every passenger has then been thoroughly checked. If I were a passenger, it would give me a lot of comfort."[670] The South African DHA, in contrast, focused on individuals that posed a risk to South Africa. Specifically, the DHA, stated in reference to SITA and the use of PNR that it "allowed us to concentrate our efforts on those suspects, hooligans and others, who posed a real risk to the country, speeding up the entry process for the majority of passengers upon their arrival."[671] It is important to take note of the contrast between the public messaging, particularly from SITA, that framed the PNR system as primarily being concerned with enhancing passenger safety, aligning with global post-9/11 concerns about terrorism and that of the South African DHA that emphasized the use of PNR for identifying and targeting specific individuals – those considered to pose a threat. This contrast reveals a deeper issue of risk profiling and selective scrutiny,

[667] Michael Atkinson and Kevin Young, "Shadowed by the Corpse of War: Sport Spectacles and the Spirit of Terrorism," *International Review for the Sociology of Sport* 47, no. 3 (2012): 286–306, https://doi.org/10.1177/1012690211433452.
[668] Vice president for IT aviation specialist Sita in the Middle East and Africa
[669] The significance of this is the assumption that such checks contribute to security without considering the potential for bias. While the intention is to instill confidence in passengers, it also raises concerns about privacy, racial profiling, and the broader implications of surveillance practices.
[670] "Pre-Clearance for Tourists to SA," *News24*, July 22, 2009, https://www.news24.com/news24/pre-clearance-for-tourists-to-sa-20090722.
[671] DCS Aero, "South Africa Advance Passenger Information."

suggesting that while the public was given a narrative of safety, the government's focus on certain risky populations suggests that PNR could be used to enforce exclusionary practices, disproportionately affecting specific populations considered high-risk.

The security measures related to the World Cup and PNR were framed as beneficial to the broader public but served to reinforce a system of racialized and political risk categorization. It is clear that the DHA understood PNR to be a useful tool in preventing access to specific populations considered to be a threat. However, there is little detail as to what, or who, is categorized as a threat. As such, the South African airports (embedded within the South African border) serve as an assemblage of technology, society, and Race. The vagueness of South Africa's description of who is a threat poses a risk that the South African airport is a space where individuals who have historically been marginalized by the state (anyone who was not white-European) are made exceedingly visible, not as a population that poses an inherent risk to the state but as a population that is deemed undesirable and thus subject to excessive surveillance. Alternatively, there is the possibility that through importing 'Western' conceptions of risk through the use of technology – such as through SITA technology – certain populations are stereotypically banned (notably, Muslim, Arab, African).[672] A further risk is that because of the historically racially motivated border policies, the African and Arab individuals moving through the South African border may have faced additional challenges at the South African border (compared to if they were moving through borders in the West using the same technology) and particularly during the period of the World Cup, which took place only sixteen years after the end of the Apartheid. Race continued to play a significant role in virtually all aspects of society, and certainly to a much greater extent than would have been seen in Europe or America.

The risk in South African PNR use is that it gives the illusion of complete control over mobile populations entering or departing South Africa. As mentioned previously, PNR typically works invisibly, and is only made visible to those excluded by it.[673] In other words, PNR technology targets only certain individuals and makes them hyper-visible. Specifically in reference to the World Cup, surveillance technologies have

[672] Cf. Mahmood Monshipouri, "Immigration Politics and the Rise of Islamophobia," in *Terrorism, Security, and Human Rights: Harnessing the Rule of Law* (Boulder, CO: Lynne Rienner Publishers, 2012), 207–242.
[673] This form of operation has been described by Didier Bigo as a ban-opticon where the focus of surveillance is concentrated on the small percentage of mobile populations that are deemed as undesirable. In short, while everyone is profiled, only few are monitored. Bigo, "Globalized (In)Security."

been described as having targeted African and Arabs who were labelled and monitored, whereas white individuals, even those linked to hooliganism, faced less scrutiny.[674] While South Africa had legally moved past Apartheid racial practices, racial profiling in the name of security remained prevalent. South Africa's use of PNR, especially during the World Cup period, disproportionally targeted African and Arab individuals, preserving racialized border practices under the pretense of security and inclusion.[675]

The surveillance assemblage that operated at the South African airports during the 2010 World Cup, and which PNR was central to, resulted in a situation where a "profile picture of surveillance is in monochrome: black criminals/traffickers and white tourists."[676] This reflects the fact that studies have shown that South Africans, regardless of Race or economic class, prefer white visitors over African visitors – white populations are seen as tourists whereas Africans are seen as a source of insecurity.[677] PNR has been key to this process: the aim was to include all people in a network of visibility – suggesting an "illusion of total inclusion"[678] – however, this inclusion is designed towards the strict monitoring and control of specific populations. The reality of PNR is that it creates control, not universal oversight. In addition, PNR operates through the use of established categories of identification such as nationality, and while not directly collected, it is very reasonable to assume that it also operates through profiles such as ethnicity and migratory status. The risk of profiling through PNR is that it de-politicizes mobility and it risks normalizing profiled categories of difference as genuine. This is concerning because, following the Apartheid, the country has been described as a "vortex of profiling African and Asian migrants who enter ports of entry unduly cast under the cloud of suspicion in advance."[679] Notably, those working at the DHA have been known to have carte blanche in determining who is permitted entry into the South African state and are known "to be stricter with African migrants."[680] This practice of racial profiling at ports of entry continues to perpetuate systemic inequalities, undermining efforts to foster inclusive and non-discriminatory border policies, while reinforcing historical patterns of exclusion and suspicion towards African and Asian mobile populations.

[674] Masemola, "The Airport Geography of Power."
[675] Masemola, "The Airport Geography of Power."
[676] Masemola, "The Airport Geography of Power," 125.
[677] Steven L. Gordon, "Understanding Evaluations of Foreigners in Modern South Africa: The Relationship between Subjective Wellbeing and Xenophobia," *Journal of Happiness Studies: An Interdisciplinary Forum on Subjective Well-Being* 19, no. 2 (2018): 545–566, https://doi.org/10.1007/s10902-016-9838-6.
[678] Masemola, "The Airport Geography of Power," 125.
[679] Masemola, "The Airport Geography of Power," 124.
[680] Masemola, "The Airport Geography of Power," 136.

Figure 10: Arrival sign for passport control during the 2010 World Cup. Note that African passports are considered different than other passports. This is significant given the known reality that South Africa considers immigration from other African countries to be a threat.[681]

Description: A photograph of an airport immigration sign in Cape Town dividing travellers into three queues: "South African Passports," "African Passports," and "Other Passports." Each category is displayed in bold white lettering on a blue background, accompanied by directional arrow symbols. The sign reflects differentiated border-processing lanes based on nationality.

During the World Cup period there was intense scrutiny on South African security (including secure borders) and there was an amplification of stereotype profiling that was dangerous because it risked normalization. This was especially true in airports because they represented an exceptional space. Given the history of a racially motivated border management in South Africa, the use of PNR at airports, through the technical and human actants, risked preserving racial categories in PNR, and through profiling, risked becoming a form of racialization.[682] There is a risk of institutionalizing racial profiling and legitimizing discriminatory practices within the PNR system.

The design of PNR algorithms, and the technologized categorization of difference, risks being harmful to certain populations more than others. The risk is that these technologies legitimize bias as fact while making certain categories visible and risky, and others invisible and neutral. The larger problem is that much of the classification of mobile populations is invisible to everyone except those whose mobility is affected. In the case of PNR, there is no possibility to contest the computer's decision, and often, even the

[681] Image Source: Masemola, "The Airport Geography of Power," 126.
[682] Cf. This dissertation chapter 5

humans acting on the suggestion of the machine do not understand why the specific decision has been made. Racial bias in the case of the development of PNR for the 2010 World Cup is a concern because technology development occurs in a specific political context and often replicates existing biases and power hierarchies that already exist in society. In addition, PNR technology operates in a global context, not a local context, and PNR risks reinforcing structures that reinforce global power relations with little oversight or accountability. This was particularly concerning because technology does not replace human actors. South African officials explained that while PNR puts "powerful tools into the hands of the existing officials," their own border agents were "still going to rely on their instincts."[683] Simply, despite the technological capabilities of PNR, the subjective judgments of border agents, who are detailed as often being corrupt and holding xenophobic bias, still influence outcomes in a way that perpetuates inequalities.

As noted previously, PNR is situated in a sociotechnical assemblage that reinforces the ideas of belonging (sameness) and exclusion (differentness). PNR is very much a tool that "excludes certain groups in the name of their future potential behavior."[684] The nature of PNR is one that includes sameness, and even in South Africa, the African body (especially, from outside South Africa) is deemed as otherness.[685] Especially in the case of South Africa, surveillance practices such as PNR that seek to control mobility (by inclusion and exclusion) cannot be fully understood without considering the early interventions of technology in mobility management. The concern with contemporary PNR is that it is inherently based on profiling, and there is consensus that both the West (specifically the US and EU countries) and South Africa have a history of racially biased border management. This is to say, regardless of if South African or Western data were used to structure PNR algorithms, the result is that African/Muslim bodies are increasingly likely to be deemed as 'other' and excluded in the name of security. The contemporary area of mobility continues to experience colonial-era power imbalances between Races and populations.

[683] Duncan, "App to Save DHA, Airlines Millions."
[684] Hempel and Töpfer, "The Surveillance Consensus," 161.
[685] Masemola, "The Airport Geography of Power."

Figure 11: Group of tourists at the O.R. Tambo Airport in 2010. There is a prevailing notion that the West interprets South African history whereby Africans are understood as a source of danger to the white population in South Africa.[686]

Description:s A photograph showing a group of travellers walking through an airport terminal wearing matching white T-shirts printed with a large red block of text on the back that reads: "PLEASE DON'T KILL ME, I AM ONLY A TOURIST, NOT THE BOER." The image depicts the group from behind, highlighting the coordinated message displayed on their shirts.

While the implementation of enhanced PNR during the period of the 2010 World Cup cannot be said to be overtly Race-based, there is no evidence that safeguards were implemented to prevent racialization from occurring due to existing inherent biases that transitioned, intentionally or not, into current decision-making algorithms through legacies of colonial border management systems. Contemporary PNR does not directly attribute Race onto bodies but rather risks operating through racialization and the effect of material power relations. Simply, if Race continues to structure global politics, it cannot be ignored in the design and implementation of surveillance technologies such as PNR, and the impact ought not be reduced to a simplified version of Race (white body vs. others); there needs to be active effort to ensure that these systems are not embedded with bias.

[686] Image Source: John Knox, "Please Don't Kill Me, I Am Only a Tourist!" *Banderas News*, April 10, 2010, https://www.banderasnews.com/1004/nw-theboer.htm.

8.5 Conclusion

The events of 9/11 did not have a direct impact on the development of South Africa's PNR system. Instead, the South African PNR regime is a security legacy of the 2010 FIFA World Cup. While South Africa had already been using PNR for national security purposes, hosting the 2010 World Cup represented a renewal and modernization of the country's PNR technology. While 9/11 heightened global security concerns, South Africa's focus on modernizing its PNR systems was driven more by the specific security requirements set by FIFA for hosting the World Cup, as well as the need to ensure a safe and seamless event. The modernization of PNR in South Africa was aligned with global trends in mobility management and surveillance. Thus, rather than the World Cup representing a new security endeavour, it represented an expansion of the existing surveillance network through the incorporation of new technology, increased intelligence sharing, and cooperation with public and private sector partners and other foreign governments and agencies.

Hosting the World Cup exposed South Africa to new pressures, external and internal, including international intelligence networks and surveillance practices. The nature of the World Cup is one whereby multiple organizational arrangements, including security measures, are temporary but leave behind long-lasting legacies. However, PNR demonstrates that the effect of these securitized measures often overlook the potential contribution to existing inequalities. Further, this transnational exchange of security expertise and technology reinforces the integration of local PNR systems within broader global surveillance networks, solidifying their role in regulating mobility well beyond the immediate context of the event. The case of PNR demonstrates a need to take seriously the relationship between Race and security legacies in the context of mega-events, particularly in the Global South, because they often intertwine with broader social, political, and economic dynamics.

Chapter 9: PNR, Race, and Security Legacies After 2010

9. Introduction

South Africa has been using PNR for the management of mobile populations since the colonial period. However, the 2010 FIFA World Cup saw an intense sophistication of South African PNR capabilities and practices. The increased securitization of the country's border that occurred during the World Cup remains a key feature of the South African state. Airport security now depends heavily on technology for pre-emptive and predictive risk management of mobile populations through the use of big data, which becomes comprehensible through algorithms. The principal advancement in airport security by states globally over the last two decades has been the use of Passenger Name Record (PNR) data to collect and assess substantial amounts of personal information to determine the risk that individual passengers pose. However, exactly how PNR technology impacts mobile populations is often overlooked. It is therefore necessary to not only consider how PNR was initially implemented as a technology to support national security practices and later for the securitization of the 2010 World Cup but also how it continues to function after the mega-event. Further, attention must be given to how these technologies can be used for purposes other than for those which they were developed and originally implemented. While PNR systems were initially justified for aviation security and counterterrorism, their expansion into immigration enforcement has led to questions about racialized border practices. The cause for alarm in the case of South Africa is that what many believe to be unbiased technologies are being used to limit African migration to the country in a way that does not necessarily comply with South African or international laws.

While South Africa has followed the global trend towards increased use of digital technology, its use in border management raises substantial ethical concerns. The history and design of South Africa's PNR regime must be considered in order to determine if Race is more deeply embedded in algorithms than typically acknowledged by the state. The design could have significant impact on the ways in which risk calculations create new invisibilities that have already been exacerbated by racial biases of the colonial and Apartheid eras. To understand how Race is embedded in South Africa's PNR regime as a seemingly neutral technology, it is important to outline what is known about the algorithms. Since PNR is a

technology of national security, it is not possible to access South African PNR algorithms;[687] for this reason, it is necessary to critically interrogate the socio-technical systems in which Race risk being embedded. It is know for certain what data is inputted into the algorithms, and theoretically the consequences, with much more certainty than the dataset that South Africa used to develop the PNR algorithms and the intention of its use – specifically because the country is monitoring everything that may be threatening.[688] PNR systems risk being embedded with Race in the data inputs, design assumptions, and institutional priorities that reflect broader structures of power—particularly racialized and geopolitical logics of threat assessment. The algorithm's opacity must not be mistaken for neutrality; rather, it risks functioning to obscure and legitimize the reproduction of bias under the guise of technocratic objectivity. Thus, even unseen, PNR algorithms are likely to participate in and reinforce existing forms of racialized surveillance and mobility management.

9.1 What Is Known about South African PNR Post-World Cup

In South Africa, the PNR algorithms operate at two main stages: pre-border and upon arrival. The pre-screening prior to immigration starts no later than two hours before the departure of a flight arriving in or departing from South Africa.[689] This is important because only 10 percent of customs functions are performed at the port of entry, demonstrating the importance of algorithms in the pre-examination of passengers before they reach the South African territory.[690] The pre-border stage is also when a traveller's PNR data is cross-referenced with more than seventeen data bases; the country's own V-list (South

[687] This is not unusual; Security tends to be marked by secrecy. It is recognized that secrecy shapes how knowledge is produced—and therefor, perspectives may always remain fractional. Information on security practices in South Africa is widely known to be more inaccessible than in Europe due to the different security culture related to; differences in transparency norms, the prioritization of national security over public access, fewer resources dedicated to documenting and publishing such practices, and the legacy of secrecy within state institutions shaped by Apartheid-era governance. Additionally, academia tends to concentrate more heavily on the Global North, contributing to gaps in visibility and scholarship around the South African PNR security landscapes.
Cf. Pallister-Wilkins, Polly, Marieke de Goede, and Esmé Bosma, eds. *Secrecy and Methods in Security Research : A Guide to Qualitative Fieldwork*. Abingdon, Oxon ; Routledge, 2019.
[688] Pieter Van der Merwe, "Why the UN Is Worried About South Africa's Surveillance Methods," *Huffington Post*, May 31, 2017, http://www.huffingtonpost.co.za/pieter-van-der-merwe/the-diary-of-a-paranoid-spy-boss_a_22103032/.
[689] South Africa, *Summary of the Customs Value Chain and the Proposed Role for the BMA*.
[690] South Africa, *Summary of the Customs Value Chain and the Proposed Role for the BMA*.

Africa's version of a no-fly list);[691] nearly 100 different police data bases;[692] South African passports issued, lost, and stolen; and South African visas issued in order to detect the status of a traveller.[693] If a positive match is found before boarding, the airline has an opportunity to consult the Department of Home Affairs (DHA) operational centre in South Africa to verify the in/admissibility of a passenger, and a government override could be performed. The success of South Africa's use of pre-border algorithms can be seen in the fact that 623 travellers were denied boarding flights to South Africa by various airlines between December 9, 2016 and January 14, 2017; it is likely that as the South African PNR has continued to modernize that these statistics have continued to improve.[694] It is important to note that as soon as the PNR data is run through the algorithm, there is also 'back office' processing of travellers to the country completed by the DHA, supported by the relevant law enforcement and security agencies of the government.[695] For example, "the data fields in PNRs with mobile phone information and credit card information obviously allow for easy linking of the PNR data to the other massive 'bulk' data collections held by the intelligence agencies, on global e-communications and financial transactions."[696] Simply, law enforcement bodies gain unprecedented access to travellers' personal and financial activities. This raises concerns about privacy and data protection and also about how PNR systems can extend beyond aviation security to function as tools for broader state surveillance. The ability to cross-reference and analyze vast amounts of information heightens the risk of profiling, particularly for already marginalized populations, and further embeds security-driven approaches in immigration and border control policies.

The second stage of screening occurs at the port of entry whereby the South African Revenue Service (SARS) and the DHA rely primarily on traveller information from the PNR system.[697] As the PNR data is matched, there is a human review of the data; if the risk is negated, the electronic processing is over, but if there is a potential match, there is further examination at the port of entry.[698] The first process

[691] The DHA V-list is described as "a list that takes on a life and questionable legality of its own, courtesy of the Department" and has the names of individuals who are not welcome in the country. Chris Watters, "Visas and Entry into South Africa," Bregman Moodley, accessed March 25, 2025, https://www.bregmans.co.za/visas-and-entry-into-south-africa/.
[692] Fabrizio Di Carlo, "Processing API/PNR Data through INTERPOL Databases," INTERPOL, 2019. https://www.icao.int/ESAF/Documents/meetings/2019/ICAO%20Technical%20Worskhop%20ICBWG%202019/7-%20Fabrizio%20Di%20Carlo%20-%20INTERPOL%20-%20Session%203%20(day%201).pdf.
[693] South Africa, *Summary of the Customs Value Chain and the Proposed Role for the BMA.*
[694] South Africa, *Summary of the Customs Value Chain and the Proposed Role for the BMA*.
[695] South Africa, *Summary of the Customs Value Chain and the Proposed Role for the BMA.*
[696] South Africa, *Summary of the Customs Value Chain and the Proposed Role for the BMA*.
[697] South Africa, *Summary of the Customs Value Chain and the Proposed Role for the BMA.*
[698] South Africa, Summary *of the Customs Value Chain and the Proposed Role for the BMA.*

identified is the submission and approval of the primary traveller's documents; for example, some international travellers must use their passports when purchasing international air travel tickets, and in some cases must apply for visas from the DHA. Accordingly, travel documents are checked against the traveller's passport in the country of origin prior to departure.[699] Customs officials have access to the data involved, including API and PNR, but the data is not processed by SARS at this stage. At this point the DHA is responsible for issuing visas, facilitated by Visa Facilitation Services (VFS) and South African embassies. It is only once the traveller has departed from their country of origin that South African authorities are alerted to any risk associated with a particular traveller.[700] Simply, PNR is continuously shifting border enforcement to pre-departure stages and reinforcing remote surveillance mechanisms.

The DHA notes that PNR data is required for all flights for a complete profile of mobile populations to support a risk-based approach to immigration.[701] In addition, the information collected under PNR is used by South African Intelligence and by the SAPS.[702] PNR data is also compared to the South African Stoplists and used for criminal investigations.[703] In addition, PNR data will be used by the South African authorities to identify those who overstay their visit in South Africa.[704]

Based on the PNR parameters that have been inputted into the algorithms, there are no obvious signs of racial biases beyond those that can only be assumed if only the effect of the algorithms is considered. As such, South Africa's PNR regime is seemingly objective and it appears that largely unbiased knowledge is produced in the PNR assessments where algorithms interpret data and apply risk calculations to passengers. Subjectivity is removed from the profiling equation and may help temper the debate on Race issues to some extent. However, the joint agency of PNR algorithms and officials in South Africa is unquestionable. Algorithms conduct the initial work in sorting and assigning risk profiles to mobile populations; however, the algorithms still rely on human analysts who act on the algorithms' decisions. For the entirety of the life of a PNR algorithm, it must collaborate with human and technological actors. While an algorithm can process data in quantities and at a speed humans cannot, the algorithm does not

[699] South Africa, *Summary of the Customs Value Chain and the Proposed Role for the BMA.*
[700] South Africa, *Summary of the Customs Value Chain and the Proposed Role for the BMA*.
[701] Parliamentary Monitoring Group, "*Responses to Questions*" (February 2011), https://pmg.org.za/files/docs/110208responses.doc.
[702] Parliamentary Monitoring Group, "*Responses to Questions.*"
[703] Parliamentary Monitoring Group, "*Responses to Questions.*"
[704] Parliamentary Monitoring Group, "*Responses to Questions.*"

replace human agency that acts on the PNR decisions and who may make judgment calls regarding a decision. In other words, while an algorithm can have autonomy in its development and decision making, it is not self-sufficient: the algorithm cannot act on its decision, which implies that algorithms and humans have a "mutual constitution of entangled agencies."[705] This means that even if an algorithm could be created without any bias, human actors could continue to influence how the algorithm operates. As such, the body is "a continual crossing of multiple encoded borders – social, legal, gendered, racialized."[706] The integration of digital technologies and data in border management simply translates into a site of multiple encoded borders – social, legal, gendered, and racialized – that ultimately shape the contemporary management of mobility.

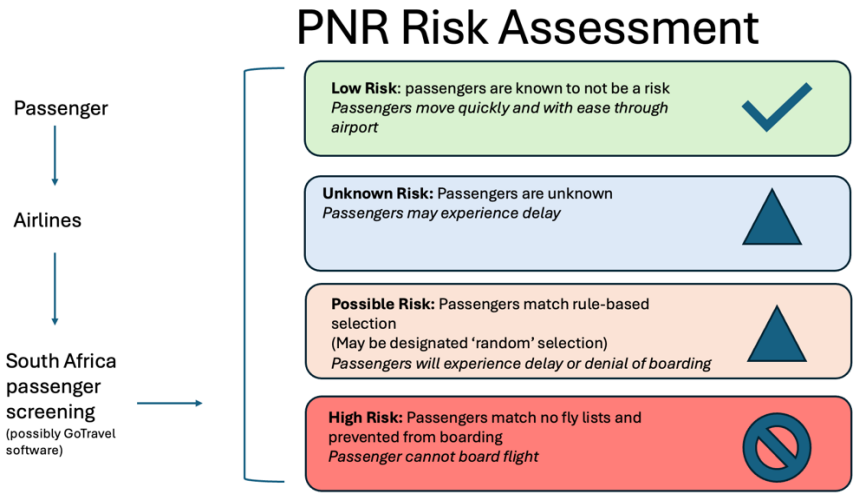

Figure 12: PNR Assessment Process in South Africa

Description: A diagram explaining South Africa's PNR (Passenger Name Record) risk assessment system. It shows four risk tiers—Low, Unknown, Possible, and High—each with a color block and icon, outlining how passengers are categorized and what delays or restrictions they may face. Arrows on the left illustrate the flow from passenger to airline to South African passenger screening.

[705] Karen Michelle Barad, *Meeting the Universe Halfway Quantum Physics and the Entanglement of Matter and Meaning* (Durham: Duke University Press, 2007), 33.
[706] Amoore, "Biometric Borders."

9.2 What Is Still Enigmatic about South African PNR Post-World Cup

While it is possible to understand the South African PNR regime in terms of its inputs (the data points collected by the country for PNR purposes)[707] and how the decisions are acted on by its human counterparts, the original dataset and instructions that the algorithms receive remain elusive. Algorithms can learn to perpetuate injustices related to Race in invisible ways and can therefore produce new borders for those seeking to enter South Africa. Through PNR algorithms, some individuals will be labelled risky and treated as a potential threat to South African security because of the nature of their Race, place of birth, or economic status. PNR data inherently has an impact on who is included and who is excluded, and the burden of exclusion is always uneven. However, what remains difficult to assess is whether or not, or more likely to what degree, South Africa's original dataset or risk parameters used to develop their PNR algorithm was embedded with racial biases.

The 2014 additions to the South African Immigration Act, specifically to *Immigration Act 13 of 2002*, provided the legal foundations for PNR and sought to streamline immigration procedures by the DHA. The DHA is responsible for the identification of immigration status for all foreigners at the borders, and only the DHA has lawful authority to make decisions on an individual's entry or exit of the country.[708] The primary changes made to the Act were related to immigration at the ports of entry and the legally mandated transfer of information found in Advanced Passenger Processing (PNR and API). The concern is that the legacy of the 2010 World Cup Advanced Passenger Processing system, and the implementation of section 35, is that the South African state began to use this information in a way that risks violating the human rights of individuals travelling to South Africa; especially those individuals seeking asylum, or those individuals who are from countries that have a high number of asylum seekers in South Africa. As such, there is sufficient cause to worry that individual data may be misused by the South African government and that the data and system may be vulnerable to abuse – especially because with PNR systems, there is no opportunity to appeal decisions made. There is considerable evince to suggest that PNR is being used to limit the number of foreigners seeking political asylum in South Africa. In 2010, South Africa had one of the largest accounts of asylum applicants globally, and, in 2024 the country

[707] Cf. This dissertation chapter 7
[708] South Africa, *White Paper on International Migration* (Pretoria: Department of Home Affairs, 2017), http://www.dha.gov.za/files/dhawhitepaper.pdf.

received approximately 250,000 refugees and asylum seekers.[709] With the current number of individuals seeking asylum in South Africa, the DHA estimates that, without any new cases, it would take sixty-eight years to address the current backlog of cases.[710] However, within the DHA, there remains a belief that refugees are economic migrants seeking to abuse the South African asylum system, and this "has given rise to an anti-asylum seeker bias" within the DHA.[711] South Africa, a key destination for migrants and refugees from various parts of Africa and Asia, has historically framed cross-border mobility as a matter of national security and with the use of technology such as PNR has effectively criminalized migration.[712]

In recent years, South Africa has become less suspicious of white populations crossing the border.[713] Notably, employees of the Department of Home Affairs (DHA) stationed at airport customs and immigration offices are known to exercise broad discretion in the application of border control measures, often enforcing stricter scrutiny on African migrants.[714] The idea that South Africa would direct its PNR based on a socioeconomic vector is logical: PNR is usually focused on the threat of terror, and yet South Africa "has largely escaped the terrorism problem plaguing countries like France, the UK and the US, and African countries further north, like Nigeria and Kenya."[715] It has been suggested that the country has no significant threats to national security,[716] and it is possible to suggest that the intentional use of PNR may have different purposes than those of its Western counterparts.[717] In fact, it has been suggested that the Apartheid concepts of Race may remain prevalent in the country because there hasn't yet been a significant reimagining of the role of Race in political, social, or economic spheres of society.[718]

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[709] Beverly Goldberg, "Refugees in South Africa: What You Need to Know," HIAS, accessed January 26, 2025, https://hias.org/news/refugees-south-africa-what-you-need-know/.
[710] Neil Walker, "South Africa's Border Management Authority Dream Could Be a Nightmare," *Border Security Report*, October 5, 2020, https://www.border-security-report.com/south-africas-border-management-authority-dream-could-be-a-nightmare-2/.
[711] Roni Amit, *All Roads Lead to Rejection: Persistent Bias and Incapacity in South African Refugee Status Determination,* Johannesburg: African Centre for Migration & Society 2012), 10, http://www.migration.org.za/wp-content/uploads/2017/08/All-Roads-Lead-to-Rejection-Persistent-Bias-and-Incapacity-in-South-African-Refugee-Status-Determination.pdf.
[712] Global Detention Project, *Immigration Detention in South Africa: Stricter Control of Administrative Detention, Increasing Criminal Enforcement of Migration,* June 2021, https://www.globaldetentionproject.org/immigration-detention-in-south-africa-stricter-control-of-administrative-detention-increasing-criminal-enforcement-of-migration.
[713] Masemola, "The Airport Geography of Power," 124.
[714] Masemola, "The Airport Geography of Power," 136.
[715] Duncan, *Stopping the Spies,* 14.
[716] Duncan, *Stopping the Spies.*
[717] Duncan, *Stopping the Spies.*
[718] Jeremy Seekings, "The Continuing Salience of Race: Discrimination and Diversity in South Africa," *Journal of Contemporary African Studies* 26, no. 1 (January 1, 2008): 2, http://www.tandfonline.com/doi/abs/10.1080/02589000701782612.

It is interesting to note that post-Apartheid immigration policy and management of refugees was largely based on the American system.[719] The shift towards a securitized approach to migration was largely influenced by the significant involvement of the US government and the reliance on the implementation of security focused on migration policies and border control strategies modelled after those used in the US.[720] It is crucial to note that the American immigration system had not only repeatedly failed to meet their intended goals but also raised significant human rights concerns.[721] Under the *Aliens Control Act* and later the *Immigration Act 13* of 2002, administrative procedures have made it relatively simple to detain and deport individuals suspected of being undocumented migrants. However, this broad authority has also led to the wrongful detention and deportation of legitimate populations who were perceived as being "too Black."[722] The significance of this is how immigration enforcement in South Africa has historically been shaped by racialized assumptions and broader patterns of exclusion and discrimination embedded in the country's border management practices even in the post-Apartheid era.

As previously mentioned, the 2014 amendments to the South African *Immigration Act 13* of 2002, section 34.5, require that every aircraft submit PNR information to the government electronically. Since the end of the Apartheid, the *Immigration Act* has continued to place the dominant emphasis on security, and specifically the preemptive management of undesirable populations. The 2017 *White Paper on International Migration* argued that South Africa had emerged as a key destination for irregular migrants who were perceived as a security threat to the nation's economic stability and sovereignty.[723] Since the formation of the Border Management Authority (BMA),[724] the key legal frameworks – the *Refugees Act*, the *Immigration Act*, and the *Border Management Act* (BMA) – give the power to detain individuals for illegal entry and give significant discretion in deciding whether to arrest and detain foreign nationals or

[719] Jeff Handmaker and Caroline Nalule. *Border Enforcement Policies and Reforms in South Africa (1994-2020).* Working Paper No. 686, Erasmus Research Institute of Management (ERIM), Erasmus University Rotterdam, July 2021. https://repub.eur.nl/pub/135642/wp686.pdf. Cf. Jonathan Crush, and David A. McDonald. "Introduction to Special Issue: Evaluating South African Immigration Policy after Apartheid." *Africa Today* 48, no. 3 (2001): 1–13. http://www.jstor.org/stable/4187430.
[720] Handmaker and Nalule. *Border Enforcement Policies*
[721] Handmaker and Nalule. *Border Enforcement Policies* https://repub.eur.nl/pub/135642/wp686.pdf.. Cf. Human Rights Watch, "Slipping through the Cracks: Unaccompanied Children Detained by the U.S. Immigration and Naturalization Service," April 1, 1997, https://www.hrw.org/report/1997/04/01/slipping-through-cracks/unaccompanied-children-detained-us-immigration-and.
[722] Amit and Monson, *Securitisation and the Securitisation,* 16.
[723] South Africa, *White Paper on International Migration*.
[724] Cf. This dissertation chapter 8

deny entry, often without considering the potential for refugee protection.[725] The accelerated border procedures[726] outlined by the BMA are likely to violate the principle of non-refoulement, and have detrimental impact on the fairness of asylum procedure.[727] It should be considered that the securitization and criminalization of migration in South Africa, PNR could be utilized to further restrict access to the country under the guise of security concerns.

While it is not possible to gain access to the original dataset,[728] or to gain precise insight into the intentions of the South African PNR design, there is considerable evidence that PNR risk profiling is directed to, and renders visible, refugees and the "labour migration from eastern and southern African countries."[729] PNRs have been used to mitigate the strain somewhat since they provide an additional tool to the government to admit or exclude individuals. State agents, police, and intelligence services using PNR data have the capacity to define and identify undesirable travellers, which will have "profound effects on the freedom of those individuals."[730] As previously noted, it has been suggested that beyond issues of crime and terrorism, South Africa's use of PNR and APP collection permits the country to limit migrants and asylum seekers.[731] Simply stated, PNRs can help to identify and limit the arrivals of refugees. The South African Home Affairs Minister, when discussing PNRs, stated that:

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[725] Fatima Khan and Nandi Rayner, "Migration Management: The Antithesis of Refugee Protection – The Case of South Africa," ASILE, October 2, 2020, https://www.asileproject.eu/migration-management-the-antithesis-of-refugee-protection-the-case-of-south-africa/.

[726] The Border Management Authority's accelerated border procedures were implemented to enhance efficiency and security at all points of entry. These measures include the integration of various law enforcement and immigration agencies to streamline border control operations (border management has become much more centralized). The use of advanced technology, such as PNR but also biometric systems and automated passport processing, are integral to expedite entry and exit while maintaining security standards. Risk profiling and intelligence sharing allow authorities to focus on high-risk travellers and cargo, reducing unnecessary delays for low-risk individuals. Additionally, provisions for frequent travellers, including trusted traveller programs and fast-track lanes, further improve processing times. Enhanced coordination between agencies, such as customs, immigration, and law enforcement, ensures that border checks are conducted swiftly and effectively, balancing security with the smooth movement of people and goods. Data and technology are central to the accelerated border procedures.

[727] Khan and Rayner, "Migration Management."

[728] All relevant parties refused to provide any significant information on PNR in terms of datasets or how/who structured the data.

[729] Aderanti Adepoju, "Leading Issues in International Migration in Sub-Saharan Africa," in *Views on Migration in Sub-Saharan Africa: Proceedings of an African Migration Alliance*, ed. Catherine Cross, Derek Gelderblom, Neil Roux, and Jonathan Mafukidze (Pretoria: HSRC Press, 2006), 25.

[730] Zureik and Salter, *Global Surveillance and Policing*, 40.

[731] María-Teresa Gil-Bazo, *Responses to Secondary Movements of Refugees: A Comparative Preliminary Study of State Practice in South Africa, Spain, and the USA*" Amman: United Nations High Commissioner for Refugees, 2011), 4, http://www.unhcr.org/4ef3321b9.pdf.

> You must remember, international law refers to the first safe country an asylum seeker enters.… [W]e must ask if we are the first safe country because international law regulates this matter.… But if it is clear that South Africa is the first safe country then you cannot ask. This is all it means.[732]

In addition, the Minister stated that:

> [T]here is a longstanding first country of asylum principle in international law by which countries are expected to take refugees fleeing from persecution in a neighbouring state, South Africa has not been strictly applying this principle.[733]

The use of PNR allows for the pre-screening of mobile populations and may provide the opportunity for the South African state to prevent the arrival of potential refugees, especially of those not originating from its neighbouring countries. The Home Affairs Minister has effectively explained that PNR is a pre-emptive risk management tool that allows for the removal of refugees and asylum seekers before their arrival in South African territory. This means that asylum seekers "arriving at South Africa's borders who are not originating from neighbouring countries" may risk further examination of their claims and possible refoulement.[734] PNR may be used to automatically prevent refugees from reaching South Africa if they have not arrived directly from their state of origin.[735] The implication of the use of PNR as an automated technology has implications for the control of mobile populations, but specifically the control and management of marginalized populations, including refugees. The role of PNR and AI in the management of global mobility increasingly raises racial and ethical concerns; this is true especially in South Africa, where migration is often criminalized, and could further marginalize refugees by limiting their mobility and access to legal protections under the pretext of security enforcement.[736]

Current PNR practices allow the DHA to prevent "would-be asylum seekers who had passed through another country before entering South Africa" from reaching the territory.[737] Although the legality of this is debated, "it served to reduced demand on the asylum system."[738] Therefore, the use of PNR data may automatically prohibit asylum applicants who do not enter South Africa directly from their country of origin. This suggests that South African government policies are used to manage the movement of

[732] Gil-Bazo, *Responses to Secondary Movements of Refugees*, 5.
[733] Gil-Bazo, *Responses to Secondary Movements of Refugees*, 5.
[734] Gil-Bazo, *Responses to Secondary Movements of Refugees*.
[735] This was specifically referenced in relation to the growing number of Somalians entering South Africa through Zimbabwe.
[736] Ysefa Loshitzky, "Fortress Europe: Introduction," *Third Text* 20, no. 6 (2006): 629–634, https://doi.org/10.1080/09528820601068609.
[737] Amit, *All Roads Lead to Rejection,* 17.
[738] Amit, *All Roads Lead to Rejection*, 17.

individuals (and to manage risk), and they are a tool to prevent refugees from arriving in South Africa – therefore preventing the refugees from accessing legitimate asylum procedures in the country. As noted, the use of PNR by the state, then, is not only to identify threats for pre-emptive risk management related to serious crime, but also to prevent legitimate access to political asylum.

A central concern, then, about the use of PNR is the misuse of the security policies to prevent access to asylum procedures and the misuse of personal data. The new *Immigration Act* of 2014 fails to clearly indicate what purpose PNR data collection serves, and what the data will be used for. What is of particular interest in suggesting that PNR may be used to prevent legitimate asylum claims is that the country's 1998 *Refugees Act* does not incorporate the terms "safe third country" or "country of first asylum." As such, PNR data can allow pre-emptive rejection of asylum applications that could not be done on South African territory due to the lack of legal basis. PNR is a means for the government of South Africa to implement and apply the 'first safe country,' 'safe third country,' and 'country of first asylum' rules. Specifically, the DHA has publicly stated that pre-screening will not take place when South Africa is the first safe country when entering from the countries of origin (as mentioned, this limits asylum seekers to countries South Africa shares a border with) but that:

> it will be applicable where [South Africa] is not the first safe country of entry from a person's country of origin. If an appeal is lodged same will be made whilst a person is not in [South Africa] as is the case with other applications.[739]

PNR pre-screening permits the expeditious blocking of likely asylum seekers arriving at South African borders if they do not originate from bordering countries, even if it is a risk to the non-refoulement principle. The point is that the screening of migrants through PNR has the potential to lead to the refoulement of refugees and other infringements of the rights of migrants wishing to seek asylum. While it is not possible to determine the extent to which South Africa's PNR is embedded with Race, there seems to be a similar logic with South Africa's PNR regime in efforts to limit refugees and migrants, not only inadmissible individuals, as was practiced in the colonial and Apartheid eras.[740] In the case of South Africa, it seems that too often issues of security rush implementation of technological solutions to manage global mobility without considering the full implications of such technology.

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[739] "Response by the [Department] to Submissions Made on the Immigration Amendment Bill, 2010 [B32–2010] on 25–27 January 2011 [Portfolio Committee on Home Affairs]," Parliamentary Monitoring Group, 8 February 2011, https://pmg.org.za/files/docs/110208responses.doc.
[740] Macdonald, "Colonial Trespassers."

9.3 Conclusion

PNR algorithms are not neutral in nature, but highly political.[741] The ways Race is embedded in PNR algorithms remains largely 'unseen' in the material aspect of the decision making. While this agency is not a replacement for human agency, human decision making is still influenced by the algorithmic calculations notwithstanding that the information and the calculations are inaccessible and likely unintelligible to the individual making the decision. Increasingly, the accountability of decision making about passengers is hidden and moved from individuals to machines, this means that the result of decision making is most obvious to those excluded by it. This is particularly concerning in the case of South Africa because of the historical intersection of Race and Refugee status both being shaped by racial bias and the criminalization of migration in the country. There is evidence to suggest that even in the post-Apartheid era individuals from other African countries face increased discrimination at the border and are perceived as a security threat to the nation.

In South Africa, the PNR regime has an increasingly significant role in the racialized restriction of refugee mobility. While PNR is presented as a neutral technology of mobility management, South African officials have been public about its potential use in limiting mobility of undesirable populations. It is likely that the country's PNR system now relies on data proxies- such as nationality, travel route patterns, or travel histories- that are deeply entangled with global Race hierarchies. Pre-emptive passenger filtering, enabled by PNR, contributes to the externalization of borders and the datafication of asylum control, where surveillance technologies are used to prevent access to the physical border and prevents asylum claims from being made. Race risks playing a central role in this process, Race is operationalized through algorithmic suspicion and techno-bureaucratic regimes that systematically render certain bodies as being a risk. In this way, PNR systems function not simply as tools of border control but as instruments of racialized exclusion within a global security infrastructure. In the context of PNR algorithms, the removal or omission of race as a data point does not prevent the reproduction of racial bias in use.

While it is currently not possible to confirm that South Africa is using PNR as a means to restrict access to the state for particular populations, the use of PNR data may "act as automatic bars for asylum applicants who do not enter South Africa directly from the country of origin."[742] Evidence suggests that South

[741] Hoijtink and Leese, *Technology and Agency*, 10.
[742] Hoijtink and Leese, *Technology and Agency*, 6.

African government policies to manage the movement of individuals and risks serve as a tool to prevent refugees from arriving in South Africa from their country of origin – thereby preventing refugees from accessing asylum procedures in the country.[743] Consequently, the use of PNR by the state is not solely for identifying threats and pre-emptive risk management related to serious crime, but also as a tool to prevent just access to asylum, in consideration of international and human rights law. Simply put, there is no evidence that South Africa is attempting to avoid misusing its PNR system. However, information on its use in South Africa remains minimal.

[743] Hoijtink and Leese, *Technology and Agency*, 8.

Chapter 10: Interlude – South Africa (Co)de Dependency and Co(de) Bordering

Border management in South Africa is driven by data, including PNR data. PNR technology is increasingly facilitating cross-border security collaborations between states. Since the end of the Apartheid, South Africa has recognized that contemporary threats are not exclusively military, and that there is a requirement to collaborate with other actors. As such, when looking at PNR, and specifically bias, in its operation in the management of global mobility, the classic understanding of sovereignty and border control needs to be understood as an assemblage: states do not act independently but rather with increasing collaboration with non-state actors and other states. This is particularly true in the case of South Africa and its management of mobile populations. There is a need to reflect on the fact that South African management of mobile populations does not occur in isolation and that biases can be influenced by other actors, state and non-state.

10.1 Management

The Airport Company South Africa (ACSA) plays a crucial role in managing the South African border, particularly through its oversight of the country's major airports. The ACSA is a state-owned company[744] and, by offering airport consultancy services, the ACSA aims to expand its presence and leverage of intellectual property and to monetize it.[745]Currently, the ACSA owns O.R. Tambo International Airport, Cape Town International Airport, King Shaka International Airport, King Phalo Airport, Chief Dawid Stuurman Airport, Upington Airport, George Airport, Bram Fischer International Airport, and Kimberley Airport.[746] ACSA currently manages other global international airports outside of South Africa with the "the strategic intent to leverage [their] skills and capacity."[747] The ACSA also assisted with Brazil's Guarulhos International Airport, specifically during the 2014 FIFA World Cup- whereby Brazil also notably implemented PNR technology.[748] Additionally, it is noted that the ACSA had a role in managing Kotoka International Airport in Ghana. The ACSA also has a sister agreement with Munich, which opened new areas of expertise to exchange ideas and experiences related to IT and security. It is noted that this

[744] Airports Company South Africa (ACSA), *Annual Report 2023*, accessed February 11, 2025, 2025, https://nationalgovernment.co.za/entity_annual/3540/2023-airports-company-south-africa-(acsa)-annual-report.pdf.
[745] Airports Company South Africa (ACSA), "FY2020/21–FY2022/23 Corporate Plan 2022–2023," accessed December 10, 2024, https://static.pmg.org.za/ACSA_CORPORATE_PLAN_2021-_2023_SIGNED_BY_THE_MINISTER.pdf.
[746] Airports Company South Africa (ACSA), *Annual Report 2023*.
[747] Airports Company South Africa (ACSA), "FY2020/21–FY2022/23 Corporate Plan 2022–2023."
[748] Airports Company South Africa (ACSA), "Milestone in Our History," accessed March 31, 2025, https://www.airports.co.za/about-us/airports-company/milestone-in-our-history.

agreement represented a new avenue "for collaboration that will benefit our passengers and operations through the development of new technologies and products."[749] While the capacity of the ACSA is not explicit, it is apparent that there is room for South African influence in airports abroad. However, it must not be overlooked that there were previous claims, which have not yet been substantiated, that the Civil Aviation Authority in London "instructs" the ACSA on aviation security.[750] The representative at ACSA only confirmed that they did not know it to be the case but that they follow global best standards.[751] Further, the ACSA notes that it does not have direct access to PNR, but that it recognizes PNR as being a crucial tool of border management; however, it is unclear if ACSA has any influence over its adoption of PNR in the states of the airports it helps to manage.[752]

The ACSA currently or has:[753]

- Managed Guarulhos International Airport, Brazil's busiest airport. Focused on upgrading infrastructure, improving operational efficiency, and preparing for major global events.
- Provided technical and advisory services for airport operations and infrastructure improvements at India's Chhatrapati Shivaji Maharaj International Airport.
- Provided consulting services for operational improvements of Ghana's Kotoka International Airport.
- Worked with airports in the Middle East and Southeast Asia (including Thailand), providing expertise in security, infrastructure, and operational management.
- Reported to have worked with airports in Liberia, Zambia, and Rwanda

[749] Airports Company South Africa (ACSA), "Airports Company South Africa and Munich Airport Extend Sister Airports to Further Areas of Cooperation," Media Release, March 13, 2017, https://www.airports.co.za/Documents/Munich%20Airport%20Agreement%20Release.pdf.
[750] Rachel Hall, *The Transparent Traveler: The Performance and Culture of Airport Security* (Durham, NC: Duke University Press, 2015), 160.
[751] Anonymous interview with author, Cape Town, South Africa, October 18, 2022.
[752] Anonymous interview with author, Cape Town, South Africa March 21 2022.
[753] Airports Company South Africa. *Integrated Annual Report 2019.* Airports Company South Africa, 2019.

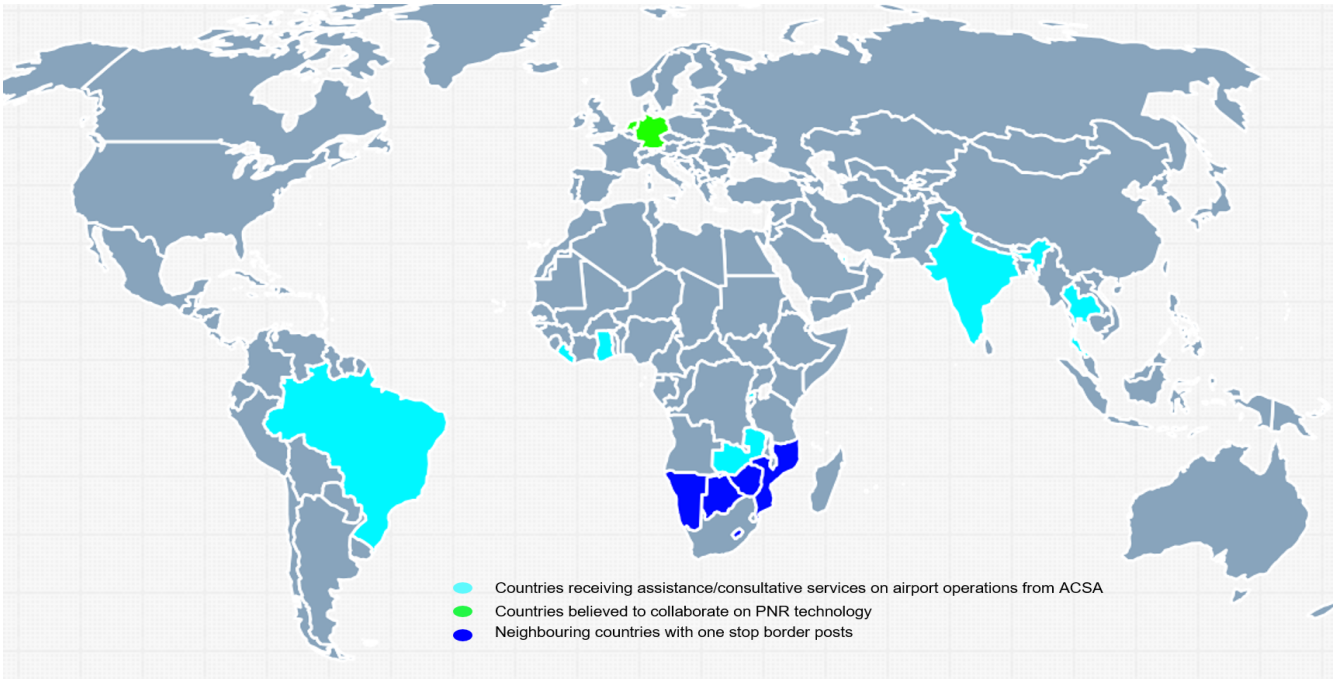

Figure 13: Map of ACSA global activities

Description: A world map highlighting countries connected to ACSA; those receiving airport-operations assistance, those believed to collaborate on PNR technology, and neighbouring states involved in one-stop border-post projects. The image highlights Brazil, India, Ghana, Thailand, Liberia, Zambia, Rwanda, Ghana, and Germany.

10.2 One-Stop Border Posts

PNR is now used at all of South Africa's ports of entry; data is collected and utilized using the same technology and the same data bases used in aviation. This is significant because South Africa has established 'One-Stop Border Posts' with five bordering countries (Lesotho, Botswana, Zambia, Zimbabwe, and Mozambique), which includes data transfer agreements. The One-Stop Border Posts are designed to streamline border-crossing processes, improve efficiency, and reduce delays. Additionally, this project was established through the use of public-private partnerships.[754] This approach is said to facilitate the distribution of risk between the government and the private sector, thereby alleviating pressure on the national budget.[755] It is also anticipated to enable the government to leverage private sector expertise in infrastructure development and benefit from enhanced financial flexibility.[756] The only

[754] South Africa, Department of Home Affairs, "White Paper on International Migration for South Africa," *Government Gazette*, July 28, 2017, http://www.dha.gov.za/files/dhawhitepaper.pdf.
[755] South Africa, Department of Home Affairs, "White Paper on International Migration for South Africa."
[756] South Africa, Department of Home Affairs, "White Paper on International Migration for South Africa."

elements that can be confirmed at this time is that the function of the One-Stop Border Post requires a harmonization of technical systems with neighbouring countries.[757]

The South African agreement with Zimbabwe is particularly interesting because the two governments are working together to develop an IT system that will enable real-time data exchange, creating a shared platform for border officials on both sides of the crossing.[758] This shared platform aims to streamline processes such as passenger screening, customs declarations, and cargo inspections, ultimately reducing delays and improving overall efficiency at the border. By integrating their systems, both countries can better track the movement of goods and people, improving security and ensuring compliance with national and international regulations. These initiatives represents a significant step towards regional cooperation, allowing both South Africa and Zimbabwe to improve border security, trade facilitation, and economic collaboration in a mutually beneficial manner.

The current state of the One-Stop Border Post is precarious. PNR operations are evident at all ports of entry, including land crossings. A key element of this process is the consolidation of customs and immigration checks into a single location. The Government of South Africa is pushing to further integrate public-private partnerships into border management, with the head of the BMA stating that the department "was never meant to work alone." [759] What is significant about the One-Stop Border Post is that it increasingly moves away from state bordering towards intra-state collaboration. As a result, South Africa is pushing for an integrated, collaborative border management approach that involves multiple stakeholders, both internally and externally, in order to effectively manage borders.

However, this shift could also present challenges, especially given South Africa's comparative power on the continent.[760] As countries collaborate more closely and share data, there is a risk that biases embedded in border security systems – such as those based on racial profiling – could be amplified across borders, or shared between states. This is especially the case if border agencies collaborate in terms of policy and

[757] South Africa, Department of Home Affairs, "White Paper on International Migration for South Africa."
[758] South Africa, *One-Stop Border Post Policy* (Pretoria: Department of Home Affairs, 2022), https://www.dha.gov.za/images/PDFs/OSBP_POLICY-_MAY2022.pdf.
[759] Martin Guy, "BMA Commissioner Calls for Private Sector Involvement to Help with SA's Border Management," defenceWeb, November 15, 2024, https://www.defenceweb.co.za/security/border-security/bma-commissioner-calls-for-private-sector-involvement-to-help-with-sas-border-management/.
[760] Murilo Gomes da Costa, "South Africa as a Leading Regional Power in Africa? An Analysis of the Implementation of the African Union, Auda-Nepad and Agenda 2063," *Revista Brasileira de Política Internacional* 66, no. 2 (2023): e019. https://doi.org/10.1590/0034-7329202300219.

share intelligence that disproportionately targets certain racial or ethnic groups. However, there is currently very limited public information of the new border management technologies and how intra-agency cooperation is implemented, but there is no evidence that ensure that these systems are designed with fairness and transparency in mind.

While border management is crucial for any state, in South Africa, the function extends beyond border security to encompass a framework that ensures national safety, supports economic growth, and fosters environmental sustainability.[761] Increasingly, technology allows collaboration not only between South African government departments but also between other states. The BMA believes that by "sharing information, resources, and expertise, [they] are able to respond more effectively to threats."[762]

The BMA has also stated, "Tech companies can help us with data analytics, border surveillance, risk assessment, [and] faster and more efficient trade routes."[763] However, the increased reliance on technology may introduce new ways for bias to be embedded in the process and confounding accountability for any future potential biases. Risk assessment tools rely on large datasets and predictive algorithms to identify potential threats. There is always the possibility that these systems reflect historical biases (which, globally, have tended to privilege white populations) and reinforce racial profiling. The use of big data in border control means that decisions about who can cross borders, who is considered a threat, and who gets prioritized for additional screening and scrutiny are increasingly determined by algorithms rather than by human agents. This shift does not eliminate bias; instead, it encodes and automates it.

South Africa's surveillance practices are not isolated but are inherently connected with global security practices through the exchange of technology, expertise, and policy frameworks. The country serves as both an adopter and innovator, applying colonial-era population control strategies within modern global security paradigms. This dynamic reinforces the circulation of surveillance knowledge between South Africa and the broader international community. The One-Stop Border Post run by the Border Management Authority of South Africa engages with organizations like INTERPOL, ICAO, the UN, and the World Customs Organization, which provide expertise on PNR, surveillance, and risk management.

[761] Gomes da Costa, "South Africa as a Leading Regional Power in Africa?"
[762] Gomes da Costa, "South Africa as a Leading Regional Power in Africa?"
[763] Gomes da Costa, "South Africa as a Leading Regional Power in Africa?"

Chapter 11: Co-Bordering: South Africa's PNR as a State/Non-State Assemblage

11. Introduction

The South African government has increasingly relied on third parties, often private actors, to operate its PNR border regime. Increasingly, South Africa is collaborating with actors beyond its state borders, specifically with respect to PNR, and there is now a complex assemblage of both human and non-human actants as well as state and non-state actors. South African officials note that it is with "interagency collaboration, public–private collaboration, and technological innovation" that the South African government can "effectively meet the challenges presented by modern borders."[764] This complicates locating bias and accountability in PNR because of the number of actors involved. In addition, there is a risk that the heavy reliance on private companies could lead to the prioritization of efficiency as opposed to ethical considerations and obligations of the South African state.

While borders have conventionally represented the limits of a sovereign territory and have been an obvious site of the sovereign's expression of inclusion and exclusion, PNR and the digitalization of border management practices demonstrate that a greater number of actors, more so than the sovereign state, express power over global mobility. The increased digitalization of border management requires changes to how a state manages mobile populations and increased cooperation between actants. This chapter argues that the South African PNR regime represents not only a complex sociotechnical assemblage but also an increasing situation of co-bordering with other states and non-state actors. This is a notable change to the concept of state sovereignty and affects who makes decisions regarding global mobility.

The Department of Home Affairs (DHA) in South Africa has explained that the use of PNR in South Africa is related to the reality of the risks of non-secure borders in the country:

> Non-secure borders could enable the trafficking of drugs, weapons, contraband, and terrorist funding, material related to weapons of mass destruction, conflict minerals, wildlife and people. Common security issues at borders included criminal acts, technical violations, transnational organised crimes, terrorist threats and threats to the integrity of border management.[765]

[764] Anonymous interview with author, Cape Town, November 13, 2023.
[765] B. Mashile, "Border Management Authority Bill [B9-16]: Home Affairs, SAPS & National Treasury Briefing" Parliamentary Monitoring Group, August 16, 2016, https://pmg.org.za/committee-meeting/23073/.

As such, South Africa has, since the end of the Apartheid, increasingly focused on the technological management of mobile populations.[766] Understanding the contemporary PNR regime as a sociotechnical assemblage is incomplete if the public and private companies that affect the security setting are not examined. Non-state organizations are increasingly setting the immigration agenda in South Africa in terms of influencing what categorizes a risky individual. Currently, the South African PNR regime can be understood not only as a sociotechnical assemblage but also as a state (South African) non-state (SITA, INTERPOL, and the UN) assemblage. The South African PNR regime has relied on non-state actors since 1995 to support the use of PNR to develop and enforce immigration control and the management of global mobility.[767] However, an examination into South Africa's PNR demonstrates the lack of regulation and accountability of deployed technology. In addition, the state's power over inclusion and exclusion of mobile populations is obscured by technology and the apparent neutrality of deployed technology.[768] An in-depth inquiry into the non-state actors involved in South African PNR shows that different non-state actors interact and cooperate in South African border management while also creating and altering institutions and practices. PNR as a global security assemblage has significant implications for how Race is understood in relation to PNR as well as the relation between the South African state and non- state actors that alter the structure of global political power. In order to demonstrate that sociotechnical, public-private nature of the South African PNR regime, this chapter proceeds in three main steps: first, this chapter explores the assemblage of actants in the post-FIFA World Cup era of PNR, with a focus on how Race may be embedded in the technical practices mandated by South African law; second, it focuses on how PNR permits non-traditional actors to enforce the management of mobile populations; and finally, it looks at the use of technology acquired from private actors. This chapter shows that PNR is increasingly complex, and that there continues to be reasonable risk of racial bias embedded in the practice.

11.1 South African PNR since the FIFA World Cup

Since 1999, South Africa has emphasized the need to invest in technological systems to manage mobile populations, and specifically the move away from the Apartheid-era compliance-based models in favour of risk-based models.[769] While South Africa had been using technological systems to manage mobile

[766] This is significant as South African airports continue to be the busiest on the continent.
[767] Cf. This dissertation chapter 8
[768] Stephan Scheel and Funda Ustek-Spilda, "On the Politics of Expertise and Ignorance in the Field of Migration Management," *Environment and Planning D: Society and Space* 37, no. 4 (2019): 663–681. Cf. Stephan Scheel, *Autonomy of Migration? Appropriating Mobility within Biometric Border Regimes* (New York: Routledge, 2019).
[769] Cf. This dissertation chapter 8

populations for over a decade before the 2010 World Cup, the mega-event exceptionally altered the foundations of the country's border management with regard to the use of technology, data sharing, and the structure of border operations.

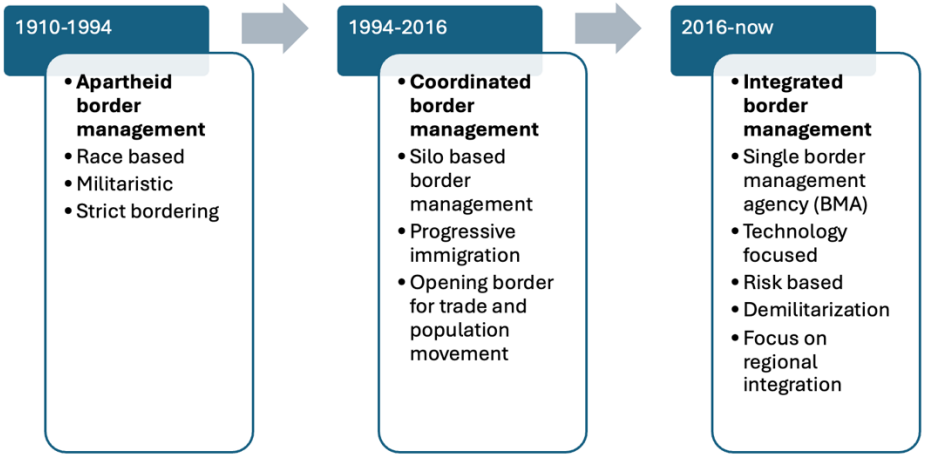

Figure 14: History of Border Management in South Africa

Description: A timeline graphic summarizing the evolution of South Africa's border management. It shows three periods—1910–1994, 1994–2016, and 2016–present—each with a labeled box outlining the dominant border management approach: apartheid-era militarized control, post-1994 coordinated but siloed management with more openness, and the current integrated, technology-driven, risk-based system under the Border Management Authority (BMA).

The 2010 FIFA World Cup represented a shift away from a multi-agency approach to border management and a greater shift towards utilization of private companies to assist in border security. The World Cup facilitated the introduction of the Inter-Agency Clearing Forum (IACF) that set the foundations for the inter-agency collaboration and the move towards a single border management agency. This move was further facilitated by the reality that the post-Apartheid multi-agency approach bred fragmentation, generated "silo mentalities and facilitate[d] high levels of corruption."[770] Since 2013 the country's border management has been in a state of transition; this is reflected in the fact that since 2014 very little has been published in the country regarding PNR and, among officials, there is very little coherency on the current state of PNR in the country. The South African government is currently amending the country's border strategy and there is a general sentiment that the current regime is unsuitable to the current risk

[770] Mike Masiapato, Historical Context Of Multi-Agency Approach For Border Management, *BMT Issue 8,* August 2022, 21. https://www.ibmata.org/wp-content/uploads/2022/08/BMT_Issue_08_Aug2022.pdf.

setting. Even with the implementation of the Border Management Authority (BMA) in 2023, there is an understanding that little has improved regarding corruption amongst South African border officials.[771] The BMA is responsible for all operations relating to border law enforcement functions, including immigration control.[772] By all accounts, the BMA should have the primary role in PNR, yet although, South African officials were unable to confirm that this was the case,[773] it has been stated that the DHA has transferred all immigration functions to the BMA.[774] As such, the BMA is responsible for the management and operations of all seventy-two ports of entry in South Africa, including the nine international airports. The DHA is responsible for the management of international migration and, as such, oversees the Immigration Services Branch and the new Border Management Authority project.[775] Immigration Services is responsible for implementing immigration and refugee systems, which includes the administration of PNR systems.[776] Inference, however, suggests that the BMA is also responsible for enforcing immigration law[777] and that PNR contributes to a risk-based approach to border management and the management of mobile populations – particularly undesirables and refugees/asylum seekers.

The BMA falls under the DHA[778]and has inherited many of the problems of the DHA. For example, experts suggest that the "culture of abuse and corruption in Home Affairs will probably extend to the new authority."[779] Like the DHA, the BMA is infiltrated with corruption.[780] Reports continue to show that mobile populations are able to bribe[781] South African officials into entering the country.[782] In addition, the

[771] Anonymous interview with a security professional, Cape Town, South Africa, October 29, 2024.
[772] Border Management Authority (BMA), "About Us," accessed October 4 2021, https://www.bma.gov.za/about-us/.
[773] Throughout the research period, this question was posed to each of the twenty government officials.
[774] Masiapato, "Historical Context"
[775] South Africa, *Annual Report 2016–2017* (Pretoria: Department of Home Affairs, n.d.), October 4 2021, https://nationalgovernment.co.za/department_annual/183/2017-department:-home-affairs-annual-report.pdf.
[776]South Africa, *Annual Report 2016–2017.*
[777] South Africa, "New Border Management Authority is a Boost for Our Country's Security and Development," State of the Nation, October 9, 2023, https://www.stateofthenation.gov.za/newsletter/new-border-management-authority-is-a-boost-for-our-countrys-security-and-development.
[778] South Africa, "Joint Statement by the Border Management Authority (BMA) and the Public Service Coordinating Bargaining Council (PSCBC)," Department of Home Affairs, April 12, 2023, https://www.dha.gov.za/index.php/statements-speeches/1664-joint-statement-border-management-authority-bma-public-service-co-ordinating-bargaining-council-pscbc.
[779] Walker, "South Africa's Border Management Authority Dream Could Be a Nightmare."
[780] ProtectionWeb, "Home Affairs Minister Admits There Is Corruption at SA Ports of Entry," defenceWeb, September 26, 2024, https://www.defenceweb.co.za/security/border-security/home-affairs-minister-admits-there-is-corruption-at-sa-ports-of-entry/.
[781] It is not uncommon for individuals from Zimbabwe to drive across borders, even with legitimate documents, as opposed to flying, because borders are "less official" and land borders are more likely to accept bribes. Anonymous interview with author, Cape Town, South Africa, April 3, 2022.
[782] South Africa Parliamentary Monitoring Group (PMG), "Committee Question 26193," October 1, 2024, https://pmg.org.za/committee-question/26193/.

DHA is understaffed and under-resourced; functioning at approximately 42 percent capacity.[783] Simply, it is entirely plausible that the department would be operating ineffectively. In 2022, there were claims that the DHA postponed projects related to the 'new' PNR.[784] This is significant because while advancements in technology can contribute to a government's capacity to manage its borders, border security professionals still act on the data and in all accounts are the front line against threats. Thus, regardless of how effective the PNR algorithms are, they are likely not able to work as effectively as in situations where border management is operating effectively. Without adequate staffing and resources, the DHA's ability to leverage PNR technological advancements, and to manage and enforce border security effectively, is severely limited, leaving the system vulnerable to inefficiencies and exploitation.

There is not only the risk that BMA officers operate at their own discretion at the borders but also a risk that the BMA itself is founded on xenophobic principles, which are deeply rooted in the state.[785] For example, the act that created the BMA is based on national security concerns and includes strong anti-migrant undertones.[786] Nearly all reports related to the BMA since its conception in 2023 have focused on illegal and irregular migration as a primary threat.[787] Government officials have also disproportionately correlated xenophobia with illegal migration and poor border management. While the BMA and the use of PNR represent the securitization of migration in South Africa, there is a legitimate risk that PNR could be misused or embedded with xenophobic racism. Specifically, there is a risk that PNR will learn from and act on data and decisions of BMA employees accused of being xenophobic and learn from legislation that is anti-migrant in nature, which could risk affecting African mobile populations disproportionately to others.[788]

PNR is essential to the DHA and the country's "risk based approach ensures the highest possible degree of certainty, security and efficiency in support of national security, priorities and interests, while

[783]South Africa, *Annual Performance Plan 2021*, accessed February 11, 2025, https://static.pmg.org.za/Minister_of_Home_Affairs_DHA_APP_2021_low_res.pdf.
[784] South Africa Department of Home Affairs, *Annual Performance Plan 2021*, accessed February 11, 2025, https://static.pmg.org.za/Minister_of_Home_Affairs_DHA_APP_2021_low_res.pdf.
[785] There is a known culture of abuse and corruption.
[786] Aimée-Noël Mbiyozo and Ottilia Anna Maunganidze, "South Africa's Border Management Authority Dream Could Be a Nightmare," *ISS Today*, August 11, 2020, https://issafrica.org/iss-today/south-africas-border-management-authority-dream-could-be-a-nightmare.
[787] Parliament of South Africa, "Department of Home Affairs Steps Up Efforts to Address Illegal Migration," July 16, 2024, https://www.parliament.gov.za/news/department-home-affairs-steps-efforts-address-illegal-migration.
[788] Mbiyozo and Maunganidze, "South Africa's Border Management Authority Dream Could Be a Nightmare."

preventing illegal migration through the ports of entry."[789] Despite the Government of South Africa referring to a 'new PNR,'[790] the last mention of PNR in official government publications was in a SARS performance plan of 2015–2016.[791] No explanation was given by South African officials regarding how the new PNR might differ from the 'old' PNR. From this publication, it was noted that a goal of South African departments in relation to PNR was to expand the customs functions and to include Customs Border Control Unit (CBCU) activities.[792] This expansion indicates a continued effort to strengthen the integration of border control measures, but the lack of further details or updates on the implementation of the 'new' PNR raises concerns about the effectiveness and transparency of these changes. Furthermore, the absence of clear communication regarding these developments suggests potential challenges in aligning technological advancements with the realities of managing border security, particularly in light of the DHA's culture of corruption and known resource constraints.

PNR is key to the BMA because it assists in managing international migration. As of 2024, the DHA continues to run the APP system, which included PNR data.[793] The DHA notes the value of PNR in the contemporary global security environment because it allows South Africa to "see and target undesirable visitors before they even board a flight from their destination."[794] This gives the South African state the capacity to determine what classifies an undesirable person and allows the state the capacity to prevent the arrival of undesirable populations to South Africa in the name of national security.[795] It is important to note that in South Africa 'national security' is defined by the country "as a nation defending its sovereignty and the integrity of its state and institutions; ensuring safety and security; and providing for its people."[796] Simply, PNR and digital passenger data are used to identify mobile undesirable populations

[789] South Africa Department of Home Affairs, *Annual Report 2017*, 2025, https://nationalgovernment.co.za/department_annual/183/2017-department:-home-affairs-annual-report.pdf.
[790] Anonymous interview with author, Cape Town, South Africa, November 1, 2024.
[791] South African Revenue Service (SARS), *Annual Performance Plan 2015/16*, 2015, https://www.sars.gov.za/wp-content/uploads/Enterprise/Strat/SARS-Strat-15-Annual-Performance-Plan-2015-2016.pdf.
[792] South Africa Department of Home Affairs, *Annual Report 2017*, 2025, https://nationalgovernment.co.za/department_annual/183/2017-department:-home-affairs-annual-report.pdf.
[793] Anonymous interview with author, November 1, 2024. Note that in government speeches it is referred to as *an* APP system. Cf. Njabulo Bheka Nzuza, "Speech Delivered by the Deputy Minister of Home Affairs Hon. Njabulo Bheka Nzuza on the Occasion of the Home Affairs Budget Vote," Republic of South Africa, Department of Home Affairs, July 10, 2019. https://www.dha.gov.za/index.php/statements-speeches/1270-speech-delivered-by-the-deputy-minister-of-home-affairs-hon-njabulo-bheka-nzuza-on-the-occasion-of-the-home-affairs-budget-vote.
[794] Nzuza, "Speech Delivered by the Deputy Minister of Home Affairs."
[795] Nzuza, "Speech Delivered by the Deputy Minister of Home Affairs."
[796] ¹Government of South Africa, *Government Gazette No. 42162, Notice No. 8*, January 2019, https://www.gov.za/sites/default/files/gcis_document/201901/42162gon08.pdf.

and prevent them entry into South Africa in the name of national security. The reliance on PNR algorithms and automated systems to classify individuals as 'undesirable' may inadvertently perpetuate biases, and, as such, while PNR may support the state's security goals, it also underscores the need for transparent and accountable practices in border management.

It is interesting to note that since the Apartheid, and certainty since the 2010 World Cup, risk management assessments of mobile populations have been emphasized as a key part of border management in the name of national security. In South Africa, risk management by customs is understood as curtailing daily operations to address the circulation and movement of risks.[797] This was originally part of the Business Intelligence Unit, but would later become the Customs Risk Management Division.[798] While there remains little information on the Business Intelligence Unit, the "main purpose is the identification, classification, dissemination and mitigation of compliance risk."[799] The Business Intelligence Unit was originally tasked with gathering and analyzing data to identify and mitigate risks related to customs and border control, including the movement of both goods and people. This directly relates to PNR use because PNR data is a critical source of intelligence in identifying potential risks before individuals even board a flight. The Business Intelligence Unit's focus on risk analysis laid the groundwork for what later became the Customs Risk Management Division. This division would take on the responsibility of incorporating PNR data into its broader customs and border control functions, enhancing the country's ability to predict and manage mobile populations.

PNR data is essential for supporting South African border development because the ports of entry in South Africa were built for different purposes and different volumes of traffic. In 2022, there were over fifteen million foreign travellers who entered South Africa,[800] and in the first two quarters, the "BMA apprehended over 36,000 undocumented, undesirable and inadmissible persons."[801] The value of APP is

[797] World Customs Organization (WCO), "South Africa's Experience with Managing Risk," *WCO News*, June 2010, https://www.wcoomd.org/~/media/wco/public/global/pdf/topics/wto-atf/dev/south-africa-experience-with-managing-risk-_-wco-news-june-2010.pdf?la=en.
[798] WCO, "South Africa's Experience with Managing Risk."
[799] WCO, "South Africa's Experience with Managing Risk."
[800] South Africa, *Tourism, 2022.* (Pretoria: Statistics South Africa, 2022),6. https://www.statssa.gov.za/publications/Report-03-51-02/Report-03-51-022022.pdf.
[801] Leon Schreiber, "The Border Management Authority Is Getting Down to Business," Politicsweb, November 14, 2024, https://www.politicsweb.co.za/documents/the-border-management-authority-is-getting-down-to.

that it allows the processing an increased number of travellers with fewer staff as South African ports of entry.[802] Further, PNR is noted to save South Africa millions of dollars every year.[803]

In 2019, the South African government publicly upgraded to a 'new PNR'[804] for national security.[805] The implementation of a 'new' PNR is part of the implementation of the iBorders strategy, which is another reiteration of the South African government's implementation of digital risk management – but there is very little suggesting anything is new.[806] The PNR system has continued to allow the South African government to collect passenger data and profile passengers before they arrive in South Africa.[807] The only element that can be considered 'new' is the introduction of a secondary analysis of passenger data by a new organization called the National Targeting Center, which "will do risk assessments on visitors after they have boarded flights as a secondary control system."[808] Notwithstanding, the South African government was already utilizing secondary examinations of PNR data.[809] Simply, it would appear that the 'new' PNR system that is mentioned by South African officials is just an upgrade to the existing system as opposed to a 'new PNR' regime.[810]

The National Targeting Center uses PNR data to conduct risk assessments of visitors before they board flights from their origin destination.[811] These systems are connected with international policing organizations (such as INTERPOL) and security infrastructures.[812] However, this has also been occurring since at least the 2010 World Cup, so represents very little 'new' in the system. However, the National Targeting Center is understood by the international community as being central to effective border management when synchronized with other advanced technologies and intelligence systems to analyze the data of mobile populations to identify potential risk in the movement of both passengers and cargo.[813]

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[802] Duncan, "App to Save DHA, Airlines Millions."
[803] Duncan, "App to Save DHA, Airlines Million."
[804] Anonymous interview with author, November 1, 2024. Cf. Mkuseli Apeleni, "Address by Home Affairs Director-General Mkuseli Apeleni at the Briefing of Stakeholders on Visa Regulations, Sandton, 10 December 2015," Department of Home Affairs, https://www.dha.gov.za/index.php/statements-speeches/717-address-by-home-affairs-director-general-mkuseli-apleni-at-the-briefing-of-stakeholders-on-visa-regulations-sandton-10-december-2015.
[805] Nzuza, "Speech Delivered by the Deputy Minister of Home Affairs."
[806] South Africa Year Book 2020-2021, Government Communication and Information System (GCIS). https://www.gcis.gov.za/sites/default/files/docs/gcis/10.%20Home%20Affairs.pdf.
[807] Nzuza, "Speech Delivered by the Deputy Minister of Home Affairs."
[808] Nzuza, "Speech Delivered by the Deputy Minister of Home Affairs."
[809] South Africa, *Summary of the Customs Value Chain.*
[810] South Africa, *2021/22 Annual Performance Plan*.
[811] Nzuza, "Speech Delivered by the Deputy Minister of Home Affairs."
[812] Nzuza, "Speech Delivered by the Deputy Minister of Home Affairs."
[813] Cf. WCO, "South Africa's Experience with Managing Risk."

However, nothing about the practice appears to be 'new' except for the name and organization of the practice it falls under. In fact, interviews with South African officials suggest that with reference to PNR, and the current overlap in responsibilities between Immigration Services and the Border Management Authority, at this time, it is not clear if South African officials know who is actually in charge of their borders; thus, there is ambiguity over who has access to and overall responsibility for PNR data.

The DHA notes that PNR data allows for air carriers to work with governments in the transfer and assessment of passenger data in real time. Since PNR is collected up to the point of check-in, governments can prevent undesirable populations from departure to South Africa. Airlines receive real time responses from the Government of South Africa regarding the eligibility of passengers to travel to the country. Essentially, the contemporary PNR regime in South Africa is characterized by the fact that borders are extended directly to the point of departure and a decision on a traveller's entry is made at check-in at the departure country and not upon arrival in South Africa. The South African government recognizes PNR as an essential element of the development of sophisticated risk-based developments to immigration.[814] Although, ironically, the South African government and officials seem to be unaware that PNR has been used in the country since (at least) the World Cup, frequently referencing the new "inclusion of the passenger name record (PNR)" without any indication as to what is new about the system.[815] It appears that in 2019, South Africa allocated R606 million to the implementation of new PNR systems and an addition R450 million for the APP systems.[816] However, the specifics of the new systems remain ambiguous.[817]

Globally, there is a growing demand for digital solutions to the management of mobile populations, and technologies developed by third parties offer significant advantages for South Africa, including enhanced security, and streamlined processes. The new border management policy, as of 2022, is one that must always be risk based; that is to say that efforts must be made to manage risks outside the border and to separate the low risks from the high risks.[818] PNR operates in line with the border management goals and,

[814] Parliament of South Africa, "Report of the Portfolio Committee on Home Affairs on the Oversight Visit to the Department of Home Affairs," 2020, https://www.parliament.gov.za/storage/app/media/Docs/tpap/66de54be-5fd5-4719-9f25-c878d966159d.pdf.
[815] Parliament of South Africa, "Report of the Portfolio Committee on Home Affairs."
[816] Parliament of South Africa, "Report of the Portfolio Committee on Home Affairs."
[817] South African officials disclosed nothing related to the New PNR or the cost of implementation.
[818] South Africa, *One-Stop Border Post Policy*.

as such, "[t]he passenger name record system helps spot unknown threats by looking at passenger profiles and is used to flag known suspects, like those on watchlists."[819] While this is considered to be a 'new PNR,' this has been the process since at least 2010.

Table 7: *Known Profiling Triggers*

Known Profiling Triggers from PNR Data
Connection between travelers
Detected patterns used by illicit travels (drug/ terrorism) or suspicious routes
Booking patterns
Luggage or lack thereof
How booking was made and paid for (cash, visa, ext.) and where processed
Nationality and travel route
One way ticket
Watchlist info

11.2 Air Carriers

Airline carriers are key actors in PNR globally. As previously noted, the collection of PNR data is not new; in fact, much of the information that makes up a PNR has been gathered and registered by commercial airlines as a form of documentation since the 1970s.[820] As a result of increased international travel trends, PNR was originally created to facilitate and ease airline bookings.[821] South Africa now uses PNR data to essentially move the South African border to the site of departure flights.

It is well understood that "a state has the right to control the entry of non-nationals into its territory,"[822] and carrier sanctions are one of the means that South Africa has implemented in order to ensure better

[819] Anonymous interview with author, Johannesburg, South Africa, October 2, 2023.
[820] Floyd Garvey and Suresh Sankaranarayanan, "Intelligent Agent Based Flight Search and Booking System," *International Journal of Advanced Research in Artificial Intelligence* 1, no. 4 (2012): 12, http://dx.doi.org/10.14569/IJARAI.2012.010403.
[821] Bellanova and Duez, "A Different View on the 'Making' of European Security."
[822] *Abdulaziz, Cabales and Balkandali v The United Kingdom* (ECtHR, 1995), 67, quoted in Tilman Rodenhäuser, "Another Brick in the Wall: Carrier Sanctions and the Privatization of Immigration Control," *International Journal of Refugee Law* 26, no. 2 (2014): 223. https://doi.org/10.1093/ijrl/eeu020.

migration control of non-nationals into its territory. Carrier sanctions can simply be understood as financial penalties that are placed upon airlines if they transport improperly documented passengers. In South Africa since 2016, if a carrier lands and presents an individual to immigration who is deemed 'inadmissible,' the carrier will be fined by the Department of Home Affairs and must take the individual back to the country where they boarded the plane.[823] The fine imposed by the South African government on airlines who bring inadmissible individuals to South Africa is estimated to be R96,000, but the exact cost the airline endures has not been made public.[824] Further, airlines using PNR are estimated to save over R54 million on fines and repatriation costs.[825] In addition, South Africa notes that the use of PNR by airlines is estimated to save millions in administrative fees related to repatriating undesirable individuals who arrive in South Africa.[826] In the case of South Africa, the required documents include appropriate identification, visas, and birth certificates for children under the age of eighteen.[827] Airlines are also expected to not board individuals who have been deemed inadmissible to South Africa and are on the DHA's V-list.[828]

Through the implementation of carrier sanctions, private transport companies are obliged to ensure that all passengers have the travel documentation required by the destination state. If the passenger does not have the correct documents, the carrier is obligated to refuse the transport of the passenger. The carrier sanctions burden private companies in checking passengers' documents, as well as implementing South African risk assessments of high-risk individuals and prohibiting them from boarding, which was not originally part of their business. While private carriers have always collected the PNR data and have checked documents for their own commercial and security purposes, they now also do so in the interest of the state. Carriers and private actors no longer simply collect this information but are now actors in the states immigration control.[829]

[823] Watters, "Visas and Entry into South Africa."
[824] Anonymous, interview with author, October 2, 2023.
[825] Anonymous interview with author, October 2, 2023.
[826] Anonymous interview with author, October 2, 2023.
[827] Anonymous interview with author, October 2, 2023.
[828] Including those who have overstayed their visas in South Africa.
[829] While the South African border officials attempted to implement carrier sanctions in the colonial era (cf. this dissertation chapter 6 on passengers travelling to South Africa by ship), the extent of what is now required is much higher and reaches much further.

The implementation of carrier sanctions is a supplementary measure to the country's normal immigration process, which, like South Africa's Western counterparts have 'off-shored' a large portion of their immigration process. The obligations of the carriers are to operate in cooperation with other ambitious forms of risk management that contribute to a 'remote control' immigration process: the South African border is therefore not only at the physical border.[830]According to South Africa, only 10 percent of functions are performed at the port of entry,[831] whereas the majority of functions are performed pre- and post-border, outside of the physical territory of South Africa. This is done through the digitalization of immigration control, which occurs with the use of Passenger Name Records. The use of PNR for risk analysis falls under this category of activities that are detached from the physical territory of the state; that is to say, the pre-examination of passengers takes place before they reach South African territory and airlines are required to perform immigration functions at the departure port.

The process effectively means that commercial airlines must act on the PNR risk analysis on behalf of the South African state. In addition, airlines now mandate that employees assess the legality of passengers' travel arrangements.[832] This effectively means that airline employees are tasked with the role of immigration enforcement: this increases concern about discriminatory practices and the potential to further target individuals based on factors such as nationality or Race under the guise of suspicion of risk. Further, because "carrier personnel are obliged to control migrants' documentation at the point of embarkation, and to deny boarding… In this respect, private carrier personnel become a first instance immigration control."[833] While this is not unique to South Africa, increasingly, the sheer number of actors involved in the execution of PNR and the enforcement of its decision making increases the difficulty of identifying how and where bias may be located in the practice, especially as airline personnel assume responsibilities of immigration control.

This has several important implications that ought to be seriously considered. The first is that there are new actors who take part in the sovereign function of migration control and the subsequent recomposition of power relations between traditional and new actors. The second is that carrier sanctions have effectively

[830] Elspeth Guild and Didier Bigo, *Controlling Frontiers: Free Movement Into and Within Europe* (New York: Routledge, 2005).
[831] This dissertation chapter 9
[832] Amnesty International, *The Right to Seek Asylum: A Guide to the Rights of Refugees and Asylum Seekers* (London: International Secretariat, 1997), https://www.amnesty.org/en/wp-content/uploads/2021/06/act340211997en.pdf.
[833] Rodenhauser, "Another Brick in the Wall," 223.

privatized an element of immigration control that has long been central to state power, but has now created new 'borders' for migrants who are seeking asylum, and thus, the carrier sanctions have potential legal implications. Naturally, the introduction of new actors in border control (and the redistribution of power) and the potential legal implications are related insofar that carrier sanctions require a re-examination of assumptions regarding state responsibility: immigration decisions are made by non-state actors outside of South Africa and, thus, displaces and challenges the state's obligations to protect the human rights of mobile populations. Carrier sanctions are potentially a means for states to bypass the limitations imposed on migration control policy within a national context, and this simultaneously shifts competences and responsibilities of the immigration process to include new actors: thus, strategically expanding the realm of immigration. However, this expansion has also been identified as a means for governments to overcome constraints of immigration law: not only because of the inclusion of new private actors but also because these actors are operating before and outside the physical border.

South Africa's expansion of actors involved in immigration control is interesting because immigration has always been a primary principle of state sovereignty.[834] Carrier sanctions and the new power relations that are created between states and the commercial airlines is interesting precisely because the government is delegating quintessential acts of sovereignty concerning immigration control to private actors. While it is the case that commercial airlines have always checked passengers' possession of valid tickets, determining admissibility of an individual into the destination country has not been part of the airlines' routine practices.[835] Confirming admissibility of passengers is purely for the benefit of the country of arrival as opposed to the benefit of the airlines.[836]

The fact that refugees are seen as a security concern for South Africa has justified the border effectively being 'offshored' via the use of PNR. This system allows for an exchange of information, passengers to be monitored, and administrative sorting to take place prior to an individual arriving at the physical South African border. There is an inherent pre-emptive mentality that underlines PNR, where the focus is largely on points of embarkation: to this end, the immigration control of the South African state essentially operates first through informed spaces in countries outside of South Africa's sovereign control, but

[834] Sophie Scholten, *The Privatisation of Immigration Control through Carrier Sanctions: The Role of Private Transport Companies in Dutch and British Immigration Control* (Leiden: Brill Nijhoff, 2015), 21.
[835] Scholten, *The Privatisation of Immigration Control*.
[836] Scholten, *The Privatisation of Immigration Control*, 23.

wherein they can make decisions based on PNR data to prevent the travel of an individual. In other words, the South African government decides via PNR data who is "good to board" but airline personnel are required to take action on the decision.[837]

11.3 SITA

SITA[838] is a multinational technology cooperation that is used by "almost every airline and airport in the world does business with SITA, and nearly every passenger trip relies on SITA advanced technology."[839] SITA primarily provides technological solutions that collect and analyze PNR data while also allowing data exchange between countries and other actors. Most importantly, SITA technology does not only provide movement records of passengers but also includes interactive PNR, and South Africa was the first state on the continent to implement it.[840] The primary benefit of interactive PNR is that it operates in real time and allows governments to deny passengers boarding a flight to the country prior to departure. Additionally, SITA claims that its PNR system allows states to "discover threats" and match mobile population against "future events."[841]

Table 8: *South African Interactive PNR compared to API*

Interactive PNR (post 2014)	API
Governments can delay or prevent boarding with risk assessments at check in	API is assessed while passengers are already en-route to destination. Deportation can only occur once passenger arrives in South Africa, and airlines bear the deportation cost
Includes biometric information from passports	Only includes soft data from booking
Lower rates of errors in data	Higher rates of errors in data
Entry/exit information is automatically collected	More difficult to correctly reconcile entry/exit movements

[837] Savitri Taylor, "Offshore Barriers to Asylum Seeker Movement: The Exercise of Power without Responsibility?," in *Forced Migration, Human Rights and Security*, ed. Jane McAdam (Oxford: Hart, 2008), 93–127.
[838] For more information of SITA, see this dissertation chapter 6 and 8
[839] SITA, "SITA Membership," accessed March 1, 2025, https://www.sita.aero/about-us/sita-membership/.
[840] This Dissertation chapter 1
[841] SITA, *SITA Intelligence and Targeting* (Brussels: SITA, 2025), https://www.sita.aero/globalassets/docs/brochures/sita-intelligence-and-targeting-product-brochure.pdf.

Although South African officials were unwilling to clarify if SITA technologies were still being used in the country, in 2017 it was recorded that the DHA integrated a live data system from SITA.[842] One of the most notable tools provided by SITA was the connection it provided South African DHA with historical data and reports from airlines. In addition, it fully automated flagging of lost and stolen passport files – although it is unclear if this was through its own data or data that was from INTERPOL.[843]

Currently, all G20 countries use SITA in some capacity – this means that South Africa must still contract SITA.[844] SITA provides a technological solution in the form of a PNR gateway for governments to conduct passenger risk assessments but also to share this information with other governments and airlines.[845] When inquiring directly with SITA regarding any safeguards that are in place in terms of bias or misuse of PNR systems, it was only stated that SITA "does not comment on how states use our systems."[846] SITA Africa stated that there was no need for oversite because there is no personal information and that "SITA systems comply with ICAO standards."[847] This is significant because SITA's PNR technology is a unified interface that provides governments with the capacity to adjust the systems to their exact needs and requirements.[848]

Simply, there is no indication that there are any protections to ensure that governments do not abuse the technology. Further, SITA was unwilling to discuss if the 'new' PNR in South Africa impacted their use of SITA systems. Neither SITA, the South African government, nor UN goTravel were willing to disclose if SITA would continue to be operational at the South African border with the implementation of the UN PNR system; however, it is likely that they will remain in some capacity because SITA solutions extend far beyond PNR, including biometrics and e-visas.

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[842] South Africa, *Annual Report 2017*, https://www.dha.gov.za/files/Annual%20Reports/Annual%20Report%202017%20WEB.pdf.
[843] South Africa, *Annual Report 2017*.
[844] SITA, *SITA Your Digital Travel Partner for Today and Tomorrow* (Brussels: SITA, 2024), https://www.sita.aero/globalassets/docs/white-papers/sita-digital-travel-paper.pdf.
[845] Aviation Business Middle East, "SITA Marks a 25-Year Milestone in Border Management," May 11, 2021, https://www.aviationbusinessme.com/aviation-services/23550-sita-marks-a-25-year-milestone-in-border-management.
[846] Anonymous interview with author, September 27, 2023.
[847] Anonymous interview with author, September 27, 2023.
[848] SITA, *API PNR Gateway for Governments* (Brussels: SITA, 2024), https://www.sita.aero/globalassets/docs/brochures/api-pnr-gateway-for-governments-brochure.pdf.

11.4 UN goTravel

The United Nations goTravel program is a United Nations owned software that was originally developed by the Netherlands.[849] The UN now owns the Travel Information Portal (TRIP) program that assists states in developing or enhancing state use of PNR to detect high-risk populations, specifically terrorists and other serious criminals.[850] Accordingly, the goTravel solutions help member states, including South Africa, comply with UN Security Council resolutions[851] to receive and analyze passenger data, develop the capacity[852] to receive and analyze PNR, utilize relevant watchlists, and share information about terrorists and other serious criminals that may use commercial air travel within national and international jurisdictions.[853] The goal of these initiatives is to assist states in preventing, detecting, and investigating terrorist activities and related travel, with the ultimate aim of reducing the threat of terrorist violence and enhancing global security.[854]

The goTravel solutions facilitate the process for law enforcement to collect passenger data from airline carriers, conduct analyses, and share the results of the data analysis. Member states implement the goTravel solutions to automate the analysis of large passenger data volumes and supports the collection, analysis, and distribution of air travel data.[855] This technology is used and justified to help member states to "establish a standard for the collection, use, processing and protection of PNR data."[856] UN GoTravel notes that the use of data and technology can help identify known high-risk travellers but also those

[849] United Nations, "goTravel," Office of Counter Terrorism, accessed January 10, 2025, https://www.un.org/cttravel/goTravel.
[850] United Nations, "goTravel."
[851] Cf. Resolutions 2178, 2396, and 2482.
[852] It is interesting to note that the UN generalizes the capacity of African states fairly broadly in terms of capacity to manage borders, especially related to counterterrorism. The report presents Africa as sharing a common experience citing a lack of infrastructure and technologies which hamper the ability for states to secure their own borders; "Member States in Africa require investment in technology and infrastructure." United Nations Security Council Counter-Terrorism Committee, *Technical and Capacity-Related Gaps in Border Security*, April 2024, https://www.un.org/securitycouncil/ctc/sites/www.un.org.securitycouncil.ctc/files/ct_border_technical_and_capacity-related_gaps_-_april_2024.pdf.
[853] United Nations, "goTravel."
[854] Fionnuala Ní Aoláin, "Position Paper of the Special Rapporteur on the Promotion and Protection of Human Rights and Fundamental Freedoms while Countering Terrorism on the United Nations Countering Terrorist Travel ('CT Travel') Programme and the goTravel Software Solution," United Nations Humans Rights Special Procedures, Statewatch, October 30, 2023, https://www.statewatch.org/media/4124/2023-10-30-a-ct-travel-goTravel-position-paper.pdf
[855] United Nations, "goTravel."
[856] Uniting Aviation, "New PNR Data Standards Amendment to Improve Global Counter-Terrorism Efforts," July 3, 2020, https://unitingaviation.com/news/security-facilitation/new-pnr-data-standards-amendment-to-improve-global-counter-terrorism-efforts/.

travelers "who may be inadmissible or may otherwise pose a national security threat based on the existence of critical information."[857] Interestingly, GoTravel technology allows states to determine what counts as a threat to their national security. The concern in the case of South Africa is that there is nothing to prevent the country from preventing entry to legitimate travellers from countries that states deem undesirable. This is especially the case because the goTravel software facilitates the adoption of Amendment 28 to ICAO's Annex 9 on the revised standards governing systems for collection, processing, and transfer of PNR.[858] While it is apparently being implemented in a way that respects human rights and the rule of law,[859] there is currently no legally binding international legal instrument that regulates PNR technology or seeks to prioritize the risks of this technology. While international organizations such as the ICAO and the UN have provided guidelines and recommendations on the use of PNR data for border security and counterterrorism purposes, these frameworks do not constitute enforceable legal obligations. The absence of binding regulations leaves significant gaps in oversight, accountability, and safeguards against potential misuse. Further, the nature of PNR makes it inherently difficult to assess for misuse because the process of data occurs in a 'black box' and covert nature of algorithms used to process it. Thus, even if legal instruments were binding, it would be incredibly difficult to monitor state compliance and use of PNR, and the system would vary between national jurisdictions. Simply, the lack of transparency and standardized oversight mechanisms of PNR complicates efforts to ensure fair operation.

What is interesting about the GoTravel software is that states can search for patterns within their PNR data through an algorithm. However, it appears that this is done through a state's own historical data, and that the algorithm identifies patterns to model criminal phenomena.[860] Thus, if a state's historical data reflects discriminatory practices or flawed risk assessments, these biases could become embedded into the PNR algorithm's decision-making process. It also seems that states can share this information with other states, or, as the UN explains, the states can share "hints" that are "provided by other authorities operating at the frontline of crime prevention and counterterrorism." [861] This is concerning because one state's bias regarding what constitutes a threat can be unknowingly shared and circulated with other states with no

[857] United Nations, "Operational Use of Passenger Data," UN Office on Drugs and Crime, accessed March 31, 2025, https://www.icao.int/MID/Documents/2024/API-PNR%20Seminar/PPT2-4%20-%20Operational%20use%20of%20Passenger%20Data%20WL%20RBT_HS%20-%20UNODC%20AIRCOP.pdf
[858] Uniting Aviation, "New PNR Data Standards Amendment."
[859] Uniting Aviation, "New PNR Data Standards Amendment."
[860] United Nations, "Operational Use of Passenger Data." .
[861] United Nations, "Operational Use of Passenger Data."

oversight or explanation.[862] Simply, this could lead to a situation where biased assessments from one country influence the decisions of others. Understanding why certain populations are considered to be a risk is then complicated because algorithmic decision making is difficult to understand due to its opacity, complexity, and lack of transparency, which can mean even developers cannot fully explain their decisions.

South Africa is currently implementing UN goTravel solutions.[863] However, it is unclear if it replaces or complements previous PNR solutions. Further, it is not clear if the goTravel solutions are what South African security professionals refer to in referencing the implementation of a 'new PNR.' Regardless of the current state of the South African implementation, what is most significant with the goTravel technology is that it is a completely configurable software that allows rule-based targeting watchlists, as well as allowing connectivity with INTERPOL and other international and national databases.[864] The UN does not host the software and therefor does not monitor state use of the technology nor can it access PNR data. While it may be configured with reference to ICAO standards and UN best practices, the ICAO has incorrectly stated that PNR data is not inherently sensitive so there is no need to have oversights in place for questionable use by states.[865] This is concerning because "goTravel software is an experimental software program which…has never been subject to formal review."[866] This is concerning especially when implemented by states, such as South Africa,[867] with a history of using data to support biased or racialized practices that proportionality target specific populations.

The UN goTravel solutions provide advanced technologies to create unique watchlists and risk-based targeting.[868] The UN goTravel is celebrated for being able to handle unlimited conditional clauses for

[862] United Nations, "Operational Use of Passenger Data."
[863] International Civil Aviation Organization (ICAO), *MID Seminar CTTP Overview,* 2024, https://www.icao.int/MID/Documents/2024/API-PNR%20Seminar/PPT3-1%20-%20MID%20Seminar%20CTTP%20Overview%20NEW.pdf.
[864] United Nations, *Digital UN CT Travel Programme: goTravel Software Solution,* accessed December 29, 2024. https://www.un.org/cttravel/sites/www.un.org.cttravel/files/digital_un_ct_travel_programme_trifold_brochure_on_goTravel_software_solution.pdf.
[865] Anonymous interview with author, digital, March 30, 2023.
[866] Biometric Update, "UN's Counter-Terrorist Travel Biometrics Poses Human Rights Risk: Special Rapporteur," December 2023, https://www.biometricupdate.com/202312/uns-counter-terrorist-travel-biometrics-poses-human-rights-risk-special-rapporteur.
[867] This dissertation chapter 6
[868] United Nations, "goTravel FAQ," Office of Counter Terrorism, accessed January 10, 2025, https://www.un.org/cttravel/goTravelfaq.

watchlists.[869] This means that a set of rules or conditions can be applied to the watchlist entries such that the conditions are flexible and allow for a variety of different situations or exceptions. In addition, the risk-based targeting is completely customizable by states and allows for states to select unwanted populations and to identify patterns, or relationships between passengers. Ironically, the UN seems to have designed the goTravel system without human rights in mind, and while the UN may assist states in the implementation of the technology, there is no oversight to prevent misuse – even in states with a known history of human rights abuse.

The UN goTravel program provides South Africa, as well as other countries, with a free and incredibly powerful tool that is completely open to misuse, be it intentional or not. Despite the potential for misuse, there is no apparent effort to avert or sanction misuse by states.[870] States are handed the tools to profile data bases on any risk indicators they wish. This allows the state not only to identify individuals who are on watchlists but also to identify qualities or patterns that are used to limit an individual's entry. Since the risk categories are determined by each country rather than being pre-set in the PNR data, the UN Office of Counter-Terrorism (UNOCT) does not place any restrictions on the type of analysis conducted. As a result, domestic authorities are free to conduct these analyses in whatever way they see fit. Additionally, they do not have to report the criteria or methodology they use to UNOCT.[871] While the goTravel platform provided by the UN supports member states in utilizing PNR data for their own purposes, there is currently no system in place for the UN to monitor or control how these states use the data.[872] Simply, this technology can automate bias, especially as deep learning algorithms are integrated.[873]

[869] United Nations, "goTravel FAQ."
[870] Biometric Update, "UN's Counter-Terrorist Travel Biometrics Poses Human Rights Risk."
[871] Ni Aoláin, "Position Paper of the Special Rapporteur."
[872] Ni Aoláin, "Position Paper of the Special Rapporteur."
[873] Ni Aoláin, "Position Paper of the Special Rapporteur."

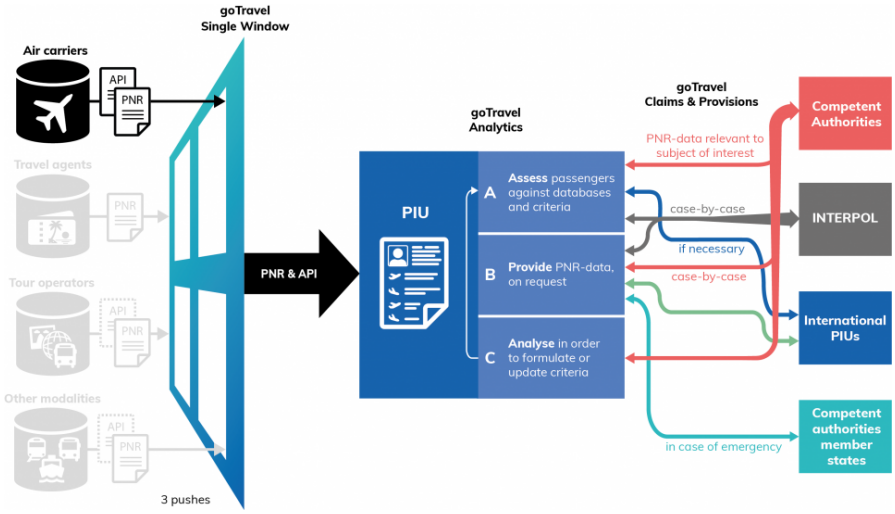

Figure 15: PNR Use in UN goTravel Software.[874]

Description: A diagram illustrating the flow of Passenger Name Record (PNR) and Advance Passenger Information (API) data through the goTravel Single Window system. Air carriers send API and PNR data to the Passenger Information Unit (PIU), which uses goTravel Analytics to assess passengers, provide PNR data on request, and analyse trends for criteria updates. Processed information is then shared with competent national authorities, INTERPOL, international PIUs, and other member states on a case-by-case basis or in emergencies.

Ironically, the UN goTravel program could be an opportunity to implement oversight and accountability to PNR systems, and due to the fact that the software will be gifted by the UN to any state, it will no doubt be rapidly diffused globally. This is not to say that the UN goTravel would be completely free from biases even with oversight, especially those biases found in the EU, which represent its own set of challenges. Yet, it could provide limitations on how countries with known human rights abuse and racialized border management operationalize the system – arguably, the EU biases being the less detrimental option. However, at this time, neither the UN nor the ICAO recognize the possibility of racial bias in the software – because PNR data isn't considered inherently 'personal'[875] – thus, it is not likely that the potential for bias will be remedied unless the international community acknowledges that such bias could already be occurring.

[874] United Nations. "goTravel: The United Nations Counter-Terrorism Travel Programme." https://www.un.org/cttravel/goTravel.
[875] Anonymous employee ICAO, interview with author, Johannesburg, South Africa, October 8, 2023.

It would appear that, like other organizations from the Global North, there is a very limited understanding or wilful blindness of bias and Race as it is not a matter of concern in the deployment of PNR and surveillance technologies. This is concerning because technologies developed in the Global North are implemented in the Global South without any attempt to understand how Race may be embedded in the technology or the possible consequences of implementing these technologies in the region. As a result, these technologies may unintentionally reinforce or exacerbate existing social harms by not accounting for regional complexities.

11.5 PNR technology and migration control: in way of a conclusion

In the case of PNR, none of the primary actors (UN, ICAO, and the Government of South Africa) seem to believe that Race could be embedded in current PNR practices. As it relates to Race, both SITA and UN goTravel state that Race is not permitted as a category of risk. However, removing Race as a category does not prevent racialization or racism. In fact, colour-blind technology that ignores explicit racial markers still risks amplifying racism.[876] This not only results in racism being rendered neutral but also risks establishing whiteness as the default.[877]Moreover, PNR algorithms are socially managed – the sociotechnical nature requires humans to act on algorithmic suggestions – increasing the likelihood that individual bias will lead to system bias. This is despite one international expert noting that, with specific reference to PNR and the goTravel solution, "In light of South African history, I would hope that questions would be raised in the South African context about the ease of use of this system for racial discrimination."[878] Since PNR does not directly collect sensitive data such as Race, the possibility that there could be racial bias is treated as an unlikely, backwards, and outdated possibility. The UN mandate on the use of the goTravel system is, in effect, "Thou shalt track and profile air travelers,"[879] but they are silent on the algorithm. This is concerning as states are free to use whatever profiling, scoring, and blacklist-generating rules they see fit. Ultimately, even if the algorithm is developed in another country and starts with another state's default results, "states can add their own rules based on whatever criteria they choose."[880] This is especially concerning as governments "partially or fully separate the profiling

[876] Milazzo, *Colorblind Tools*.
[877] Milazzo, *Colorblind Tools*.
[878] Anonymous global PNR expert, interview with author, Cape Town, South Africa, February 26, 2023.
[879] Anonymous global PNR expert, interview with author, Cape Town, South Africa, February 26, 2023.
[880] Anonymous global PNR expert, interview with author, Cape Town, South Africa, February 26, 2023.

engine from the real-time PNR-processing engine" and use separate algorithmic profiling to generate 'black lists' from PNR data as well as other data lists that can be imported into the goTravel software. The risk is that as PNR infrastructures become increasingly widespread, the associated potential harm grows more prevalent, yet more dispersed. Alongside this, accountability becomes diluted to the point of vanishing, making it difficult to attribute responsibility.[881]

South African PNR is a complex assemblage of public and private actors and technologies. South Africa's 'new' PNR is using third-party technologies; however, these technologies are completely configurable using historical data from South Africa and allows South Africa to determine what criteria it wishes to identify as a risk. Despite these technologies largely being experimental and unregulated, states and international organizations are ushering in their use. The software solutions that allow states to customize border management based on their preferences without oversight have the potential to make bias into rule – intentionally or not – and have it disappear into the technology; especially in the space of migration management because it is already a space of opaque decision making. However, it is important to emphasize that it is not only South Africa that enacts migration management: it is assisted by technological solutions and various other bodies such as the UN. These technologies are powerful tools to secure borders; however, the lack of oversite suggests that these technological innovations fail to consider the impact they could have on human rights and the subsequent impact on human life.

PNR data is used to construct a lifetime travel database with notes. This data is used to profile and predict those who may be a threat (not just terrorism), who are undesirable with respect to migration, and simply those who may overstay a visa. PNR algorithms translate bodies into digital codes and give these codes identity and meaning through risk analysis. Data is used to sort populations into specific categories and trusted to reveal 'true' identity and risk. There is no evidence that countries or private companies are fully considering the social or political impacts of PNR as a technological solution. This is particularly true given that both the SITA and UN goTravel solutions have been developed in the Global North and likely have been developed with Western perspectives and interests. There has been very little effort documented to demonstrate how these technologies operate outside of Western liberal states, or how states could misuse these technologies.

[881] Cf. Mirca Madianou, *Technocolonialism: When Technology For Good Is Harmful* (Cambridge: Polity Press, 2024).

The South African PNR system represents a complex sociotechnical assemblage involving public and private actors. The integration of PNR technology contributes to national security by enabling risk-based border management and facilitating the identification of high-risk individuals. However, the effectiveness of the system, even with the use of non-state actors to facilitate border security, is hampered by persistent issues of corruption, inefficiency, and lack of resources. The shift towards technological solutions and private sector involvement highlights the dynamic nature of border management in the modern era, challenging traditional notions of state sovereignty and decision making in global mobility. The ongoing evolution of South Africa's border regime underscores the need for continuous adaptation and vigilance to address emerging security challenges. Ultimately, with the use of both public and private actors, the South African case demonstrates that there are limitations with technical solutions especially related to potential misuse – intentional or not – and reinforce the possibility of racial biases being embedded in PNR. In all accounts, PNR use may risk exacerbating racial profiling and reinforce existing structural inequalities at the border.

Box 6: Challenges in following the Actants

The limitations encountered in this project were anticipated, given that PNR operates as a tool of national security. More than forty interviews were successfully conducted with public and private actors connected to South Africa's PNR system, which constitutes a significant achievement. Nevertheless, the precise information sought was not always disclosed. This reflects broader challenges commonly documented by scholars engaged in security research. While attempting to follow the actants and engage with both the language and practical complexities of the field, researchers in security inevitably confront secrecy as an inherent component of the assemblage. The difficulty of accessing the field is not unique to the study of South African PNR, but represents a recurring dynamic across security research, where access is often denied, delayed, or tightly controlled, and data is frequently withheld under the guise of confidentiality. Rather than viewing this solely as a limitation, it is more productive to conceptualize secrecy as a constitutive feature of the security field itself. A list of the primary challenges met in attempting to follow the actants in South African PNR, beyond the limitations of conducting field work during a global pandemic, includes:

1. Opacity of the PNR technical infrastructure: PNR systems globally operate within a highly technical network. The key actors are often black boxed making locating them difficult.
2. Restricted access to Data and Networks: The security-sensitive nature of PNR means that significant institutional barriers are faced in attempting to access actors directly. This includes human (government officials, airline staff, etc.) and non-human actants (datasets, algorithms, etc.). Further, resource constraints, institutional instability, and high staff turnover across South African government departments often mean that even when access is granted, follow-through can be inconsistent, records incomplete, and data unreliable.
3. Transnational assemblage: The nature of PNR is one that includes multiple jurisdictions, airline, border agencies, and private actors. The transnational nature of PNR complicates attempts to trace the associations across countries and legal frameworks.
4. The south African government: Researching within the South African government presents significant challenges that are rooted in both structural and historical dynamics. The South African security apparatus is shaped by both Apartheid legacies and post-Apartheid state-building that remains marked by a culture of secrecy, institutional fragmentation, and competing bureaucratic mandates. These dynamics often result in highly regulated access to information, particularly in sectors related to national security, policing, and border management.
5. Administrative gatekeeping: For all researchers in South Africa, it appears common to encounter administrative gatekeeping where access is delayed, denied, or restricted under the justification of confidentiality or security. Further, given South Africa's ongoing struggles with corruption and state capture narratives, officials seem to be hesitant to engage with research projects that could expose institutional weaknesses or generate politically sensitive findings.

Chapter 12: Conclusion: How Is Race Embedded in PNR as a Sociotechnical Assemblage?

This dissertation has explored how Race is embedded in PNR as a sociotechnical assemblage. In doing so, it makes three central arguments. First, it contends that PNR is not simply a technology that emerged in the West following the events of 9/11 but rather is a technology that is closely related to colonial-era surveillance and identity management. Colonial systems of population control and management for security purposes are the foundation of South Africa's contemporary global mobility regime. Second this dissertation demonstrates that PNR technology is not neutral, but is deeply embedded with Race and is a racialized sociotechnical system – one that reflects the historical continuities between Apartheid-era surveillance and contemporary data-driven governance. In doing so, this research reconsiders the nature of PNR as a security technology by examining its entanglement with Race, arguing that PNR does not merely reflect racial bias but actively participates in the construction and governance of racialized identities. Third, this dissertation demonstrates that international security standards, particularly those shaped by Western counterterrorism agendas, are being exported without regard for the potential of racial bias and are insensitive to the racial histories and present inequalities that exist elsewhere; it is not sufficient for PNR technology to be 'colourblind' (to not include Race as a direct category), but must actively be non-racial. In South Africa, the differential treatment of travellers based on racialized risk profiling is encoded into technical systems using PNR technology to support global security but also risks the further racialization of mobile populations. South Africa's current PNR regime may be 'colourblind,' but this does not equate to being non-racial because ignoring Race does not eliminate its influence or impact. By analyzing South Africa's PNR regime as a sociotechnical assemblage, this study reveals the pervasive risk of racial bias embedded in the design, deployment, and use of PNR technologies for national security purposes. It demonstrates how colonial legacies of racialized surveillance and exclusion continue to shape contemporary data infrastructures, embedding historic logics of control within these systems.

Contrary to the notion that 9/11 was the most significant catalyst for modernizing South Africa's PNR system, this research identifies the 2010 FIFA World Cup as being a more pivotal event. Mega-events such as the World Cup have served as accelerators for the expansion of surveillance infrastructures, under the guise of improving global security. This study highlights how such events intensify racialized logics of suspicion and control within national data regimes. Since 2010, South Africa's PNR system has undergone extensive transformations yet continues to be a central tool in racialized border governance. By targeting and differentiating mobile populations based on Race, nationality, and perceived security

threats, the system perpetuates the Apartheid-era logics of exclusion. Notably, both the South African government and the international community treat PNR as a neutral, objective security technology, despite its deep entanglement with racial, political, and historical biases in mobility governance. This dissertation has also critically engaged with the role of the United Nations in promoting generic PNR systems globally-through the UN goTravel software. It argues that the proliferation of such surveillance technologies through UN initiatives has inadequately addressed their potential for racial bias or the ways they operate within specific historical, social, and political contexts in non-Western states.

The contributions of this dissertation also extend beyond the study of PNR systems. By framing PNR as a complex sociotechnical assemblage, it interrogates not only the material infrastructure of these technologies but also how bodies become marked by Race and how racialized bodies come to matter within these systems. Additionally, this research bridges ANT with post-colonial and racial analyses, offering a critical framework for understanding how algorithms and institutions produce, categorize, and govern bodies that may become marked by Race. In examining the intended and unintended consequences of PNR systems, this study has challenged the dominance of Eurocentric perspectives that often overlook the constitutive role of knowledge and history. By centring Race and post-colonialism, it provides theoretical and empirical contributions to the literature on security and PNR systems, ensuring that the Western experience is not conflated with a universal one.

Simply, the South African case has allowed PNR to be problematized in a way that incorporates issues related to Race. Current studies of PNR remain restricted to the Western use of technologies of migration control without a full understanding of the realities of the Global South. Analyzing PNR as a sociotechnical assemblage that may be embedded with Race, opened the possibility to better understand how bodies may be marked by difference, specifically Race, and how it came to matter with technology and politics. Race is always a presence-absence in PNR; its influence is felt even when not explicitly mentioned or considered. Consequently, there is a need to make the invisible exclusionary practices of PNR more visible.

12.1 Ontological, Epistemological, and Theoretical Contributions:

This dissertation provided inquiry into the ways in which Race is embedded in South Africa's PNR regime. The research serves to 'decode' the technology and give attention to the process and context of the

technology itself, not only its impact. In doing so, this project has contributed theoretically and empirically to existing PNR literature and the study of security and Race more generally. Epistemologically, this study challenged dominant modes of knowledge production around border technologies by examining the often-invisible frameworks through which data is collected, classified, and acted upon. It foregrounds the racialized ontologies embedded in security infrastructures and makes visible how technological systems participate in the reproduction of global inequalities.

The theoretical contribution of this project is noteworthy. Materially orientated studies have tended to overlook the categories of colonialism and Race. This project not only places Race at the centre of its analysis, but it is also the first to extensively examine South African PNR as a sociotechnical assemblage. Reconciling PNR with Race represents an important attempt to draw attention to the fact that material and technology can't fully be understood without considering colonial technological development; that is to say that the technology is already embedded with inherent racial and structural relations of difference. ANT has encouraged an examination of how technologies mediate and materialize Race and the co-production of knowledge; technological systems are not neutral but actively participate in the construction of racial identities – shaping ways mobile populations are classified, monitored, and controlled.

This research has furthered the understanding of how to make the invisible exclusionary practices of PNR more visible. The South African case contributes empirically to the literature because of the country's location in the Global South and because of its long history of colonial and racist practices of control. Problematizing South Africa's PNR regime with Race has critically opened the study of PNR in a way that questions the global tendency to ignore the colonial roots of contemporary security practices, and particularly security practices related to the management of mobile populations. This project has not provided instances of Western PNR and sociotechnical assemblages in a different setting but rather destabilized conventional Western accounts of PNR as a neutral technology developed in the Western wake of post-9/11 securitization. In doing so, it critically opened the study of PNR by incorporating both Race and post-colonial perspectives.

In addition, this inquiry into South African PNR has offered a significant ontological contribution by rethinking the nature of security technologies like PNR and their embedded racial logics. Rather than treating PNR as a neutral, purely technical system, this research has revealed the ways in which technology

is always entangled with power structures and particularly racialized forms of governance. PNR systems do not merely monitor and categorize mobile populations; they are material manifestations of historical processes of exclusion, surveillance, and control that reflect and perpetuate global inequalities. Simply, this study has moved beyond identifying *who* is excluded by surveillance practices, towards an understanding of *how* certain bodies become marked by Race and how these are constitutive of technologically mediated surveillance practices.

By examining the ontological relationship between PNR and Race, this study challenges the assumption that 'neutral' technology operates independently of social and political forces. This research has demonstrated that technologies like PNR do not exist in a void; rather, they are shaped by—and actively shape—the racialized dynamics of global security. The study has emphasized that PNR systems, far from being neutral or apolitical tools, are social constructions that embed the legacies of colonialism and Apartheid-era practices of exclusion and control. Moreover, by exploring the intersection of Race and technology through the lens of postcolonial theory, this research contributes to a more nuanced understanding of the relationship between Race, security, and technology.

12.2 Racializing Assemblages

A theme throughout this dissertation has been the need for studies of security and technology, and specifically materially oriented approaches, to not only take Race more seriously, but to also elaborate beyond an American understanding of Race. The case of South Africa, because of its long history with Race, shows that the prevailing understanding of Race is insufficient to capture the realities of Race beyond the Global North. The European experience with colonialism has shaped dominant epistemologies of Race, often leading to a reductive binary that distinguishes between "racialized" and "non-racialized" populations. This framing treats Race as an attribute imposed on certain populations, rather than as a relational, structural, and epistemic force that organizes global hierarchies of knowledge, governance, and personhood. Consequently, research focusing on Race and technology tend to look at legal markers of 'other' rather than technology having the power to produce and reproduce racialized differentiation. In the case of PNR in South Africa this occurs at every stage of its design and implementation- from data collection to the final decision-making algorithms.

This dissertation, has sought to challenge such binary understandings and to demonstrate how Race is not a static category applied to specific subjects, but a dynamic and constitutive element of global sociotechnical systems. The case of South African PNR has shown that the concept of Race, in reference to PNR specifically, cannot be understood through the American or Western conception marked by a clear dichotomy of being white or not. This is not sufficient to capture how bodies interact with the South African[882] border or where issues of Race are far more complex, including; colonial history, tribalism, ethnic groups, colonial unification causing geographic difference, and religious divisions.[883] This occurs because of the continued prevalence of Apartheid-era racial classifications in the country that operate beyond the categorization of skin colour but also include elements such as ethnicity, language, and geography.[884] Bodies marked by Race in South Africa experience the border differently because PNR systems do not always account for the nuanced social realities and historic inequalities tied to identity or the biases held by human actors in the country, especially, those known to be xenophobic. PNR systems rely on algorithms and risk profiling that may be more likely to treat individuals from certain racial or ethnic backgrounds as potential threats based on pre-existing biases embedded in PNR data and algorithms. Therefore, the South African experience of Race and border control is shaped by a far more intricate set of factors than an American understanding of Race can capture, making it inadequate to fully understand how these technologies might disproportionately affect populations interacting with the South African border- whether they be citizens or not.

PNR technologies, developed in South Africa or in the Global North (e.g. UN goTravel), risk exacerbating racial inequalities in South Africa without anti-racial safeguards or attempts to monitor algorithms against bias. The materialization of bodies through PNR, influenced by data and algorithms, complicates the understanding of Race and raises concerns about the perpetuation of harm. The relationship between PNR and the mobile body is contingent and performative, highlighting the need to consider the sociotechnical assemblage and its impact on Race and identity.

The recognition that technologies, far from being neutral or value-free, are embedded within and actively contribute to systems of racialization necessitates an understanding of technology as a racializing assemblage. This approach draws from both ANT and post-colonial theory to examine how technologies

[882] This is not unique to South Africa. In general, an American understand of Race is not sufficient.
[883] Cf. Chapter 4
[884] Cf. This dissertation chapter 4

like PNR are not only tools of surveillance and control but also instruments through which Race is enacted, reproduced, and operationalized. The racializing assemblage emphasizes that Race is not an incidental feature or external imposition on technological systems but is, rather, deeply embedded in their material and epistemic design. Technologies, particularly those involved in border management and security, are co-produced by social relations of power, colonial histories, and racial hierarchies that continue to shape contemporary governance.

In the realm of technology and identity management in security, the concept of PNR as a racializing assemblage delves into how technologies not only manage and control identities but also how they actively shape and regulate bodily subjectivities. By focusing on technology as a racializing assemblage, it is possible to move beyond understanding passive objects as reflecting the designer's or user's intentions. Technologies like PNR actively create and maintain racialized subjectivities and categories through design, implementation, and interpretation. This includes data collection, categorization, and action, often invisibly but consistently marginalizing certain populations based on Race, ethnicity, or nationality. Security technologies and surveillance infrastructures do not merely collect and analyze data, as well, they actively construct specific forms of bodily and social identity, determining who is visible, legitimate, and potentially perceived as a threat.

The concept of racializing assemblages highlights how technologies like PNR systems, and surveillance mechanisms generate racialized subjectivities, effectively transforming Race into a tangible reality embedded within and manifested by technological systems. These technologies influence the manner in which bodies navigate and interact with state power, not merely by controlling borders or granting access, but also by actively defining and restricting who can exist within the framework of security. PNR is not a neutral tool; it is integral to how Race, security, and identity are co-constituted in the global order.

12.3 Further Research

This dissertation has contributed theoretically, epistemically, and ontologically to the study of Race and technology, and in doing so, provides the tools for approaching future research on materially oriented studies of security and technology. One of the major contributions of this research is the suggestion that the racializing nature of technology is not just about discriminatory outcomes; rather, it reflects the way

in which Race becomes inscribed within the very infrastructure of global systems, from the algorithms used to assess risk to the policies governing immigration, surveillance, and national security. This insight challenges traditional, Eurocentric views of technology, which often treat technological progress as a neutral force that operates independently of social contexts. Understanding technology as a racializing assemblage brings to the forefront the importance of interrogating the intersection of Race and technology across both the Global South and Global North, to better understand how these systems perpetuate racial inequalities in contemporary security practices. Such an analysis also exposes the limitations of current approaches that focus on technology in isolation from the broader historical and sociopolitical contexts in which they are embedded. It calls for a more nuanced examination of how technologies like PNR function within complex networks of racialized governance, and how they contribute to the production of racialized knowledge and practices in global security systems.

This situation underscores the urgent need to conduct historical trace analyses of security technologies, particularly in regions where Race is often presumed absent or irrelevant. This includes parts of the African continent, as well as countries such as India, Malaysia, China, and Singapore, where critical examinations of the relationship between Race and technology remain largely neglected.[885] To fully understand the complex dynamics of Race globally, it is essential to study security technologies more broadly (including biometric and PNR systems) and in a much wider range of case studies especially those beyond the traditional focus on the Global North. Materially oriented approaches to the study of Race and technology provide increased insight into how Race operates in contemporary security technology and through historically specific forms shaped by colonialism, global capitalism, and postcolonial state-building.

The study of PNR in South Africa illustrates that technologies integral to contemporary identity management systems are central to practices of border control, immigration regulation, and surveillance. The material body, both the subject and the object of monitoring, undergoes a transformation from a biological entity into a digitized profile. This is accomplished through digital technology and biometric identification systems such as fingerprints, facial recognition, and iris scans. While recognizing that South Africa has a unique history of Race, the study of South African PNR demonstrates the need to move

[885] This builds off an emerging literature the focuses on security developments outside of the West, and specifically literature that has sought to bring together ANT and STS as well as post -colonial study of security.
Cf. Machold, Rhys. *Fabricating Homeland Security : Police Entanglements Across India and Palestine/Israel*. First edition. Stanford, California: Stanford University Press, 2024.

beyond the myth of African exceptionalism and the idea that Race does not operate on the continent. This dissertation has provided the foundations to argue that racial structures are still relevant in contemporary security technology, even if Race is disavowed in national discourse. Simply, there is a need to better understand areas where Race and security technology intersect, especially in countries where Race is nuanced.

The inquiry into the history of PNR during the colonial and Apartheid eras further demonstrates the importance of studying the relationships between technologies of identity control, Race, and data. While it was beyond the scope of this dissertation, there is a need to further elaborate how technology perfected in South Africa for the management of its indigenous populations has been used by other states. For example, Canada's deployment of biometric and identity management systems has been shaped—both materially and ideologically—by precedents set during Apartheid-era South Africa.[886] While IBM's involvement in South Africa's Apartheid bureaucracy has been widely documented—particularly its role in providing data-processing infrastructure used to enforce racial classification and control—the transnational implications of that technological legacy remain understudied. South Africa's use of IBM systems served as both a testing ground and a model for subsequent implementations of population management technologies in other settler colonial contexts, including Canada, which require additional study. Political trace analysis would allow for a better understanding of how racialized logics of data collection and identity verification were encoded into early IBM systems used by the Apartheid state, and how those logics—repackaged as technical "solutions"—have informed the developments in other contemporary border and identity regimes.[887] A subsequent phase of this project will involve a critical assessment of the Canadian case.

Materially orientated political trace analysis offers valuable insight into the relationship between technology and Race and can provide us a way to critically analyze things that might otherwise be overlooked. It enables the historicization, politicization, and denaturalization of the systems and tools we often perceive as neutral or technical. In domains such as surveillance, mobility management, and data systems, this approach reveals how historical racial logics and colonial infrastructures persistently influence the material and discursive aspects of contemporary technology.

[886] This dissertation chapter 6
[887] This dissertation chapter 6

There also exists a pressing need to expand scholarly research exploring the connection between Race and technology in post-colonial contexts, particularly in regions that deviate from the dominant, American frameworks of racial analysis. A substantial portion of critical literature on surveillance, data infrastructures, and security technologies has been influenced by American or Western European comprehensions of Race, which often prioritize black/white binaries. While these studies have provided valuable insights, they risk obscuring the diverse ways in which Race operates—yet equally powerfully—in post-colonial states where histories of racialization are shaped by settler colonialism, indirect rule, and Apartheid, or by ethnic, religious, and national forms of differentiation and discrimination. Studying how Race is integrated into technologies such as PNR in contexts like South Africa offers the potential to identify racial logics in technology that may not be immediately apparent—within administrative categories, risk profiles, algorithmic decisions, and border protocols. This approach emphasizes the significance of examining racialization as a dynamic and interconnected process, influenced by local histories of colonialism and mobility control, yet simultaneously entangled in transnational circulations of security practices and technological standards. By doing so, it prompts research into where and how Race manifests in global security infrastructures, and to take seriously the ways in which technologies themselves carry and perpetuate racialized ontologies—even, and particularly, in places that are not typically considered "racialized" spaces.

Following security technology contributes to challenging the assumptions that technology is neutral as well as challenging the assumption that Race is primarily a Western or colonial construction by demonstrating that Race continues to operate in the post-colonial context. Race is not erased with the end of formal colonialism but rather rearticulated through global hierarchies and local insinuations. Race is a global not just Western phenomenon, and thus, the study of surveillance technology must move beyond the tendency to treat Race as foreign to post-colonial states.[888] Even in post-colonial states, such as South Africa, where only a minority population is white, white supremacy persists in institutional and discursive

[888] Jemima Pierre, *The Predicament of Blackness Postcolonial Ghana and the Politics of Race* (Chicago, Ill. ; University of Chicago Press, 2013).

forms, shaped by histories of European colonialism and reinforced by global racial capitalism.[889] In this way, African exceptionalism can obscure how global racial logics operate in Africa just as powerfully as in the West, albeit in different configurations. Further, the idea that there is African exceptionalism when it comes to Race ignores the reality that security technology – such as PNR - is thoroughly embedded in global regimes of data exchange, risk profiling, and racialized mobility control. Rather than existing outside of these systems, African states and their citizens are deeply implicated in the racialized infrastructures of global security, challenging any simplistic notion of exceptionalism.

The case of PNR demonstrates the need to consider security practices as a global network embedded in the circulation of experts, technology, norms, and practices. Specifically, when considering these technologies as a racializing assemblage, there is increased need to explore categorization and classification of mobile populations as a powerful technology that is deeply embedded in technical infrastructure that becomes obscured, but that is no less significant. As this dissertation has emphasized, there is a need to demonstrate how these technologies are not passive actors but are rather crucial sites of politics.

[889] In *The Predicament of Blackness*, Jemima Pierre shows that African contexts are not exempt from Race—they are shaped by it. In this way, African exceptionalism can obscure how global racial logics operate in Africa just as powerfully as in the West, albeit in different configurations.

Annex 1: Legal Basis of PNR

PNR was initially used in South Africa to contribute to customs and immigration functions and to facilitate passenger traffic. The basis for state use of PNR is derived from Article 22 of the Convention on Civil Aviation (1944), known as the Chicago Convention, which recognizes the necessity for states to manage airline passengers who pass through international borders, and suggests that all member states adopt efficient measures in order to ensure security and avoid unnecessary delays at all points throughout the airport – from check-in to customs and immigration.[890] Further, Article 29 (f) of the Chicago Convention states that an airline must carry a document with "a list of [passengers'] names and places of embarkation and destination."[891] While the initial intention of the Chicago Convention was vague, it is now increasingly used to justify PNR use and the politically motived surveillance practices that have been adopted in recent decades. The implementation of PNR in South Africa is for the purpose of customs and immigration, as well as facilitating passenger safety and rights. The 2014 amendments to the South African *Immigration Act 13 of 2002*, Section 34.5, require that every aircraft submit PNR information to the government electronically.[892] This applies to every person travelling to, from, and within South Africa. South Africa's implementation of its own PNR policy for the purpose of pre-screening prior to immigration has been recognized at the international level. The ICAO has noted that South Africa has received a clean audit (related to Annex 9 of the Chicago Convention), and has excelled in its adoption and implementation of PNR.[893] South Africa has thus met the standards in terms of the transmission of this data, the elements that it collects, and limiting burdens related to the system (administrative or operational).[894] South Africa's implementation of PNR is not a replica of another country's use, and involves the transmission of not only passenger record fields but also Advanced Passenger Information System (APIS) data.[895] This is reflected in the 2010 amendments to the South Africa *Immigration Act* (2002) to enforce the mandatory transmission and use of APP, and the inclusion of PNR data shortly after.[896] As previously noted, South Africa is the first country on the African continent to implement a PNR system, and one of only thirteen international states to link their API and PNR systems – typically API and PNR operate separately.[897] This reflects the level of security practices South Africa has adopted, and is an important move in the facilitation of South Africa's border security. In fact, the ICAO has ranked South Africa as number one in terms of aviation security in Africa, and in the top 30% globally.[898]

The use of PNR in the country reflects the 2015 WCO Punta Cana Resolutions,[899] which speak to the role of Customs in security, and specifically the role of Customs in the prevention of terrorism and serious

[890] Convention on Civil Aviation ("Chicago Convention"), Dec. 7 1944, 15 U.N.T.S. 295.
[891] Convention on Civil Aviation, Chapter V, Article 29(f).
[892] *Government Gazette* 37679, Regulation Gazette 10199, 22 May 2014 [South Africa], http://www.ufh.ac.za/international/assets/13-of-2002-immigration-act_regs-gnr-413_26-may-2014---to-date.pdf
[893] ICAO, "Advance Passenger Information."
[894] ICAO, "Advance Passenger Information."
[895] ICAO, "Advance Passenger Information."
[896] Government of South Africa, "Statement on Cabinet meeting of 20 July 2010," Government Communication and Information System (GCIS), July 20, 2010, https://www.gcis.gov.za/content/newsroom/media-releases/cabinet-statements/statement-cabinet-meeting-held-20-july-2010.
[897] Inside MRO, "There Is Still Hope For African Aviation."
[898] ICAO, "Advance Passenger Information."
[899] South African Revenue Service (SARS), "Summary Overview of the SARS Customs Function as it Relates to Ports of Entry: Proposed Roles and Responsibilities for the Border Management Authority (BMA) and the South African Revenue Service (SARS)," SARS, September 23, 2016, https://pmg.org.za/files/161018OVERVIEW_OF_THE_SARS_CUSTOMS.docx.

crime. The Punta Cana Resolutions include recommendations on the use of both API and PNR by states for efficient and effective customs control.[900] The Punta Cana Resolutions request that states and their customs administrations use investigative technologies, which include risk profiling, API, PNR, intelligence sharing, various forensic techniques, and other non-intrusive techniques, and upgrade these technologies to high standards.[901] As such, South Africa's adoption of PNR recognizes the critical role of airport security, and is bringing the country in line with international standards.

[900] SARS, "Summary Overview."
[901] SARS, "Summary Overview."

Annex 2: Semi-Structured Interview Guide

The intended interview subjects for this project vary across a range of actors and associated organizations. One of the benefits of semi-structured interviews is the flexibility they provide; different questions are drafted for different actors based on their position/location within South Africa's border security regime and based on where the individuals are situated within the knowledge gap. Not all questions will be asked to all interviewees; certain questions will not be relevant to some actors.

Main actors that will be sought for interviews

1. PNR 'clients' in South Africa: Border Control Operational Coordinating Committee, Border Management Authority, Department of Home Affairs, South African Police Service, State Security Agency
2. South African Aviation Organizations: South African Civil Aviation Authority**,** the Cooperative Development of Operational Safety and Continuous Airworthiness Project in the Southern African Development Community **(**COSCAP-SADC), Airport Company South Africa
3. Immigration and Border Control Agents in South Africa
4. Surveillance and oversight bodies in South Africa
5. Apartheid experts: professionals, retired actors, academics
6. Technology Developers/ computer scientists

Table A2.1: Process and Questions

Technique	Description	Question
Before interview	Adjust interview questions to fit interviewee position. Ensure information that is easily available elsewhere is not sought in the interview. Finalize probing questions, order, and draft potential follow up questions. Specific attention will be given not only on the question, but to the vocabulary used, shifting appropriately to fit the institutional setting in which the individual is located. For example, the questions and vocabulary used with computer scientists will be more technical than with border agents.	n/a.

Beginning of interview / Greetings	Thank the participant for their availability and participation in the interview.	
Explain the aim of the project and interview	Explain the primary objectives of the research and the procedures that will be followed.	This project looks at airport security practices in South Africa. South Africa has advanced airport security practices, yet extraordinarily little has been written on it. Specifically, I am looking at the use of PNR and the management of mobile populations. [Specific elements of the research will be emphasized as necessary- i.e. historical, practice, technical]
Record authorization	Consent will have already been given via SurveyMonkey if an interview has been scheduled. However, a quick review of the participants rights will occur (specifically – participant's right to not answer questions and their right to withdraw). Further, it will be reiterated that no personally identifying information will be kept and that all data will be anonymized.	Do you have any questions for me before we get started?
'Grand tour' questions	Broad questions will be asked to get the conversation going and to situate the actor within South Africa's Border Security regime. The introduction about the research may in itself probe conversation – if this is the case, it will be followed.	Tell me a little about your work, and what you do? What does it involve? What are your main roles and responsibilities? How do you go about decision making?

	The goal is to get the interviewee talking about their experiences and to understand the main actants and their responsibilities.	
'Funneling technique'	The goal is to begin to narrow into questions on border security practices. The specific probe will be based on the participants - their positions and responses to previous questions.	What are the biggest challenges in your role? In your view/ experience, what is the biggest threat to South African border security? [potential follow up] Have you seen a change in what is considered as a risk? Do you work/ coordinate with other agencies/actors/ etc. ?
'Mini tour'	Based on 'grand tour' and will seek to focus into specific aspects of the interviewee's response.	How is technology used in your role? ['why' question if necessary] How is technology being used to advance border security?
Follow up	The goal is to deepen the answers to previous questions.	Can you explain [...] more? Can you tell me more about how [...] works? [Goal here is to ask the interviewee about trust in the algorithm / how does the computer decision affect their operational practices.]
Specific question	Goal is to get the actors talking about PNR or the role of data; however, questions will vary significantly based on participant. If the	How familiar are you with Passenger Name Records?

	vocabulary of PNR is unfamiliar, these questions can be substituted for more general surveillance based questions (specifically related to border security/ immigration/ terrorism). The goal is to allow the interviewees to have the liberty to diverge from the question if necessary, but in a way that the conversation can still be directed towards the overarching themes of the research.	How are PNRs being used for [specific to actor being interviewed] ? What occurs in the case of a positive PNR match? How does the human review occur? [Expand question if needed]. Are you able to tell me how often you see a positive PNR match? [potential follow up question connecting to apartheid] [Specifically - surveillance oversight actors.] Are they aware of abuse of the PNR regime? If so, are they able to hold those accountable for abuse?
Follow-up questions	Goal is to ask a question about justice practices/ accountability. If discussing this with surveillance oversight actors or computer scientists, questions about race/ racial bias in technology can be much more explicit.	What measures are used to ensure that the practice is 'just'? How is it possible to make just algorithms? [specifically, surveillance oversight actors] Are they aware of PNR abuse? If so, are they able to hold those accountable for abuse?
Closing the interview	Give indications that the interview is coming to and end. Finalize with a note on gratitude.	

	Assure confidentiality. Ask the interviewee if they would like to make any additional comment/ if they have any questions. Note on how the information will be used and how the research will progress, if necessary.	

Semi-Structured Interview Guide

Date:	Interviewer:	Archival #:	
In person / Online	Location:	Start Time:	End Time:

1. **Greetings**
2. **Explanation of purpose**
   - **a.** *Explain the purpose of project. Focus on the most relevant aspects of the project in relation to the interviewee).*
   - **b.** *Go over the procedure that will be followed and how the interview will proceed. Explain how the interviews will be used in the research.*
3. **Receive consent [in person]**
   - **a.** *Go over the written consent form with participant.*
   - **b.** *Provide an opportunity for the interviewee to ask the interviewer any questions before getting started.*
4. **'Grand-tour' questions**
   - **a.** *Ask a broad question about the role the interviewee occupies.*
   - **b.** *Goal is by asking a broader question that a natural conversation can commence, guided in the direction of the research objectives.*
   - **c.** *Follow up questions if needed*
5. **'Funneling technique'**
   - *a. Work toward focusing the conversation.*
   - *b. Narrow in on an element of the response, show interest, and have the interviewee 'teach' about what they do.*
6. **'Mini Tour'**
   - *a. Continue to narrow the conversation, but allow it to flow naturally, guiding it in the direction of the research objectives, with the aim of reaching PNR.*
   - *b. Pose more specific questions. One question will be asked at a time as to not overwhelm the interviewee.*
     - *i. The specific question will be highly dependent on the actor.*

c. *Follow up as necessary.*
    i. *Can you tell me more about [...]?*
    ii. *Are you able to explain how [...] works?*
    iii. *How important is [...] to [...]?*

7. **Final questions on 'ethical' elements**
    a. *Use verbal ques that the interview is reaching its end.*
    b. *Probe question on ethics/ race/ bias: These questions are highly depended on the actor and the nature of the conversation thus far; however, the goal is to get insight in how decisions are made, how we can have 'just' algorithms, how the participant views the process and if they believe there to be human or technical bias.*
8. **Concluding the interview**
    a. *Express gratitude: Thank the interviewee for their time and participation.*
    b. *Ask the interviewee if they have anything else to add or if they have any questions for me*

Université d'Ottawa
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Office of Research Ethics and Integrity

S-04-21-6401 - REG-6401 - Certificat d'approbation éthique / Certificate of Ethics Approval

(English message follows)

Cher/Chère Kailey Taplin,

Veuillez trouver ci-joint le certificat d'approbation éthique pour le projet intitulé «Code-dependency: South Africa's Passenger Name Records and Race».

Le certificat est valide jusqu'au : 10-05-2022

Recherche financée : veuillez faire suivre une copie du certificat au Service de gestion de la recherche.

Si vous avez des questions, n'hésitez pas à communiquer avec le Bureau d'éthique à ethique@uottawa.ca ou en composant le 613-562-5387.

Vous pouvez voir votre demande en vous connectant à votre compte eReviews.

Cordialement,

Kim Thompson
Responsable d'éthique en recherche

Ceci est une réponse automatisée, merci de ne pas répondre à ce courriel.

Annex 3

The figure presents a detailed flowchart illustrating the creation, international transmission, processing, and operational use of Passenger Name Record (PNR) data for travellers entering South Africa. The diagram uses interconnected boxes and arrows to indicate data movement between commercial entities, international reservation systems, South African border authorities, and law-enforcement pathways.

1. Creation and Initial Transfer of PNR Data
Travel agencies and airlines generate raw PNR data during booking. This data is transferred to the central Computer Reservation Systems/Global Distribution Systems (CRS/GDS) via standard industry channels.

2. Global Distribution Systems (GDS) and Regional Variations
The CRS/GDS networks distribute data across American and European systems. Sabre, Worldspan, and Galileo (via Travelport) operate primarily in the United States and generate alphabetic record locators, while Amadeus operates in Europe and uses alphanumeric locators.

3. International Routing and Additional Data Sources
South Africa receives PNR data from these systems as well as from aircraft communication networks and various foreign authorities, represented as Country 1 and Country 2 in the diagram.

4. Pre-Border Processing at the Border Management Authority (BMA)
Raw PNR data is received by the BMA before the physical border is reached. Some of this data is transmitted to the South African Police Service (SAPS) and the National Intelligence Service (NIS), while the remainder moves into automated analytic systems.

5. Automated Processing and Risk Analysis
South Africa's PNR algorithm—potentially based on the UN goTravel platform—conducts automated analysis. Passengers are screened against the national no-fly list and international security databases such as INTERPOL. Outputs include either a high-risk match or a low-risk/no-match assessment.

6. Human Review and Resolution
Automated flags are subject to human review. Outcomes include:
- Risk negated (processing ends),
- Risk confirmed (further processing), or
- Transfer of all passengers to border inspection procedures regardless of risk outcome.

7. Port-of-Entry Compliance and Outcomes
All passengers undergo inspection at the BMA port of entry. The outcomes depicted are either lawful entry into South Africa or arrest, followed by handover to SAPS.

8. Data Retention and Record-Keeping
PNR data is retained by the South African government for periods legally required, with some categories stored permanently.

Annex 4 (figure 6)

This figure presents a comprehensive timeline of major South African immigration laws and policy developments from 1913 to 1996. It maps the evolution of immigration regulation alongside the racialized logic that increasingly shaped entry, residence, and citizenship throughout the twentieth century.

Beginning with the creation of the Immigration Department in 1913, the timeline notes how early legislation already contained explicitly racial provisions. The 1913 Immigration Act prohibited the entry of Eastern Europeans, primarily Jewish and other Eastern European migrants, unless they could be classified as "white." This early act also gave immigration officers wide discretionary powers to exclude individuals at the port of entry and limited internal movement for Black South Africans.

The 1922 and 1927 laws further entrenched racially selective immigration. The 1927 Immigration and Indian Relief Act restricted entry by nationality, determining eligibility by country of birth rather than citizenship, and removed immigrants' rights to appeal entry decisions.

The 1930 Immigration Quota Act introduced quotas that limited the number of individuals allowed from specific countries.

The 1933 Immigration Amendment Act and the 1937 Aliens Control Act significantly intensified restrictions. The 1937 Act explicitly prohibited the immigration of all non-white people and required that immigrants be "likely to become readily assimilated" with European inhabitants. It also institutionally limited access to permanent residency for mine workers and other labour migrants, further racializing pathways to settlement.

By 1939, the Aliens Registration Act required all aliens already in South Africa to register with authorities, with employers and landlords compelled to report individuals. The 1949 Citizenship Act created formal South African citizenship and aligned the country's status with broader Commonwealth nationality policies.

The 1950 Population Registration Act marked a fundamental restructuring of the racial order, requiring all residents to be classified according to racial categories that would subsequently determine immigration eligibility, movement, and citizenship.

The 1952 Departure from the Union Regulation Act made it illegal for South Africans to leave the country without a passport or equivalent document, and emigrants risked losing citizenship.

The 1960 amendment to the 1913 Act required all entrants to hold valid visas while empowering the minister to exempt individuals or categories of persons.

In 1961, South Africa became a republic. The 1967 Border Control Act criminalized entry outside an official port of entry, reinforcing state authority over movement. The 1970 Bantu Homelands Citizenship Act further racialized citizenship by assigning Black South Africans to "homeland" nationalities, effectively stripping them of South African citizenship within "white" South Africa.

The timeline concludes with post-apartheid reforms. The 1991 Aliens Control Act ended some of the most extreme provisions but continued to deny judicial review of immigration decisions, leaving irregular

migrants vulnerable to rights violations. The 1996 Constitution and Bill of Rights established a new legal foundation, guaranteeing basic rights and equal legal protections, marking a decisive shift away from racially defined immigration control.

Overall, the figure illustrates how immigration law in South Africa served as a key mechanism for enforcing racial hierarchies, controlling mobility, and shaping demographic composition from the early Union period through apartheid and into democratic transition.

Annex 5 (figure 7)

Figure 7 illustrates the development and circulation of aviation-related administrative, security, and immigration practices in South Africa from 1910 to 1991. The chronology highlights how aviation governance evolved alongside state concerns about border control, public health, geopolitical alliances, and counter-sabotage measures. It also shows the increasing incorporation of international models—British, Canadian, American, and later African—into South African aviation policy.

The timeline begins in 1910, when white persons were no longer required to present passports or written authorization to enter the Union of South Africa. In contrast, biometric identification (particularly fingerprinting) became mandatory for all other population groups, reflecting early racialized distinctions in mobility regulation.

By 1931, the Department of Defence was formally recognized as the institution most qualified to manage all matters related to aviation. This was based on comparisons with Great Britain, Canada, and Australia, whose aviation departments served as models for South Africa's emerging administrative framework.

In 1933, state attention turned explicitly to aviation immigration, with officials focused on preventing illness from entering the Union via air travel. The record cited (BNS 12/74, VOL. 3-22/178/74) reflects increasing state scrutiny of public health risks associated with international mobility.

A major institutional development occurred in 1942, when the Civil Aviation Board was created to establish cohesion in aviation governance across Africa. This initiative was revisited again in 1961, reaffirming the Board's role in coordinating regional aviation standards and practices (BKA 16 May 1961 – Ref 20/1).

The 1948 entry marks South Africa's formal agreement with Egypt to share aviation-related information. South African officials noted that they lacked sufficient knowledge about the operation of airports in the global south and welcomed opportunities to exchange technical and operational insights (BKA – 20/1-p.5). This indicates that the circulation of practices extended beyond the Commonwealth sphere into African–Middle Eastern networks.

By 1961, South Africa had established a reputation for technological advancement in aviation security. During the Vietnam War, the United States publicly acknowledged that South Africa was highly advanced in aviation procedures and capable of aiding the U.S. American Committee on Africa (1971). This demonstrates South Africa's active participation in Cold War–era aviation security cooperation.

The period between 1971 and 1991 is characterized by bilateral aviation security agreements. In 1971, the United States and South Africa strengthened aviation-related collaboration, particularly concerning hijacking prevention, navigation safety, and airport security. By 1991, South Africa also entered into a bilateral agreement with Burundi aimed at providing mutual assistance in combating hijackings, aviation sabotage, and threats to air navigation systems (BNS-224.74 – box 318).

Overall, this figure shows that South Africa's aviation governance developed through a combination of racialized internal controls, adoption of Commonwealth and Western aviation models, and increasingly formalized international security cooperation. Aviation policy functioned not only as a technical

administrative domain, but also as a means of regulating mobility, securing borders, and participating in broader geopolitical networks.

Annex 6 (figure 8)

Figure 8 presents a detailed flow diagram explaining the design and functioning of the Passenger Name Record (PNR) algorithm. The process begins with a governmental decision to implement PNR, followed by the selection of raw data sets. Software engineers structure the raw data and process it for the first time. A circular data-cleaning workflow—removing unwanted observations, fixing structural problems, managing missing data, and addressing outliers—ensures that the data is usable for algorithmic training.

Once the data has been prepared, training data is created and then used to produce machine-learning predictors. The algorithm undergoes multiple rounds of cross-validation, testing its predictive accuracy with new data sets. This stage represents supervised learning, where humans can intervene, adjust parameters, or add corrected data.

The diagram also depicts the integration of three learning modes:

- Supervised learning: Human experts modify the algorithm or correct data inputs.
- Unsupervised learning: As more data is added, the system autonomously improves—"more data = smarter algorithm."
- Reinforcement learning: The algorithm learns from its mistakes; human decisions influence how the model adjusts.

As the model improves, it begins to make correct predictions with new data. At this stage, the PNR regime can be formally implemented. The algorithm continues to evolve after implementation, receiving new data and updating itself accordingly. The diagram highlights that machine-learning systems do not remain static: they continue to "learn" in operation, shaped by both automated processes and human oversight.

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