LOGISTICS AS RATIONALITY: EXCAVATING THE COLONIALITY OF CONTEMPORARY LOGISTICAL FORMATIONS

Megan Archer

A thesis submitted in partial fulfilment of the requirements of the University of Brighton for the degree of Doctor of Philosophy

June 2020

ABSTRACT

This thesis investigates the material and epistemic frameworks of logistics, through identifying and interrogating both the specific logics and the broader rationality that underpins logistical organisation. It writes a longer history of logistics, linking the production of Western modernity to contemporary logistical formations. The thesis argues that logistical rationality has its foundations in, and continues the project of, colonial modernity, by unpicking the epistemic framework and the representational order it is founded on. It identifies a set of logics that animate world-making logistical operations, namely representation, measurement, extraction, translation, prediction, standardisation and the control of uncertainty. I argue that logistical rationality attempts to incorporate the entire world into its own form of legibility – and in so doing, erases that which cannot be translated as such. It translates the world and its populations into what I call *logistical legibility* by extracting, translating and manufacturing *knowledge* about them in the form of data, in order that said knowledge may be used to predict the future and hence, *control* its radical uncertainty. This also amounts to a delimitation of what counts as knowledge, and as ways of being and doing in the world, and as such provides the grounds and means for the increasing administration of subjects. The framework I develop here thus allows us to reckon with those forms of violence, structural, physical, and epistemic, that lay the groundwork for current processes of domination and the shape of contemporary colonial modernity. Ultimately, this thesis contends that logistical rationality, through these logics, has come to be infrastructural to the organisation of politics, economics, industry, and further, people's lifeworlds.

CONTENTS

DECLARATION

I declare that the research contained in this thesis, unless otherwise formally indicated within the text, is the original work of the author. The thesis has not been previously submitted to this or any other university for a degree, and does not incorporate any material already submitted for a degree.

Signed

Megan Archer

ACKNOWLEDGEMENTS

Maybe this is the hardest part to write, and why I have left it until the last possible moment before I submit. This thesis would not have come together if it weren't for other people. It is a lonely thing, doing a PhD; except when you're a lucky sod like me and it's not, and you find yourself surrounded by Good Eggs that make the worst of these times feel like they can be got past, and make the best of them so full of joy you forget them. Whatever the declaration prior declares, I did not write this alone. It is also the truth that I am actually rubbish with words and will not be able to thank people with anywhere near the full force of what their kindness, patience, laughter and support has meant to me over the *absolute eternity* that this took to write.

So this is really for a lot of people. Special mention has to go to my homie and partner in everything, Emma Harrison, who has kept me smiling for years now. These last two, especially, have been full of more laughter, tears and understanding than I thought possible. My longest loves, Rosa Murdoch and Zoe Williams, for being unendingly inspiring in all that you do. Lewis Davies for being the Goodest of eggs all those years. For my family – my mum Claire and my dad James have accepted and supported me in all of my endeavours. My sister Katie is one of my best friends, inspirations, and biggest supporters. And my brother Luke always inspired me to ask weird questions. Thank you all so much. I really don't know what else to say.

The wonderful souls who read parts of this and offered their most invaluable feedback – I cannot thank you enough for routinely making more sense of my work than I could. Lars Cornelissen, Afxentis Afxentiou, Garikoitz Gomez, Giovanni Marmont, Samuel Cutting, Fearghus Roulston. Honourable mentions to Melayna Lamb, and Gabriel Wulff, for all love and shenanigans, and Lorenza Ippolito and Jacopo Condo for the same. All the above did more than read my work: their friendship and support, our shirk-in-recess, our parties and our collective struggles have made me better. I can only hope to be as kind, funny, clever and politically right on as you lot. Above all, I am beyond proud to be able to call these people my friends. And I can't wait until we can all dance together again.

I also want to pour one out for my dear friend Adrian Devine, give thanks to The Plums who were such a huge part of this, and to all of chess club, and to JJ because he specifically asked for a shout out. And my two favourite dogs – you know who you are. And I'm so sorry if I've forgotten anyone. You know I love you really.

Finally, I should thank my supervisors – Daniel Steuer, Zeina Maasri, and Mark Devenney. Each of you have displayed an incredible amount of patience, insight, and generosity of time and thought. Daniel has been an indelible guide through a tangled web of thinking since 2013. Mark has prodded me into claiming my ideas since my MA. And Zeina, although late to the party, has been so wonderfully encouraging and pushed me to consider most carefully what I think are the most exciting parts of this thesis. Thank you all.

INTRODUCTION

What connects the production and project of Western modernity, cybernetics and Cambridge Analytica? How did we get to a point of near ubiquitous digital surveillance and the apparent intervention in and rationalisation of the most intimate parts of our political and emotional subjectivities? This thesis will show the deeply entangled threads and trajectories of power that link the project of Western modernity with the operations of groups like Cambridge Analytica. It does so through investigating the material and epistemic frameworks of logistics, interrogating the rationality that underlies logistical organisation.

Logistics has come to be a pervasive organising mode of contemporary capitalist society – a highly visible yet often overwhelmingly obscure web of physical and digital infrastructures that enable the rapid globally coordinated circulation of goods, information, and capital. In lay or business accounts, logistics is a neutral scientific method conducted through the application of rationalising technologies to production and distribution processes, and results in the increased production of value through the accumulation of efficiencies that these technologies afford. This thesis seeks to trouble this narrative by drawing together what at first glance appear as disparate, and yet upon closer examination, can be revealed as crucial moments to be incorporated into any critical history of logistics and analyses of its contemporary iterations.

We begin by contending with the oft cited import of the moment of the 'Revolution in Logistics' in the 1950's and 60's. Widely understood as heralding a new era of globalisation, this moment is repeatedly argued to have begun with the incorporation of computation, systems thinking and other advances in transportation and distributive technologies into 'Physical Distribution Management', an early attempt at the scientific management of the movement of goods and the rationalisation of the firm as a holistic entity.[1] I argue that there must be a twofold extension of this history – firstly, that we must, at the least, take a historical look back to the development of cybernetic thought: the universal language it sought to develop to describe the world; the resultant ways of conceptualising the world-as-system it afforded; and how these came to structure logistical forms of organisation and thought. Secondly, that in order to re-politicise this history and unearth the underlying operations of power at work in this logistical moment, we must put Empire back into the history of logistics. What I mean by this, is that any history or critique of contemporary logistics – particularly where it is heralded as a (technically neutral)

[1] See the following authors: Deborah Cowen, *The Deadly Life of Logistics* (Minneapolis: University of Minnesota Press, 2014); Charmaine Chua et al., 'Introduction: Turbulent Circulation: Building a Critical Engagement with Logistics', *Environment and Planning D: Society and Space* 36, no. 4 (August 2018): 617–29; Sandro Mezzadra and Brett Neilson, *The Politics of Operations: Excavating Contemporary Capitalism* (Durham: Duke University Press, 2019).

modernising force – must be theoretically informed by critiques of modernity that recognise the persistence of imperial and colonial legacies and how they continue to shape the present.

On the one hand, it is necessary to read further back to recognise the late 1930's and the development of (initially) military technologies such as cybernetics, early networked computing systems, and the movement from analogue to digital computing as significant moments in the *becoming-infrastructural* of logistics to global organisation (and capital). On the other, this alone is inadequate. We must also pay sufficient attention and give proper weight to the global historical and epistemological context out of which this constellation of technological developments emerged, and what this means for their contemporary formations. To do so, I argue we need to think about the ongoing constitution of modernity, and further, to figure logistics as a project of that. Timothy Mitchell, as well as Anibal Quijano, Maria Lugones, Walter Mignolo, amongst others provide accounts of modernity as an ongoing project that is irreducibly tied to colonial and imperial domination.[2] These thinkers allow me to demonstrate the continuities of power operant in contemporary logistical organisation as in many ways continuous with this project. In the same vein, Moten and Harney argue that modern logistics itself has a violent origin story. They contend that modern logistics was born in the Middle Passage – in the 'first great movement of commodities, the ones that could speak'.[3] For them, logistics was founded with, and of, a seminal moment in the inauguration of modernity; that of enslavement. Irreducible to this is the processes of racialised domination that were constitutive of that project.

Thus, I argue that what happened in the 1950's and thereafter can be read as the (*counter*)revolution in logistics - an *extension of earlier logics and techniques of domination* – that worked to retain, recalibrate, restructure and reinscribe the inequalities of wealth and the power of Empire as it began to be formally dissolved. Out of the 1930's and on into the Cold War and the concurrent struggles for independence, a set of technologies was developed that were themselves shaped by logics of *coloniality*, and deployed *against processes of decolonisation and anti-imperialist struggles.*

MAIN ARGUMENTS & APPROACH

This thesis argues that logistics can be fruitfully understood as a rationality – or rather, that considering the underlying rationality of logistics allows us to see beyond its relatively distinct

[2] Timothy Mitchell, 'The Stage of Modernity', in *Questions of Modernity*, ed. Timothy Mitchell, Contradictions of Modernity, v. 11 (Minneapolis: University of Minnesota Press, 2000), 1–34; Maria Lugones, 'The Coloniality of Gender', *Worlds and Knowledges Otherwise* Spring (2008): 1–17; Walter D. Mignolo, 'DELINKING: The Rhetoric of Modernity, the Logic of Coloniality and the Grammar of de-Coloniality', *Cultural Studies* 21, no. 2–3 (March 2007): 449–514; Aníbal Quijano, 'Coloniality and Modernity/Rationality', *Cultural Studies* 21, no. 2–3 (March 2007): 168–78.

[3] Stefano Harney and Fred Moten, *The Undercommons: Fugitive Planning & Black Study* (Wivenhoe: Minor Compositions, 2013), 92.

'new imperial imaginary', as Cowen has shown us, to excavate the coloniality of power that animates contemporary logistical organisation.[4] Logistical rationality, I contend, has come to pervade the organisation of our politics, economics, industry and further, our subjectivities and forms of sociality at ever more intimate levels and with increasingly finer granularity. The specificity of my approach lies in identifying key logics and the epistemic underpinnings of logistical rationality in order to clarify the ways in which the models it deploys to represent reality have become infrastructural to the organisation of the world. I take seriously the claim that Western modernity is a continuing construction made possible through deleterious forms of representation and racialisation, and the instantiation of a naturalised hierarchy. This has structured how we think, how we can live, and how we produce knowledge. We must then seriously interrogate what has been seen as a largely physical manifestation and extension of the project of modernity – logistics proper – and begin to think about how its own underlying rationality and epistemic framework is consonant and continuous with its constitutive underside, coloniality.

SPECIFIC LOGICS

The logics I identify point to techniques of rationalisation, and a positivistic, universalising tendency. Logistical rationality is underpinned by a regime of quantification, calculation and modelling which is heavily influenced by or modelled on cybernetic thought. A cybernetic understanding of the world is one that sees everything as series of interconnected systems of communication and control – with a focus on what they *do,* not what they *are.* These systems are made up of 'animal and machine'[5] in the words of Weiner, or for Ashby, cybernetics, or

> [t]he art of "steersmanship" deals with all forms of behaviour in so far as they are regular, or determinate, or reproducible … [it] stands to the real machine -- electronic, mechanical, neural, or economic -- much as geometry stands to real objects in our terrestrial space. … [and] offers a method for the scientific treatment of the system in which complexity is outstanding and too important to be ignored'[6]

I argue that cybernetic thought and method, which necessitates the translation of real-world systems and behaviours into quantifiable variables and models, is a foundation of logistical rationality. Furthermore, I argue that these processes amount to forms of translation, replication, standardisation and erasure. In the translation of ever more of the world in the form of data, metrics, abstract models and replicable infrastructure, models and data have become a dominant

[4] Cowen, *The Deadly Life of Logistics*, 47.
[5] Norbert Wiener, *Cybernetics or Control and Communication in the Animal and the Machine* (MIT Press, 1948).
[6] Ross Ashby, *An Introduction to Cybernetics* (Martino Fine Books, 1956), 1, 2, 4–5.

mode of representing the world and what counts as knowledge about it. These disparate but continuous programmes of quantifying, translating and standardising then serve to erase other ways of knowing and possibilities for organising the world otherwise.

Standardisation here should be thought of as an integral part of processes of translation into logistical legibility – the mechanism by which the world is translated and represented in such a way that it can be replicated and repeated in kind. Further, in this context, standardisation is a normative process by which a standard is delineated and set as a benchmark for the correct way of doing things – epistemologically, procedurally, and materially. As a logistical process, standardisation aims at the removal and smoothing away of obstacles to replication. Concurrently, standardisation should be seen as another way of controlling uncertainty – as a form of logistical translation, standardisation aims at the production of a *more certain* future through rendering normative the models and forms said to delineate various kinds of 'best practice'. Prediction is thus another central logic in this narrative – the frontier-like orientation toward the future that aims to bring it under control.

Another important feature of logistical rationality is its extractive logic – in the very literal sense of the extractive industries such as mining and intensive agricultures – but also in terms of the extraction of value in dependent debt relationships, and the extraction of data about populations (and its subsequent translation & production into knowledge). Thought of in this expanded sense, extraction allows us to acknowledge affinities with modern forms of counterinsurgency – thinking here about attempts to extract knowledge about 'enemy' populations in wartime in order to make war more efficient; or in 'development' projects with the dual-purpose of securing an extractive debt relationship and/or loyalty to the financing nation.[7] It also then revolves around processes of inclusion and exclusion from its networks.[8]

Logistics is also widely understood as a spatial phenomenon, as Cowen amongst others show us. I show that logistical rationality is predicated on a desire for control over not only space, but temporality too – working with the logic of prediction, logistical rationality attempts to predict and control future events. Lysandrou goes so far as to say that the future is being colonized by

[7] Here I am referencing two related examples – the Hamlet Evaluation System in Vietnam – a programme aimed at discovering ways to quell resistance to the US's advancing forces. This is one of the early iterations of 'person-centric' counterinsurgency, that we see today in the US 'Human Terrain Systems', an attempt to win 'hearts and minds'. See: Oliver Christian Belcher, 'The Afterlives of Counterinsurgency: Postcolonialism, Military Social Science, and Afghanistan 2006-2012' (Vancouver, University of British Columbia, 2013); Secondly, I'm referencing the development projects in Afghanistan and across satellite nations along the buffer-zone of the Soviet Union. Both the USSR and the US built roads in Afghanistan as a method of counterinsurgency and to attempt to secure the loyalty of the Afghan nation in the Cold War. See: Nick Cullather, 'Damming Afghanistan: Modernization in a Buffer State', *The Journal of American History*, 2002, 26; Frank N. Schubert, 'U.S. Army Corps of Engineers and Afghanistan's Highways 1960–1967', *Journal of Construction Engineering and Management* 117, no. 3 (September 1991): 445–59.

[8] Saskia Sassen, 'Predatory Formations Dressed in Wall Street Suits and Algorithmic Math', *Science, Technology and Society* 22, no. 1 (March 2017): 6–20; Keller Easterling, *Extrastatecraft: The Power of Infrastructure Space* (London ; New York: Verso, 2014); Mezzadra and Neilson, *The Politics of Operations*.

processes of financialization; alongside Zuboff who argues that our "will to future" is under threat by the predictive products-turned behavioural modification technologies under what she calls surveillance capitalism. [9] Fundamentally, I argue that logistical rationality dreams the annihilation of distance and time in the delivery of goods, services, and information.

Logistical rationality is thus made up of a complex set of logics that overlap and intersect in their operations. The principle, but not necessarily exhaustive, logics that I deal with in this thesis are quantification, measurement, prediction, the control of uncertainty, extraction, standardisation, and the complexities of logistical space and time.

LOGISTICAL RATIONALITY

I deploy the term *logistical rationality* in order to describe the way in which the above set of logics structure political and economic possibilities, but further, constructs a regime that attempts to delineate and control space, time, bodies, materials, and subjectivities. This amounts to a necessary extension of the notion of political rationality as a product of modernity which fails to recognise the constitutive nature of colonialism and imperialism in its production.[10] As such, logistical rationality recognises that the epistemic grounding of these logics has a longer history of violence that must be centred in any analysis of their contemporary manifestations, not only for reasons of analytic potency and clarity, but for reasons of epistemic justice.

What I am terming *logistical rationality* is then also an intervention in a long history of writers thinking about rationality under modernity. Weber gave us an understanding of instrumental reason that recognised the increasing tendency to convert action-as-means to a permanent state of action-as-end. In other words, the tendency for rationality to *mean* a logic of pure means – with the end objectives irrelevant so long as the method itself is rational and rationalising. Wendy Brown knits this together with Frankfurt School developments of Weber's theory of rationalisation to ground her deployment of Foucault's understanding of political rationality. The Frankfurt School (broadly speaking) argued that instrumental reason had become 'suffused with the norms and imperatives of capitalism to generate a rationality that saturated society and secured capitalism in ways Marx and Marxism could not fathom or explain'. [11] Brown extends this as a grounding for her account of neoliberal rationality. For her (and from Foucault), political rationality is not merely an instrument of governmental practice, but the condition of possibility

[9] Photis Lysandrou, 'The Colonization of the Future: An Alternative View of Financialization and Its Portents', *Journal of Post Keynesian Economics* 39, no. 4 (October 2016): 444–72; Shoshana Zuboff, *The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power* (Profile Books, 2019).

[10] Quijano, 'Coloniality and Modernity/Rationality'; Walter D Mignolo, *The Darker Side of Western Modernity: Global Futures, Decolonial Options* (North Carolina: Duke University Press, 2011); Mignolo, 'DELINKING'; Mitchell, 'The Stage of Modernity'; Timothy Mitchell, *Rule of Experts: Egypt, Techno-Politics, Modernity* (Berkeley: University of California Press, 2002).

[11] Wendy Brown, *Undoing the Demos: Neoliberalism's Stealth Revolution* (MIT Press, 2015), 120.

of its instruments – it is the 'field of normative reason from which governing is forged'.[12] She writes, it

> could be said to signify the *becoming actual* of a specific normative form of reason; it designates such a form as both a historical force generating and relating specific kinds of subject, society, and state and as establishing an order of truth by which conduct is both governed and measured.[13]

I would venture that logistical rationality signifies the *becoming-actual,* or rather, *becoming-infrastructural* of a specific normative form of reason, and one that establishes or maintains an order of truth through which conduct is governed. How logistical rationality goes beyond Brown's account is in its insistence on tracing the connections between material rationalisation and logistical infrastructures; its deep influence throughout political and economic spheres; and the epistemic violence and specifically, the coloniality it is continuous with and continues to manifest. It is also not the case that this rationality emanates out of a specific state rationality, nor does it belong solely to the realm of the market or the governance of subjects bound by a nation-state. Rather, it continues a project of power and domination – Western modernity – that it simultaneously constructs and is constructed by.

Thinking in this way, it becomes clear that the notion of a logistical rationality allows us to conduct this necessary intervention in teasing out the operative and epistemic dimensions of these logics, and allows us to think across the multiple registers that logistics intersects and organises. Logistics is of course the technologies, infrastructures and territories it shapes, it is protocol and extraction, and it is *the logics and epistemic grounding of these technologies and physical manifestations.* It is the rationality that, incorporating, extending and reworking a coloniality of power, animates logistical organisation, and further, allows logistical organisation to become seen as something like a universal model that can be applied to almost anything. From global supply chains to anthropological studies – from extractive debt architectures to microtargeting in political campaigns, logistical rationality appears to obscure the coloniality of power deeply implicated in its operations.

To think logistics and logistics as rationality together is to consider both the material-infrastructural and political-epistemic foundations of logistics and the ways in which these intertwine to contribute to the contemporary shape of modernity. It allows us to get underneath the neutral veneer of scientific objectivity and efficiency that envelopes the general discourse of logistics, and to begin to excavate the colonial logics that animate its organisation of the world. In considering logistics as a form of rationality and its epistemic foundations as a continuation of

[12] Brown, 116.
[13] Brown, 118.

logics of coloniality, we can bring into relief the ways in which logistical organisation relies on and recalibrates structures that determine what counts as knowledge and what counts as being, and as a result can unearth its more violent tendencies of exclusion and erasure.

Ultimately, logistical rationality advances an (impossible) attempt at a near-total control. As outlined above, the techniques and logics through which it attempts this include modelling, calculation and prediction; extraction, expropriation and standardisation; translation, erasure and the variability of inclusion & exclusion; and ever-increasing efficiencies, valorization and commodification, with a view to extending rational control over time and space, capital and materials, and bodies and subjectivities. In reaching *back* to think about how techniques and logics of domination inaugurated during this construction continue to shape our present, we can understand how logistics contributes to the maintenance and recalibration of these forms of domination in their interrelated epistemic, social and structural dimensions. This framework allows us to reckon with the forms of violence, structural, physical and epistemic, that lay the groundwork for processes of domination in the contemporary world. It re-politicises logistics, putting Empire back into its history and its contemporary operations.

LOGISTICS, TOTALITY AND TRUTH NARRATIVES

Mignolo argues that Western conceptions of rationality (at least prior to postmodernism) advance an 'exclusionary and totalitarian notion of Totality … that is a Totality that negates, exclude, occlude the difference and the possibilities of other totalities'.[14] The project that I advance here does not attempt to write yet another totalizing grand narrative. Throughout my academic career I have struggled with the form and style of academic writing that neatly separates sets of ideas into distinct disciplines, themes and theoretical frameworks, and in particular, against myself in the habituated style of writing in the Western university that has led me at times to inadvertently erase the epistemic position from which I speak. As Grosfoguel reminds us, Western philosophy and sciences, in concealing the locus of enunciation, 'are able to produce a myth about a Truthful universal knowledge that covers up, that is, conceals who is speaking as well as the geo-political and body-political epistemic location in the structures of colonial power/knowledge from which the subject speaks'.[15] Further, in decolonial thought this concealment and the "Truthfulness" it affords is understood as an epistemic strategy which enabled 'European/Euro-American colonial expansion and domination … to construct a hierarchy of superior and inferior knowledge and, thus, of superior and inferior people around the world'.[16]

[14] Mignolo, 'DELINKING', 451.
[15] Ramón Grosfoguel, 'The Epistemic Decolonial Turn: Beyond Political-Economy Paradigms', *Cultural Studies* 21, no. 2–3 (2007): 213; Ramón Grosfoguel, 'Decolonizing Post-Colonial Studies and Paradigms of Political-Economy: Transmodernity, Decolonial Thinking, and Global Coloniality', *TRANS-MODERNITY: Journal of Peripheral Cultural Production of the Luso-Hispanic World* 1, no. 1 (2011).
[16] Grosfoguel, 'The Epistemic Decolonial Turn', 214.

This epistemic violence is the ground upon which European imperialism and colonialism was built. Gayatri Spivak is credited with coining the term in the seminal text '*Can the subaltern speak?';* in which she argues that epistemic violence is the active obstruction of non-Western approaches to knowledge production.[17] This process instantiates the active erasure of these knowledges and the attempt to overwrite them, and through this process the West becomes the legitimate epistemic subject and knowledge producer. Spivak argues that this movement establishes and generates an epistemic *Other,* through the 'assumption and construction of a consciousness or subject' that 'cohere[s] with the work of imperialist subject-constitution, mingling epistemic violence with the advancement of learning and civilization.'[18]

Where the collectively and externally described and delimited non-Western subject-as-object or Other is defined *against* the rational subject of the West, they are constituted as lacking reason, subjecthood, and thus of the rights to self-determination and freedom from colonization. The epistemic violence then, the violent imposition and delimitation of ways of being, knowing and feeling provides the legitimating groundwork for violent interventions – as Grosfoguel writes succinctly,

> We went from the sixteenth century characterization of "people without writing" to the eighteenth and nineteenth century characterization of "people without history" to the twentieth century characterization of "people without development" and more recently to the early twenty-first century of "people without democracy"[19]

We can see the continuity of this logic with the movement and logics of logistical rationality animating the turn toward Big Data, behavioural management & modification, and the experimental governance of "nudge" and "libertarian paternalism" that we come to in the final chapter of this thesis. This replays a similarly interventionist characterization of "people without rationality".

We can think of the corollary shifts in the coloniality of modes of governance a number of ways. Kwame Nkrumah in 1966 writes powerfully on what he understands as the phenomenon of neocolonialism – the continuation of colonialism by other means. This involves economic domination and exploitation without the expense of maintaining governmental administrations. This ostensibly materialist assessment has been vital in informing the position of this thesis, paying attention to the economic structures put in place to maintain forms of domination and control over former colonies or large parts of the Global South without direct rule. Deploying a

[17] Gayatri Spivak, 'Can the Subaltern Speak?', in *Marxism and the Interpretation of Culture*, ed. Cary Nelson and Lawrence Grossberg (Basingstoke: Macmillan, 1988), 271–313.
[18] Spivak, 295.
[19] Grosfoguel, 'The Epistemic Decolonial Turn', 214.

primarily Marxist anti-capitalist perspective, Nkrumah understands neocolonialism as a kind of 'collective imperialism', interrogating the

> international character of the agencies employed: financial and industrial consortia, assistance organisations, financial aid bodies, and the like. Friendly cooperation is offered in the educational, cultural and social domains, aimed at subverting the desirable patterns of indigenous progress to the imperialist objectives of the financial monopolists. These are the real methods of holding back the real development of the new countries. These are the paraphernalia of neocolonialism, superficially proffering aid and guidance; subterraneously benefiting the interested donors and their countries in old and new ways.[20]

This thesis attends to some of these questions in Chapters 1-3. This more historical section discusses the institutional advancement of development doctrines as irrevocably linked to logistical infrastructure building, as well as rational modelling and systems thinking; applied anthropology as both counterinsurgency and the extraction of knowledge about indigenous and national populations; and extractive mechanisms of debt and dependency as related to development and global structures of power and capital.

Mignolo notes that critiques of modernity are currently centred on 3 distinct types – one, immanent to Europe, is a Euro-centric critique and internal to the history of Europe itself. The other two, he argues, emerged out of non-European histories and their entanglement with Western modernity; one with a focus on Western civilization, and the other on coloniality. Though my work takes elements of all three of these avenues of critique, the concept of coloniality is most useful in describing the trajectory and dissemination of logistical rationality and its epistemologies.

The concept of coloniality is understood as a model of power which integrates the legacies and practices of European colonialism in social orders and ways of knowing. First used by Quijano and developed by Lugones and Mignolo amongst others, it refers to the way in which the concepts of modernity and coloniality are inseparable – that 'the modernity that Europe takes as the context for its own being is, in fact, so deeply imbricated in the structures of European colonial domination over the rest of the world that it is impossible to separate the two: hence, modernity/coloniality'.[21] As part of a broader project, the concept of coloniality seeks to decentre

[20] Lionel Tiger and Kwame Nkrumah, 'Neo-Colonialism. The Last Stage of Imperialism', *International Journal* 22, no. 1 (1966): 50.
[21] Gurminder K Bhambra, 'Postcolonial and Decolonial Dialogues', *Postcolonial Studies* 17, no. 2 (3 April 2014): 118; Quijano, 'Coloniality and Modernity/Rationality'.

the geographical determinism and historical internalism often present in critiques of Eurocentrism, toward an epistemic critique that allows us to look at various forms of epistemic violence and how they are present across geographical locations.[22]

This thesis thus decentres the narrative of modernization that many contemporary, even critical accounts of logistics rest on – logistical globalisation presented as a result of technical developments in the 1950's and 60's elides accounts of Empire as a violent globalising force, and is commensurate with a conception of linear and homogenous time that anti- post- and decolonial accounts of modernity trouble as part of the construction of modernity itself.

Deborah Cowen in *The Deadly Life of Logistics*, links anti-imperial piracy of the 17th Century to its contemporary forms and sees the 1950's and 60's as a threshold of contemporary globalisation and logistical organisation. She writes a convincing and situated analysis of logistics as an inherently spatial phenomenon, arguing that it represents a new 'imperial imaginary', with a distinct emphasis on the materialities of logistics.[23] This is because logistics is concerned with the reworking of sovereignty through the production of 'space' beyond 'territory'. She is one of the first writers, to my knowledge, explicitly connecting the contemporary operations of logistics with imperialism. Cowen traces the development of logistics, from its initial conception as a banal, subsidiary form of military art or strategy to its rise as a global business science. She specifically interrogates the way in which contemporary logistics transforms the 'geographies of production and distribution and of security and war', as well as 'political relations to the world and ourselves, and thus practices of citizenship too'.[24] For Cowen, logistics represents 'a profoundly imperial cartography', in which the production and contestation of logistics spaces and circulation refigures territory and sovereignty in the service of the protection of trade flows[25]. She writes that

> [f]rom its history as a military art in service of the national, territorial, geopolitical state, logistics became a technology of supranational firms operating in relational geo-economic space. In contrast to the absolute territory of geopolitical calculation

[22] Decolonial thought has its 'origin' in Latin America, strongly linked with world-systems theory and critical development studies. It takes as its point of departure the European incursions upon what was to become the Americas from around the 15th century onwards, with Sylvia Wynter amongst others placing the inauguration of modernity and its attendant forms of domination in 1492, when Colombus landed and the colonisation of Latin America by Spain began. It is beyond the scope of this thesis to draw lines between the wealth of theorists who have contributed to the decentring of the narratives of modernity from anti- or post- or de-colonial theory – for a concise outline of the nuances between approaches in this area see Bhambra above. Sylvia Wynter, '1492: A New World', in *Race, Discourse and the Origin of the Americas: A New World View*, ed. Vera Lawrence Hyatt and Rex M. Nettleford (Smithsonian Institute, 1995).

[23] Cowen, *The Deadly Life of Logistics*, 47.

[24] Cowen, 4.

[25] Cowen, 8.

> associated with colonial rule, geo-economics relies on the unimpeded flows of goods, capital and information across territorial boundaries.[26]

She thus figures logistics as a new imperial imaginary that fosters economic flows and produces 'space beyond territory'.[27] This production of space sees the reworking of national borders and trade routes as corridors and pathways, where "networked" and "systems" security reconstitute the border as an exceptional space of government, subject to different laws, trade agreements, tax breaks, and different levels of securitisation and labour rights. Put differently, logistics as a business science has come to 'drive geo-economic logics and authority, where geo-economics emphasizes the recalibration of international space by globalized market logics, transnational actors (corporate, non-profit, and state), and a networked geography of capital, goods and human flows.'[28]

Her work demonstrates the necessity of a more theoretically informed interrogation of what it means that logistics reworks imperial power. As demonstrated above, there is a wealth of post- and decolonial theory that shows the irreducibility of the construction of modernity and its political categories to the project of colonialism and vice-versa. For example, Mitchell shows us that an integral part of this construction is the production of what he understands as homogenous time and homogenous space. The organisation of time and space, in his account, is intimately tied to the project of Western modernity, as it is organised to produce a unified, coherent historical time that centres the West as the locus of its enunciation. Mitchell writes that 'to disrupt the powerful story of modernity, rather than contribute to its globalization, it is not enough to question simply its location. One also has to question its temporality.'[29] While Cowen does reference David Harvey on time-space compression and the importance of speed with regards to logistical circulation, we must interrogate this concept and the linear account of the temporality of globalization processes that still focus on the West as the centre from which they emanate. My thesis attempts to go further in arguing that logistics and the rationality that underpins it is a continuation of logics from as early as the 15th century, and that we can detail diverse genealogies that complicate this notion of a singular history and as a result, complicate the world-making representations of logistics.

SUBJECTIVITY

Other critical logistics scholars have written about labour power, practices, and resistance; geo-economic and -political movements in statecraft and the organisation of global capital;

[26] Cowen, 50–51.
[27] Cowen, 51.
[28] Cowen, 8.
[29] Mitchell, 'The Stage of Modernity', 7.

containerization and infrastructures; specific ports, shipping routes and Special Economic Zones.[30] As Charmaine Chua and others show us, 'logistics is not reducible to a mundane science of cargo movement or a discrete industry among others' – it is, rather, better understood 'as a calculative rationality and a suite of spatial practices aimed at facilitating circulation'.[31] Logistics has also been understood as a laboratory for labour and management techniques – the optimisation of productivity and cost-effectiveness as its doctrine, and Fordism, Taylorism, and now Toyotaism and Just-In-Time as its antecedents and practices. Labour in logistics has thus been well understood as a site of these new forms of management and the dissolution of labour rights but also as a historical and contemporary site of resistance and the power of labour movements – docks have long been important locations for blockades, strikes and protests and this is no less the case now. Again, many of these accounts neglect the longer histories of these techniques of management – Mitchell (amongst others) shows us that early labour management practices emerged out of plantation management during enslavement and colonial administration. Simone Browne shows us that many techniques of surveillance have their antecedents in slavery and the disciplining and management of the enslaved.[32]

Much of the writing on the logistical production of subjectivity addressed in the literature has been so far primarily in terms of logistical labour.[33] As a result I do not significantly address this particular aspect, as there is a wealth of scholarship on logistical labour and the resistances workers afford to the smooth operation of logistical networks and supply chain capitalism. I take the injunction that a 'critical logistical research agenda, broadly conceived, is concerned to interrogate how the politics of financial, corporeal, and material movement reorganizes social relations with and against profit and power.'[34] As such, I seek to extend these analyses by looking at the epistemic and other ways in which subjectivity, human experience and action comes under logistical organisation.

---

[30] Chua et al., 'Introduction'; Cowen, *The Deadly Life of Logistics*; Julie L. Cidell, 'The Rule of Logistics: Walmart and the Architecture of Fulfillment', *The AAG Review of Books* 6, no. 1 (2 January 2018): 25–26; N. Cuppini, M. Frapporti, and M. Pirone, 'Logistics Struggles in the Po Valley Region: Territorial Transformations and Processes of Antagonistic Subjectivation', *South Atlantic Quarterly* 114, no. 1 (1 January 2015): 119–34; Soenke Zehle, 'The Autonomy of Gesture: Of Lifestream Logistics and Playful Profanations', *Distinktion: Journal of Social Theory* 13, no. 3 (December 2012): 340–53; Michael J Watts, 'Reflections on Circulation, Logistics, and the Frontiers of Capitalist Supply Chains', *Environment and Planning D: Society and Space* 37, no. 5 (October 2019): 942–49; Giorgio Grappi and Brett Neilson, 'Elements of Logistics: Along the Line of Copper', *Environment and Planning D: Society and Space* 37, no. 5 (October 2019): 833–49; Brett Neilson, 'Five Theses on Understanding Logistics as Power', *Distinktion: Journal of Social Theory* 13, no. 3 (December 2012): 322–39.

[31] Chua et al., 'Introduction', 618.

[32] Simone Browne, *Dark Matters: On the Surveillance of Blackness* (Durham: Duke University Press, 2015).

[33] Mezzadra and Neilson, *The Politics of Operations*; N. Rossiter, 'Coded Vanilla: Logistical Media and the Determination of Action', *South Atlantic Quarterly* 114, no. 1 (1 January 2015): 135–52; Deborah Cowen, 'A Geography of Logistics: Market Authority and the Security of Supply Chains', *Annals of the Association of American Geographers* 100, no. 3 (25 June 2010): 600–620; Franco 'Bifo' Berardi, *The Soul at Work* (California: Semiotext(e), 2009).

[34] Chua et al., 'Introduction', 621.

Shoshana Zuboff, in *The Age of Surveillance Capitalism,* writes a sprawling critique of what she understands as a new economic form based on Big Data – surveillance capitalism, predicated on what she terms the complex 'means of behavioural modification'.[35] She argues that the most important contemporary form of value extraction is predicated on the translation of human experience into behavioural data, which is used to not only predict future behaviour, but to directly intervene in it in order to ensure profitable 'guaranteed outcomes' for the imperatives of surveillance capitalism. Her central thesis is that this turn toward behavioural modification is a novel and fundamental threat to liberal democracy and the rights afforded by it, and that capitalism must be rescued from intensifying surveillance operations. Zuboff paints a remarkably lucid picture of particularly complex dynamics of the extraction of behavioural data, its translation and development into prediction products, charting the ways in which they combine to effect behavioural change. She reckons that plumbing 'the intimate patterns of the self', surveillance capitalists and their technologies seek to 'delete' the fundamental uncertainty and indeterminacy of the human – and that this leads to the removal of our 'claim to the future tense'.[36]

Zuboff's analysis takes us deeper into the mechanisms of extraction, translation and prediction as they operate on subjectivities in contemporary (Western) societies. However, despite deploying multiple metaphors and imagery of imperialism, like Cowen she neglects any serious engagement with post- or decolonial theory. Her understanding of liberal democracy as under threat from the logics she describes relies on a clear distinction between them – something that I argue against throughout this thesis by showing their continuities and co-construction with logics of coloniality/modernity. As I show in the final chapter, the translation of human experience and knowledge into models and quantified forms, its extraction and the programme of knowledge production *about* populations in order to *intervene* in them - especially on the basis that they are somehow incapable of governing themselves - has a much longer history than Zuboff allows. Without recognising the way in which liberal democracy and capitalism themselves were co-constructed alongside colonial modernity, her analysis relies on political categories that should themselves be troubled by the logics she identifies.

I argue then that we can productively extend and deepen some of the most useful aspects of Cowen's and Zuboff's analyses by developing proper historical contextualisation and theorisation of the violences they allude to. When we think through the epistemic grounding of the practices of domination produced by physical logistical networks and Big Data surveillance, we complicate and expose some previously obscure operations of power.

Paola Ricuarte, for example, argues that Big Data forms the epistemological ground of our historical moment. She shows how it serves to amplify historical forms of colonization through

[35] Zuboff, *The Age of Surveillance Capitalism*, 203.
[36] Zuboff, 330.

the 'violent imposition of ways of being, thinking, and feeling' that work through various forms of expulsion and erasure.[37] In her understanding of 'data as a complex socio-technical assemblage that articulates material infrastructure as well as biological, emotional, ecological and symbolic dimensions', and as a way of approaching the coloniality of power, she provides a clear entry point to thinking about the epistemic violence of Big Data and predictive technologies.[38] When thought alongside Zuboff's analysis of the rendition of human experience into behavioural data and its extraction and modification, this formulation allows us a deeper epistemological analysis of the operations of power at work. I argue then it is imperative to reckon with Zuboff's formulation of behavioural modification alongside an understanding of logistics as a form of rationality and as such, an antecedent to and contributor of Big Data epistemologies that work to organise and administer subjects. Similarly, this work brings to the fore the necessity of analysing the underlying epistemic violence of Big Data epistemologies at work in material logistical networks, as I contend with in chapter four.

Considering these three thinkers together, what I argue is fourfold. Firstly, that we must recognise that logistics operates beyond the material-spatial, having formulated the ground for, and continuing to run on, an epistemology of Big Data. Secondly, that this means that we must attend to concerns surrounding surveillance, knowledge extraction and the erasure of that which cannot be translated into what I call *logistical legibility.* Third, that logistical rationality is thus in the business of organising, or rather, administering subjects and subjectivity via prediction and behavioural modification (or at least attempts to). Fourth, and corollary to the above, the central argument of this thesis is that logistics, when understood in both its material and epistemic senses, as both an form of rationality and a global organising principle*, enacts, legitimates* coloniality and *becomes infrastructural* to its operations. In this way we can see that logistics has been operative in the movement from global colonialism to global coloniality.

What follows is an outline of each chapter of the thesis, expanding on the general themes outlined above.

STRUCTURE

Chapter One develops a genealogy of logistics and its 'revolution' of the 1950s and 60s. While Deborah Cowen signals the import of systems analysis to this 'revolution' in her book, *The Deadly Life of Logistics*, I begin this chapter with a brief history of first order cybernetics, arguing that we must reach back further to grasp the underlying epistemological foundations of logistics. Starting with an interrogation of the representational order cybernetics is founded upon, I draw on Timothy Mitchell's understanding of the world-as-exhibition to argue that it reworks a

[37] Paola Ricaurte, 'Data Epistemologies, The Coloniality of Power, and Resistance', *Television & New Media* 20, no. 4 (May 2019): 351.
[38] Ricaurte, 353.

fundamental coloniality and a move toward what I call the *world-as-data*. I show that cybernetic thought represents the particular political, scientific and technological entanglement of the post-war period and in fact became infrastructural to modern logistical rationality. Through looking at the trajectory of this cybernetic-logistical representational order, I begin develop a definition of *logistical rationality* as an organising principle that establishes and incorporates multiple techniques of quantification, modelling, systems thinking, prediction, standardisation, early efforts to overcome the problem of space, and the control of uncertainty. These techniques form some of the argumentative and explanatory threads that weave together throughout the rest of the thesis and are explicated further in the case studies therein. I trace these logics across the different levels of their influence, and how they travel and settle in structuring forms of governance through looking at, for example, the RAND corporation and the careers of Robert McNamara and Jay Wright Forrester.

Chapter two demonstrates the way in which particular threads of this order were elevated to the level of foreign policy in the Global North - and directed at the Global South - through looking at the programs of modernisation that multiplied in the postwar era. It locates this analysis squarely in processes of decolonisation and the shoring up of a new international economic order and arising out of the Cold War. Drawing on the work of Mezzadra and Neilson in their assertion of an expanded notion of extraction, this chapter demonstrates the complex, extractive nature of [largely] state-sponsored applied anthropological experiments at this time. I show through a number of case studies that these experiments used methods and techniques of systems analysis and cybernetics; gathering instrumental data on their target populations and producing bodies of knowledge and programmes of intervention. These knowledges then contributed to the legitimation of similarly extractive programs of development and modernisation. Over this and the next chapter, I theorise extraction in four related ways: first, as the extraction of data and its translation into workable knowledge about a population, from the outside; second, as logistical extractive industries in the material or physical sense; third, in terms of the resultant debt as an extractive mechanism; and fourth, in demonstrating that inherent to these extractive processes are violent colonial histories and forms of power, which re-emerge in the employment of logistical rationalities.

Chapter three seeks to elucidate further the extractive and logistical nature of global architectures of debt and finance. It does so by first looking at the Marshall Plan as a blueprint for development as a form of economic counterinsurgency. Following discussions of the prescriptive character of modernisation in chapter two, it shows how early (though ongoing) development programmes mostly funded logistical infrastructure. The chapter draws on the work of Arturo Escobar to look at development as a discourse and further, as a mechanism through which a global architecture of extractive debt could be established. Recalling themes from chapter one, I connect logistical techniques of measurement, quantification and prediction as they emerged in the fields of economics, econometrics and finance to the burgeoning field of credit rating,

demonstrating how the practice and force of rating developed in tandem, and along the same epistemological and ideological lines. The chapter concludes by showing the extractive nature of the architectures of debt that these methods and metrics erect and maintain, on the one hand, by outlining the 'debt trap' of the ratings agencies-export credit agencies-Paris Club-IMF assemblage, and on the other, by bringing this architecture into relief against postcolonial readings of the aforementioned practices of measurement, governance by metrics, and geo-economics at this time.

Chapter Four departs from more a contemporary periodisation, to bring forward the so far largely historical theorisation of logistical rationality into the present moment of digital infrastructures, global supply chains and their intersections. It draws the central themes developed in the first three chapters together to look at logistical software systems, processes of standardisation, and the diverse and contradictory temporalities that they represent, reconfigure, and work within. It establishes standardisation as a central tenet of logistical organisation, situating this understanding in Timothy Mitchell's work on representation and replication, alongside Rolando Vazquez's theorisation of 'translation' as a form of erasure. It argues that logistical software and the standardisation of the International Standards Organisation act as a process of translation that renders the world logistically legible and subject to both material and epistemic domination as a result. Further, and corollary to this, the chapter interrogates the spatio-temporal regime associated with the understanding of colonial-modernity that Mitchell and Vazquez offer us, and the ways in which this plays out in the logistical drive to 'real-time', prediction, or further, the attempted translation and incorporation of the 'future' within the production of the narrative of 'the West'.

Chapter five looks to the development of techniques of mapping human subjectivity and the corollary attempts to control the behaviour of specific populations, or "target audiences". It uses case studies of Cambridge Analytica and its parent company, Strategic Communication Laboratories, and the underlying architectures that amass the data required for their psychographic techniques. The chapter explicates the complex and networked relationships between these companies and the relatively recent and influential fields of behavioural economics, and their underlying philosophy of libertarian paternalism, or 'Nudge theory'. It aims to tie together the main threads of the thesis and of logistical rationality, demonstrating how the logics of logistics so far outlined pervade contemporary digital architectures. From the cybernetic understanding of the subject as a 'programmable black box', to the behavioural economic understanding of the human as systematically irrational yet rationally programmable, to the influence-operations of governments and militaries all over the world, this chapter seeks to understand the at once individualising and massifying, incorporating and exclusionary, corporate/state/military operations of logistical rationality in contemporary digital infrastructures.

ONE: THE (COUNTER)REVOLUTION IN LOGISTICS: CYBERNETICS, SYSTEMS AND LOGISTICAL RATIONALITY

Introduction

This chapter constructs a genealogy of contemporary logistics. I demonstrate the development of the set of knowledges and practices that formed a program of measurement, quantification, modelling, and predictive technologies that served as the conditions of possibility of the so-called 'Revolution in Logistics' of the 1950s and 60s. Departing from Deborah Cowen's historicization of logistics, I argue that to interrogate the fundamental role that the uptake of systems analysis played in this 'revolution', we must reach further back to look at cybernetics – that is, the study of control and communication in human and non-human systems. It is my contention that cybernetics, its sister discipline of "Operations Research" (OR), and corollary methods of "systems analysis" had more influence on the development of modern logistics than afforded in Cowen's analysis. In demonstrating this significance of the epistemological foundations of these disciplines, we can begin to unpick the threads that weave together to form what I am venturing as *logistical rationality.* The chapter outlines some of the applications and influence of these disciplines in both industry and the military, and in economics and foreign policy.

In the first half of this thesis, I argue that modern logistics can be read as an assemblage that recalibrated and redistributed power during the period of the collapse of European empire and the emergence of the US as hegemon in the resultant global order. Further, that the continued expansion of the project of modernity is conducted in part through the expansion of logistical logics. This is done through the crystallisation of an epistemological framework; a logistical rationality in which the world was recast in a manner that allowed it to be measured, organized, and controlled via the collection and treatment of data. The specificity of this emergent paradigm lies in the shift toward machine-readable data – the new medium through which these techniques of control can be scaled up and across vastly different forms of governance. Though techniques of classification, measurement, and control are retained and recalibrated from 19th Century colonialism, I demonstrate that the introduction of modern computing vastly broadened the scale and scope of these techniques. This ultimately allowed for their intensification and instantiation as legitimate, rational, and even necessary practices of global governance during and after the dissolution of European empire.

A longer history of logistics could reach back thousands of years. This chapter takes its historical point of departure as the mid 1930's, or the tumultuous moment of the Second World War and the global upheaval that followed. As outlined in the introduction to this thesis, my suggestion is not that modern logistics *originated* in the Second World War, but that during this time it

incorporated a host of techniques and logics that have come to underpin its operations. These logics are structured by the relationship between modernity/coloniality, and emerge at a specific moment of fusion, in which military and scientific innovation and the parallel shift in the global order – from the structures of European Empire to the newly designated 'three worlds' – required new forms of management. Logistical rationality thus developed both in response to, and in tandem with, the widespread anticolonial and antiimperialist movements for independence across dwindling and decimated European empires; in the rise of new superpowers, namely the Soviet Union and the US; the inauguration of multiple supranational governing bodies and corollary forms of economic and political globalisation; and the development of early forms of networked communications and computing. This served to accelerate and maintain a programme of rationalisation, calculation, and control that recalibrated and in doing so, reinforced imperial structures of power even as formal processes of decolonisation occurred. Many accounts have demonstrated this recalibration of power through an understanding of neocolonialism, in the continuation of economic and political dominance over former colonies that continued after direct administration and colonial governance.[1] Here however, I want to demonstrate the epistemological trajectory of the coloniality of power and knowledge through the spread of logistical logics of modelling, prediction and control and the representational order they rely on. I show that these logics coalesced a programme of domination that served to erase the operation of its power through claims to scientific neutrality and objectivity.

The first section will outline the development of cybernetics, arguably one of the single most important disciplines undergirding logistical organisation.[2] Elaborating on Timothy Mitchell's notion of world-as-picture or world-as-endless exhibition, I argue in that the mode of representation that cybernetics adopts can be read as the beginnings of rendering the world-as-data. The imbrication of cybernetic thought into logistical organisation demonstrates one facet of the coloniality of its epistemological foundations. Over this and the next three chapters, I show how this epistemological coloniality was indispensable in the production of US hegemony in the post-war period. The second section traces the concatenation of disciplines and methodologies heavily influenced by cybernetics. I look to Operations Research (OR), systems analysis and finally, Physical Distribution Management (PDM) as precursors to modern logistics. Through this I show the continuing correspondence between civilian science and the military in the development of logistical rationality. Cybernetics, OR, and systems analysis all have as their direct object the development of abstract models of reality, toward the general end of the control of

[1] Furqan Ahmad, 'Colonialism and Neocolonialism: Impact of Decolonization', in *International Politics: Concepts, Theories and Issues*, by Rumki Basu (New Delhi: SAGE Publications, 2012), 97–121; Tiger and Nkrumah, 'Neo-Colonialism. The Last Stage of Imperialism'; Nelson Maldonado-Torres, 'Colonialism, Neocolonial, Internal Colonialism, the Postcolonial, Coloniality, and Decoloniality', in *Critical Terms in Caribbean and LAtin American Thought*, ed. Y. Martínez-San Miguel, B. Sifuentes-Jáuregui, and M. Belausteguigoitia (New York: Palgrave Macmillan, 2016), 67–78.

[2] In this work I will be focusing on so-called "first-order" cybernetics, as it is was this initial exploratory field that incubated various modern sciences that have had a huge impact on logistics writ large.

uncertainty in the world as complex system. I demonstrate that PDM absorbed many of these concepts and their underlying epistemological framework. The third section follows the dissemination of these methodologies via various institutions and actors to emphasise the increasing concretisation of logistical rationality in this period. I look specifically at Jay Forrester, Robert McNamara, the RAND Corporation, the US Department of Defense, and the Cowles Commission to show the becoming-infrastructural of these logics in forms of industrial, military, civil and economic governance.

First, I will sketch the foundational discipline of cybernetics and its kindred methodology, OR, demonstrating the underlying epistemological and metaphysical relation to the project of modernity and its constitutive underside, coloniality.

Section One: Cybernetics

The term 'cybernetics' was coined in 1947 by Norbert Weiner, an eminent mathematician working at the Radiation Laboratory (Rad Lab) at MIT.[3] It gave a name to the theories of communication and control that had been discussed at the now famous Macy Conferences held between 1946-53. Derived from the Greek *kybernetes*, the etymology of the word is often related to "governor" or, more frequently, "steersman", leading many historians of cybernetics to read the term as "the science of steersmanship".[4] As Orit Halpern writes, cybernetics is a 'science of control or prediction of action. In further adjoining control to communication, it is an endeavour that hopes to tame these future events through the sending of messages.'[5] Cybernetics forms a significant theoretical foundation for the development of a logistical rationality – in fact, Seb Franklin uses the term 'cybernetic logic' to describe something similar to my own articulation of logistical rationality. He deploys this concept in his work to 'account for a range of practices and methodologies that render the world legible through processes of capture, digitization, modelling and prediction.'[6] With this in mind, this section will outline the development of cybernetics, its trajectory in becoming infrastructural to logistical organisation, and the underlying assumptions that this particular worldview both affords and obscures.

Cybernetics was developed out of Weiner's work throughout World War II on gunnery control in the air force. In an engagement with information theory, and under Warren Weaver (a prominent Operations Researcher), Weiner, alongside a small research group, built an anti-aircraft motion

[3] Orit Halpern, *Beautiful Data: A History of Vision and Reason since 1945* (London: Duke University Press, 2014).
[4] Andy Pickering, 'Cyborg History and the World War II Regime', *Perspectives on Science* 3, no. 1 (1995): 48; Philip Mirowski, *Machine Dreams: Economics Becomes a Cyborg Science* (Cambridge ; New York: Cambridge University Press, 2002); Orit Halpern, 'Schizophrenic Techniques: Cybernetics, the Human Sciences, and the Double Bind', *Scholar and Feminist Online*, no. 10.3 (2012): 15.
[5] Halpern, *Beautiful Data*, 41.
[6] Seb Franklin, *Control: Digitality as Cultural Logic* (Cambridge, Mass.: MIT Press, 2015), 41.

predictor, seeing the human unpredictability of the enemy pilot as a challenge. The aim was to predict future enemy flight patterns in response to defensive anti-aircraft weaponry and was based on servomechanisms – mechanisms of information-feedback. Though this predictor did not prove much more effective than much simpler techniques in use at the time, the principles he developed here went on to become seminal work in communications theory and spawned the new science of cybernetics. By treating the enemy pilot and enemy aircraft as a single servomechanism, Wiener radically blurred the distinction between the human and the machine. It was from this starting point that the cybernetic study of systems of communication between what he called 'the animal and the machine' emerged.[7]

From these beginnings, cybernetics came to mean the study of messages, and further, the study of interactions between almost all things, made possible when conceiving of all things as fundamentally representable by information. Although Weiner was conscious to recognise the short-term and constrained nature of being able to predict social behaviour – taking great pains in this landmark study to state that only under immense constraint (for the enemy pilot, in a plane in the sky with strict limitations on freedom of action), later cybernetic theorists would go on to extrapolate its predictive power. Still, for Weiner, cybernetics offered a way of studying society as it developed, as a whole:

> society can only be understood through a study of the messages and the communication facilities which belong to it; and that in the future development of these messages and communication facilities, messages between man and machines, between machines and man, and between machine and machine, are destined to play an ever-increasing part.[8]

The study of information and communication between animals and machines was so vital for Weiner because, on an ontological or metaphysical level, it was a ward against *entropy,* the universal tendency of order to disintegrate into chaos. Fundamentally, cybernetics was a method for both understanding and producing *order.*

ENTROPY, CHAOS, ORDER

The central focus of cybernetics then is control – how does, and how can communication and information feedback bring about order and stability in a system? Weiner was principally a mathematician and physicist dealing with statistical mechanics and the study of entropy. Entropy,

[7] Wiener, *Cybernetics*.
[8] Norbert Wiener, *The Human Use of Human Beings: Cybernetics and Society* (New York: Da Capo Press, 1954), 16.

in statistical mechanics, is the principle that order decreases and disorder increases, or as Weiner puts it,

> As entropy increases, the universe, and all closed systems in the universe, tend naturally to deteriorate and lose their distinctiveness, to move from least to most probable state, from a state of organisation and differentiation in which distinctions and forms exist, to a state of chaos and sameness.[9]

Building on Claude Shannon's theory of communication, Weiner determined that information could be understood as *negative entropy* – that the amount of information in a system represented its degree of organisation in the same way that *entropy* measured the degree of *disorganisation* in a system.[10] Order, then, can only be maintained or increased if there is a sufficient amount of information produced to oppose the general tendency of increasing entropy. A central understanding of cybernetics was that self-regulation through feedback would increase information and thus order within a system. Negative feedback through servomechanisms (for example, a homeostat device that automatically senses the "input" of temperature and adjusts the "output" of regulating the central heating system to the "goal" of the desired temperature) produced order and thus negentropy in systems, preventing them from deteriorating. All goal-oriented action could be interpreted as governed by negative feedback processes. As the goal is pursued, the course of action is constantly being corrected by comparison of the current distance from the anticipated position of the goal – in Weiner's example, if the goal is to pick up a pencil, movement will be guided by 'the amount by which we have failed to pick up the pencil at each instant'.[11]

Following this reasoning, a number of interesting conclusions were drawn that had a profound effect on the language and perceived applicability of cybernetic theory. In this view, there is no contradiction between systems being both deterministic and teleological at the same time, so long as a negative feedback mechanism is present. Following this, teleology and purposeful behaviour are both possible and present in animals and machines; and further, goal-seeking behaviour is not a distinct, uniquely human feature. What this means then, is that humans, or more broadly, organisms and machines could be described with the same language – they could be represented and studied by these same methods. Although Weiner himself was extremely cautious about the abilities of cybernetics to accurately describe and pertain to social systems, the door was now very much open. As we will see in the final section of this chapter (and throughout the rest of the thesis), this metaphysics of cybernetics came to shape the development of digital computing,

[9] Wiener, 40.
[10] Wiener, *Cybernetics*.
[11] Wiener, 7.

defence strategy, economic theory and further, a conception of the human as servomechanism in the production of order.

Recasting the world as a complex series of systems that can be understood only through the study of messages, of information, as *negentropy,* rendered the world as a vast plane to be translated in order to combat this tendency to entropy. Rational organisation was a cure to this generalised tendency to chaos – the production of order through modelling and information resisted the trend. Fundamentally, cybernetics figured the world and all its possible machines as a series of systems or "black boxes" and their interconnections – each machine or animal figured as servomechanism, or black box, a device into which "inputs", i.e. messages, or information, are fed in, and out of which "outputs", in terms of the regulated behaviour of the system toward the desired goal, are put out. The black box can be seen as an abstraction, one that represents systems that can be viewed solely in terms of their inputs and outputs, or as Mario Bunge put it, '[t]he constitution and structure of the box are altogether irrelevant to the approach under consideration, which is purely external or phenomenological. In other words, only the *behaviour* of the system will be accounted for'.[12] What this means then, is that the black box can be a computer, an algorithm, or the human mind – all are figured primarily in terms of a goal oriented system that can be configured and modulated toward that end through information and feedback.

The Macy conferences, as I mentioned earlier, were a seminal moment in the history of cybernetics, and were held annually between 1946-1953 bringing together academics from vastly different disciplines in a cybernetic creative melting pot.[13] They aimed to lay the foundations for a general science for the workings of the human mind, and over the years it ran, topics were as wide ranging as automation, psychiatry, biology, anthropology, economics, language and ethics. Among the participants were a number of people who each play a significant role in the elaboration of logistical rationality as it emerged over the following decades.[14] There were also numerous psychologists and psychiatrists, and other social scientists. The uses and applications of cybernetic theories spread rapidly and widely across disciplinary boundaries. In fact, the

[12] Mario Bunge, 'A General Black Box Theory', *Philosophy of Science* 30, no. 4 (October 1963): 346.
[13] Claus Pias, *Cybernetics - The Macy Conferences 1946-1953. The Complete Transactions* (Chicago: University of Chicago Press, 2016).
[14] These include Claude Shannon, the thinker responsible for Information Theory which greatly influenced Weiner and the shape of computing thereafter; John von Neumann & Oskar Morgenstern, the creators of Game Theory; Gregory Bateson and Margaret Mead, structural anthropologists; Ross Ashby, a famous British cyberneticist; Warren McCulloch and Walter Pitts whose work in mathematical algorithms contributed to Artificial Intelligence, Machine Learning and computer neural networks; Talcott Parsons, the economist-turned-sociologist and modernisation theorist who founded structural functionalism; and Leonard Savage, an economist whose work in statistics and probability contributed greatly to economic Decision Theory, Bayesian statistics and Game Theory. For interest, and briefly put, Bayesian Statistics deals with probabilities of events, computing and the updating of probabilities after new data is obtained. Decision Theory is centred around the study of an agent's choices and is closely related to Game Theory – which is the study of mathematical models depicting strategic interactions amongst "rational decision-makers". Each of these lend themselves to the quantifying, future-oriented, control of uncertainty logics of logistical rationality.

methods and general metaphysics of cybernetics became so widespread that they no longer required "cybernetics" as a signifier – its fundamental methodologies were subsumed into so many disciplines that it became almost common-sense methodological protocol. In fact, Seb Franklin, in his study of what he terms the 'control episteme' beginning with this expansion of cybernetics across disciplines, writes that

> the logic of cybernetics was increasingly applied to fields such as economics and management until the name "cybernetics" itself disappeared and the methods it describes came to constitute a seemingly objective component of political economy and management theory, among many other fields (humanities research being only one further example).[15]

SCIENCE OF SCIENCES – UNIVERSAL, UNIFIED THEORY OF EVERYTHING

Cybernetics then came to be seen as a supposed science of sciences, one that at base viewed the world as a complex series of communicative systems, and through this attempted to create a universal scientific language to describe and unify their study. It was taken up rapidly, expanded and became understood by some to be the beginnings of a universal, scientific metaphysics, an attempt at a Unified Theory of Everything, on the basis of a common scientific language to model and describe much of, if not all, the world's phenomena and behaviour.[16]

According to Ross Ashby, a prominent early British cybernetician and participant in the Macy Conferences,

> cybernetics … takes as its subject matter the domain of 'all possible machines', and is only secondarily interested if informed that some of them have not yet been made, by man or nature. What cybernetics offers is the framework on which all individual machines may be ordered, related or understood [17]

Thus cybernetics was concerned not only with what *was* at the time, but what *would be*. It pointed to the understanding and control of an uncertain future, through the very notions of information and of control itself. The point is that cybernetics was seen to be a scientific, interdisciplinary, near transcendental way of understanding any and all current *and future* complex systems. It was not only to be a science of human-machine relations, but of all relations between machines,

[15] Franklin, *Control: Digitality as Cultural Logic*, 42.
[16] On the common language, see: Margaret Mead, 'Cybernetics of Cybernetics', in *Purposive Systems*, ed. H. von Foerster, L Peterson, and J Russell (New York: Spartan Books, 1968).
[17] Ashby, *An Introduction to Cybernetics*, 2.

organisms and their external environments. It was to be a unifying language of sciences, offering a 'set of concepts that, by having exact correspondences with each branch of science, can thereby bring them into exact relation with one another'.[18] In the application of mathematical and statistical analysis, such as linear programming, operational problems in cybernetic models could be quantified and mapped, and projections and predictions could be used to continually refine and find optimal solutions for them.

COLONIALITY OF CYBERNETICS: BATESON, MEAD AND MITCHELL

The construction of these models, however, was never an objective process. Take the structural anthropologists (and participants in the Macy Conferences) Gregory Bateson and Margaret Mead with their work on schizophrenia as an example.[19] In the 1930's, they conducted colonial ethnographic research in Bali to study mysticism and rituals of trance. Conducting a comparison of cultural pathologies, they translated different forms of being and relating prevalent in these communities into comparative psychiatric disorders.[20] Orit Halpern notes that they focused on gestural performance, and, '[w]ith an attitude symptomatic of communication theorists in general … methodology trumped any direct investment in the specificities of the locale'.[21] This supported their imperative to produce a 'global social science' as Mead would put it a few years after the study.[22] They produced an astounding amount of archival evidence, all of it visual and based on gesture and movement, with one purpose – creating 'a new method of stating the intangible relationships among different types of culturally standardized behaviour, spatially and contextually separated'.[23] Halpern argues that Mead and Bateson go so far as to 'render equivalent the concept of culture and the practice of method', when they argue that what is seen in their documentary is a pattern that embodies an abstraction – an abstraction, comprised of patterns and that is embodied by nature, that they label "culture".[24] All of this took place before the Macy Conferences, of which both Bateson and Mead were active participants. However, it is the *methodological* over the ontological focus of their work that took primacy – their work was an attempt to create scalable, transferrable techniques to model almost anything in terms of communication.

[18] Ashby, 4.
[19] Structural anthropology was heavily engaged with linguistics, communication theory and cybernetics at the time – see: Claude Levi-Strauss, *Structural Anthropology* (New York: Basic Books, 1963); Claude Levi-Strauss, *The Savage Mind* (Chicago: University of Chicago Press, 1966).
[20] Bateson later went on to become a hero of information-society cultures and the nascent Silicon Valley – with his ideas promulgated as part of a counter-techno-utopian culture based on cybernetics, environmentalism and communication theories. See Fred Turner, *From Counterculture to Cyberculture: Stewart Brand, the Whole Earth Network, and the Rise of Digital Utopianism* (Chicago: University of Chicago Press, 2006).
[21] Halpern, 'Schizophrenic Techniques', 4.
[22] Halpern, 4.
[23] Halpern, 4.
[24] Halpern, 4.

To trouble the view that these models represent or provide access to objective truths about culture, we need to trouble the form and history of representation itself. The elaboration of modern forms of representation and knowledge actively relate to the construction of colonial order. Edward Said shows us that the identification of the represented and the representation elides the interpretation involved in making an image, and not only this, but it assumes that the image either captures *all* of the essence of the object of study or that what lies outside of this capture or representation is irrelevant.[25] What cannot be captured, is then effectively deleted in this identity. In their study, Bateson and Mead neither learnt any Balinese languages nor Dutch, the official colonial and academic language at the time. It was not deemed necessary to hear the words of the subjects of their experiment to determine what their gestures meant.

In *Colonising Egypt*, Timothy Mitchell goes on to argue that this construction of Otherness is vital to the manufacturing of national identity and imperial purpose. What Bateson and Mead do, in serialising culture in the form of picture, reflects the colonial necessity of separating the observer from the observed – and further, the ordering of the world to *be* observed. In what he calls the world as endless exhibition, the representations of other cultures in 19th century world exhibitions served to reinscribe reality with the exhibited images or representations.[26] This curious representational order made claims to the truth and fidelity of the reality it represented. He argues that the symbolic representations of the cultural and colonial order were a marker of historical confidence and the political certainty of this age. Moreover, that these '[e]xhibitions, museums and other spectacles were not just reflections of this certainty, however, but the means of its production, by their technique of rendering history, progress, culture, and empire in "objective" form'.[27] It is worth quoting Mitchell at length here, in outlining three key features of this world-as-exhibition:

> First, its remarkable claim to certainty or truth: the apparent certainty with which everything seems ordered and organised, calculated and rendered unambiguous – ultimately, what seems its political decidedness. Second, the paradoxical nature of this decidedness: its certainty exists as the seemingly determined relation between representations and 'reality'; yet the real world, like the world outside the exhibition, despite everything the exhibition promises, turns out to consist only of further representations of this reality. Third, what I will refer to as its colonial nature: the age of

[25] Edward W. Said, *Orientalism*, 1st Vintage Books ed (New York: Vintage Books, 1979).
[26] Here Mitchell takes from and expands on Heidegger and Derrida in questioning the assertion that the world can be represented and set before us. See: Jacques Derrida, 'The Double Session', trans. Barbara Johnson, *Dissemination*, 1981, 173–285; Martin Heidegger, 'The Age of the World Picture', in *Science and the Quest for Reality*, ed. Alfred I. Tauber (London: Palgrave Macmillan, 1977), 115–36.
[27] Timothy Mitchell, *Colonising Egypt* (Berkeley: University of California Press, 1988), 7.

> exhibition was necessarily the colonial age, the age of world economy and global power in which we live, since what was to be rendered as exhibit was reality, the world itself. [28]

Mitchell points here to the creation of an object-world – the 'world as a system of objects', ordered carefully so as to evoke powerful notions of progress, history, and empire.[29] What this also means, then, is that in the metaphysics of capitalist, colonial modernity, the world is experienced in terms of an 'ontological distinction between physical reality and its representation – in language, culture, or other forms of meaning', in which 'reality is the material, the inert, and without inherent meaning, and representation is the non-material, non-physical dimension of intelligibility'. [30] Based on this understanding of the colonial relationship between visual representation and reality, he proceeds to argue that from these exhibitions, to urban planning and compulsory schooling, from conscription to imperial commerce, all the institutional forms and practices of the colonial powers in Egypt in the late 19th Century were 'organized around the simulation, diagramming, and replication of the real'.[31] It is this ordering of the world in order to represent it that he argues epitomizes the peculiar character of the West.[32] This ordering conjures certainty in a number of ways: first, in the apparent realism of the representations – the identity and fidelity of reality and representation, as outlined in relation to Said above. Second, despite this, and regardless of how *realistic* the model was, it remained identifiable as a copy – a deliberate difference in time and displacement in space that kept the representation separated from the real thing. Third, it ultimately depended on the position of the observer – the representation of reality was always set up for an observer.

I argue then, that it is possible to recognise these logics in the ordering and representation of the world by cybernetic models, systems analysis and operations research – in short, by the dawn, and the production of, the *world-as-data*. As Seb Franklin argues, though cybernetics has received critical attention as a radical epistemology, as 'an epoch in the history of the social sciences', and 'a utopian project bound up with countercultural movements', it has rarely been analysed as a moment of political history.[33] Nor was it conceived of 'as the epistemic grounding for a worldview that posit all material objects and their interactions as digital and thus predisposed to exchange and valorization.' [34] In this view, the organism, the machine, and its representation are interchangeable objects and their behaviours can be predicted, and hence controlled, subject to

---

[28] Mitchell, 13.
[29] Timothy Mitchell, 'Orientalism and the Exhibitionary Order', in *The Visual Culture Reader* (London: Routledge, 1989), 500.
[30] Timothy Mitchell, *Colonising Egypt* (Berkeley: University of California Press, 1988), xiii.
[31] Mitchell, 'The Stage of Modernity', 17.
[32] This understanding of the dualism between representation and reality, its separation, becomes a foundation of Mitchells later work: Mitchell, *Colonising Egypt*, 1988; Mitchell, *Rule of Experts*; Mitchell, 'The Stage of Modernity'.
[33] Franklin, *Control: Digitality as Cultural Logic*, 33.
[34] Franklin, 33.

the right messages. Where cybernetics came to be seen as a unifying science of sciences, applicable from simple to extremely complex systems – from the enemy pilot, to the brain, to life and society and the universe at large – its methods came to be seen as a universal mode of representation for all of this complexity. It sought to both render and dissolve difference, then – to *translate* complexity into machine-readable models and data. In short, to make certain the world-as-data. In doing so, what could *not* be translated, that which lay outside the models, (for example, the entirety of the meaning of the gestures not capturable by still images alone in Mead & Bateson's work) is denied and erased.

In fact, Franklin draws a connection between 19th century 'dreams of political-economic and governmental digitality', to a series of shifts in the conceptual make-up of cybernetics and the 'identification of universe and computer … driven by a desire to apply the predictability of the latter to the representation and management of the former'.[35] Whilst not explicitly tackling the coloniality of this 19th century administration, what Franklin points to is a complex epistemological lineage of operations of power. The development of these practices and conceptual structures discard the complexities of the social in favour of developing principles on the basis of the biological or empirical. What this epistemology-in-construction establishes or rather, sediments, in the 19th century, in the early days of cybernetics and through to the contemporary, is a coloniality of knowledge – it decides what counts as knowledge, how knowledge can be produced, and as a result, what is excluded from the realm of the 'real' or the true. Exclusion then is a key principle in the construction of cybernetics – here exemplified by the black box. In the apparent commensurability of the complexity of the territory with the map of cybernetic modelling, all that is not amenable to this representational format is excluded from existence. In the cybernetic modelling of increasingly diverse and complex phenomena, only 'black boxes (standing in for neurons, computers, workers, or what have you) and their interconnections can be included. Anything "inside" the box or outside the categories of input or output is left to fall out of representation altogether', a fate whose effects 'directly scale up to the dispossession of … forms of life [identified] as unvalorizable under the current conditions of the global, networked, and flexible stage of capitalism'.[36]

For Ashby, for example, behaviour (output) provides the grounds for modelling the brain; however, he explicitly excludes consciousness. In his *Design for a Brain,* he writes 'If consciousness is the most fundamental fact of all, why is it not used in this book? The answer … is that science deals, and can deal with, only what one man can demonstrate to another. Vivid though consciousness may be to its possessor, there is as yet no method known by which he can demonstrate his experience to another'.[37] Consciousness then is the black box – it matters not what goes on inside it, only that it responds to inputs in changed behaviour in the direction of the

[35] Franklin, 45.
[36] Franklin, 95.
[37] Ross Ashby, *Design for a Brain* (New York: Wiley, 1954), 11.

desired goals, the outputs. This conception of the human as black box, as regulable servomechanism, is a central theme running throughout this thesis, as we shall see most explicitly in relation to applied anthropology in chapter two, and in relation to contemporary logistical surveillance and behavioural economics in chapter five.

This becomes all the more pertinent when one again considers the diverse phenomena to which cybernetic logic became attached. We see this in the movement from Weiner's initial conception of the enemy pilot modelled as a machine, to the allied pilot, then the animal and the human brain, and finally on to life itself and the world system as a network of capital flows as we will see in the final section of this chapter. Franklin writes that

> these phenomena [in particular, the complexities of the world system] cannot be so simply reduced to the abstracted, synchronic logic of neurons firing or hormones being released that are conceptualized under cybernetics as happening automatically under certain stimuli unless one commits to the principle that the market relations of global capitalism (and by extension, the forms of violent expulsion, expropriation, exploitation, and subjectification that these relations entail) are fully natural.[38]

The next section will trace these cybernetic logics as they came to structure various aspects of organisation – in the military, the economy, and industry. This includes Operations Research, Systems Analysis and Physical Distribution Management as three of the main fields, techniques and applications that incubated logistical rationality.

Section Two: Operations Research, Systems Analysis, Physical Distribution Management

OPERATIONS RESEARCH

Stafford Beer, a prominent British cyberneticist who wrote extensively on cybernetics and its applications to management science, reflected on the relationship between cybernetics and operations research (OR), seeing them as two sides of the same epistemological coin.[39] Beer raises a definition of OR in relation to the science of cybernetics – or rather, cybernetics *as* a science in itself. He shows how the two fields function with the same object in mind – the control

[38] Franklin, *Control: Digitality as Cultural Logic*, 42.
[39] Stafford Beer, 'What Has Cybernetics to Do with Operational Research?', *Operations Research* 10, no. 1 (March 1959): 1–21.

of complex systems under uncertainty. It is OR that applies cybernetics as science to problems and operations, concretising it as a model for organising knowledge:

> Operational Research comprises a body of methods which cohere to provide a powerful tool of investigation. Cybernetics is a corpus of knowledge that might reasonably claim the status of a science. My contention is that the two are methodologically complementary; that the first is the natural technique in research of the second, and the second is the natural embodiment in science of the first. [40]

Operations Research was a burgeoning field of research beginning in Britain in the 1930s, with the enlistment of scientists and engineers into various branches and departments of the military. Though beginning within the British Army, the general concept of Operations Research (OR) quickly spread across the Atlantic to the United States, who instituted their own departments for OR within their defence system. [41] These research groups proliferated alongside the rapid development of technology throughout WWII, and were tasked with providing a 'scientific method of providing executive departments with a quantitative basis for decisions regarding the operations under their control'. [42] OR was essentially understood as the application of mathematics to build models to approximate reality, for the purposes of decision making under high levels of uncertainty. For Morse and Kimball, OR was a *scientific method*, an organized activity with sets of a definite methodologies for confronting complex problems with limited information and finding solutions to them. These methods utilized mathematics, statistical analysis, probability theory, and time and motion studies, with a distinct emphasis on quantitative analysis in order to understand and fix problems or strategies with the rapidly developing new military technologies[43]. OR was understood as being a generalizable framework useful across all operations – 'certain aspects of practically every operation can be measured and compared quantitatively with similar aspects of other operations. It is these aspects which can be studied scientifically'.[44] Again, the emphasis of OR lay in the reduction of complex problems – with great levels of uncertainty, in part due to the novel nature of much of the technology being studied

[40] Beer, 21.
[41] British OR tended to be more case-study oriented, developed as it was into city planning and local government organisation in the post-war Labour government. Where British OR was criticised by governmental officials for being too similar to the increasingly unfashionable Taylorism of the 1900s, US OR was better funded and focused more on method and technique. Across the Atlantic, OR rapidly became more abstract and mathematical, and was well funded by expanding military budgets. See: M. Fortun and S. S. Schweber, 'Scientists and the Legacy of World War II: The Case of Operations Research (OR)', *Social Studies of Science* 23, no. 4 (1993): 595–642.
[42] Phillip M. Morse and George E. Kimball, *Methods of Operations Research*, 1st Revised (New York: John Wiley & Sons Inc, 1951), 1.
[43] M. Fortun and S. S. Schweber, 'Scientists and the Legacy of World War II: The Case of Operations Research', *Social Studies of Science* 23, no. 4 (1993): 595–642.
[44] Morse and Kimball, *Methods of Operations Research*, 1.

– to quantifiable data to be analysed, in order to create predictions on alternate courses of action. As Andrew Pickering writes,

> Unlike the traditional natural sciences that find their ontological foundation in the material world, or the traditional social sciences that speak of the distinctively human (or social), the ontology of OR was the operation: the performance of a heterogeneous assemblage of humans and non-humans, of planes, submarines, radar sets and radar operators, pilots, depth charges, and so on. [45]

Here, Pickering articulates a central aspect of OR – its reliance on systems thinking and in particular, on a cybernetic understanding of the relationship between humans and machines. OR grew as a discipline in the military archive, and consequently, became a justification for the extension and accumulation of military operations data in WWII. In the early days of OR, Fortun and Schweber argue that a lack of data on previous military operations spurred a shift in the ways in which data about operations was collected.[46] There became a need for ever more precise and accurate data about how new technologies operated either in the field or in testing, in order to furnish the ever exacting models for the prediction of outcomes of future technologies. OR thinkers worked on mathematical equations to form operational models out of the stacks of reports drawn from operational archives. Again, these models were deemed to be generalizable and abstract, transcending the particularities of the specific military problem. These theories calculated probabilities and built models for the future behaviour of a military system (such as radar or aircraft bombing patterns) based on past experience and these predictive models. Pickering also traces the way in which this set about a shift in the practices of the military, and later, industry and economics, in the disciplines' emphasis on reliable data as a requirement for predictive models and their calculations.[47] He writes of the way in which the military began to be trained in scientific and observational methods to enable this further, and in this way, further cemented the coupling of science and the military:

> On the one hand, [operations researchers] reported back to Washington ASWORG [the Anti-Submarine Warfare Operations Research Group] on observed operational deficiencies in radar as performative hardware, whence the news was propagated out of the military body back to the Rad Lab where it set in train a further tuning of scientific practice, thus in turn intensifying the coupling of science to the military via the flow of objects. .. On the other hand, by improving the overall data collection exercise, the

[45] Pickering, 'Cyborg History and the World War II Regime', 21.
[46] Fortun and Schweber, 'Scientists and the Legacy of World War II'.
[47] Pickering, 'Cyborg History and the World War II Regime'.

> scientists in the field helped to constitute the kind of archive in which quantitative calculations and optimizations could be performed. And these, third, fed into a tuning and optimization of military tactics" [48]

What we see here is the broader logic of quantification for optimisation, and how this was incubated between military and scientific practices. In turn, this reorganised operational archives, and further, the operations themselves, so that they were conducted in such a way as to produce the kind of data needed for optimisation.

SYSTEMS ANALYSIS

As with OR, cybernetic methodology became subsumed and entwined with the systems approach, systems theory, or systems analysis. For Charles Hitch, a prolific operations researcher, there was little use in delineating operations analysis and systems analysis. After the war, he argued, there had been a tendency to describe more complex and future oriented analyses as "systems analysis", 'but there is no line of demarcation. Both operations analysis and systems analysis are attempts to apply scientific method to important problems of military decision'.[49] For Hitch, writing for the RAND corporation, both operations research and systems analysis have the same essential elements:

> An objective or objectives which we desire to accomplish.
>
> Alternative techniques or instrumentalities (or 'systems') by which the objective may be accomplished.
>
> The 'costs' or resources required by each system.
>
> A mathematical model or models; i.e. the mathematical or logical framework or set of equations showing the interdependence of the objects, the techniques and instrumentalities, the environment, and the resources.
>
> A criterion, relating objectives and costs or resources, for choosing the preferred or optimal alternative. [50]

Systems analysis as a generalised approach was further developed and was later to become almost synonymous with the RAND Corporation. David Jardini notes that RAND staff members 'envisioned systems analysis as a "rational", mathematically rigorous means of choosing among alternative future systems characterized by complex environments, large degrees of freedom, and

[48] Pickering, 17.
[49] Hitch here is writing for the RAND corporation – a prolific and influential think tank involved in Cold War science and policy development. We return to RAND in more detail in the final section of this chapter. Charles Hitch, 'An Appreciation of Systems Analysis' (RAND Corporation, 1955), 2.
[50] Hitch, 3.

considerable uncertainty'.[51] From a speech given to the Air Force in 1956, Malcolm Hoag describes systems analysis as having grown out of World War II OR, though typically dealing with 'choices that concern operations farther ahead in time, and [taking] a somewhat broader look at problems of military choice'.[52] For Hoag, systems analysis attends to finding relevant alternatives to a decision, as well as a test of preference, and finally, choosing a method to weigh objectives against costs – in other words, cost-benefit analysis. At the bottom of all of this is a requirement for the most efficient outcome between alternative ways of doing things.

As OR developed it was seen more and more as a logical framework, as an *applied* science, one that could be extrapolated out and applied to various problems and systems throughout the military and later, in peacetime, across business and industry. The object remained the improvement of future operations by the quantitative and probabilistic analysis of past operations, with improved efficiency as a key criterion. However, this is a criterion that remains an underdeveloped concept across the literature, except in these purely quantitative terms. American OR took as its problem these issues of uncertainty and probability, and the nature of disorder – a common theme across what both Andrew Pickering and Phillip Mirowski call the 'cyborg sciences'.[53] Mirowski argues that cyborg sciences can be identified by a set of consistencies that emerged from the peculiarity of the post-war period, encompassing disciplines such as information theory, cognitive science, neuropsychology, computer science, artificial intelligence, operations research, game theory, socio-biology, chaotic dynamics, and so on (recognisable from the Macy Conferences mentioned earlier).[54]

Interdisciplinarity here was key, and a constant feature of the kinds of military and management science being done in this period – American OR and the systems approach in general deployed heterogeneous professionals and academics - from physicists to engineers, from generals to managers and economists, and heterogeneous organizations; from universities to branches of the armed forces, manufacturing firms to government research departments – these were 'all seen as, and operated as, essential interacting components in a "system". Indeed, disciplines, persons, and organisations [took] on one another's function as if they [were] part of a seamless web'.[55] All of these sciences, as Mirowski understands it, 'shared an incubation period in close proximity to the transient phenomenon called "cybernetics"'.[56] The next section demonstrates the influence of these sciences, and the fundamental logics of cybernetics in early business logistics. I show that

[51] David R. Jardini, 'Out of the Blue Yonder: The Transfer of Systems Thinking from the Pentagon to the Great Society, 1961-1965', in *Systems, Experts, and Computers: The Systems Approach in Management and Engineering, World War II and After*, ed. Agatha C. Hughes and Thomas P. Hughes, 2000, 317.
[52] Malcom W. Hoag, 'An Introduction to Systems Analysis', Research Memorandum (RAND Corporation, 1956), 1.
[53] Pickering, 'Cyborg History and the World War II Regime'; Mirowski, *Machine Dreams*.
[54] Mirowski, *Machine Dreams*.
[55] Fortun and Schweber, 'Scientists and the Legacy of World War II', 607.
[56] Mirowski, *Machine Dreams*, 12.

business logistics developed in tandem with cybernetics and OR – in short, with these newly computational technologies of war.

PHYSICAL DISTRIBUTION MANAGEMENT

Modern business logistics, as Deborah Cowen argues, has its predecessor in the field of Physical Distribution Management (PDM).[57] In this section, I will outline this field as it presented itself at the time, framing the links to cybernetics, OR, and more broadly, the 'cyborg sciences'.[58] It was the absorption of cybernetic logics that allowed for the widely recognised 'Revolution in Logistics'. This elevated logistical thought into a broadly coherent rationality that incorporated both material and epistemological ideals of the project of Western modernity.

For Edward Smykay, one of the more prolific and earlier writers in the field, PDM could be 'broadly defined as that area of business management responsible for the movement of raw materials and finished products and the development of movement systems'.[59] He references the Taylorism of the early 1900's in his own understanding of the incorporation of scientific analysis into organisational techniques, specifically in the measurement and analysis of workflows and the imperative to improve a purportedly objective increase in economic efficiency and labour productivity in the management of the distribution process. This marks a shift in the understanding of logistics and the production of value, in that it incorporates the movement of raw materials, manufacturing and the distribution of finished goods into the production process. PDM saw all these aspects of industry as connected processes that could be optimised for productivity and hence profitability. Smykay cited the increased productivity that Taylorism afforded in U.S. businesses as the driving cause of the expansion of their markets. In his view, businesses came to be so productive that they had to expand their markets and transport networks in order to sell their wares:

> the entrance of the American economic system into its next stage became apparent with the need for rationalization and control of the production orientation … [and] when the market could no longer regularly absorb increased output, it became necessary for the business enterprise to cultivate and expand sales within geographically imposed limits.[60]

These limits, of course, became limits to transcend and dissolve as multinational corporations and logistics companies rapidly expanded alongside, or concomitantly with the development of a

[57] Cowen, *The Deadly Life of Logistics.* 2014
[58] Mirowski, *Machine Dreams*; Pickering, 'Cyborg History and the World War II Regime'.
[59] Edward W. Smykay, Donald J. Bowersox, and Frank H. Mossman, *Physical Distribution Management: Logistics Problems of the Firm* (New York: Macmillan, 1961), 1.
[60] Smykay, Bowersox, and Mossman, 1–2.

new and expanding global economic system.[61] Logistical expansionism can be thought in many ways – in the phenomenon of containerization and standardisation, in the building of networked infrastructures of circulation, and as this thesis will go on to show, in the expansion of its fundamental logics into seemingly disparate disciplines.[62]

Integration is key to understanding the novelty of PDM and, in part, the rapid development of logistics as a field of business science. The central aim of PDM was the minimisation of cost through the integration of manufacturing, packaging, storage and distribution processes into a single efficient and optimisable system. This was in part made possible by the development of computing power, systems analysis and OR techniques of linear and nonlinear programming capable of processing the large amounts of data required to conduct analyses on the total costs of a firm. Smykay argues that 'the uniqueness of physical distribution is found in the integration of these several bodies of knowledge into a framework for marketing action'.[63] This focus on the integration of various streams of knowledge and interdisciplinarity is characteristic of the post-WW2 Operations Research and Cold War or cyborg science era. It is clear in these early texts that PDM becomes increasingly seen as an aspect of marketing, where according to Edmund McGarry, it comes to cover most aspects of the business. In 1950, he defined marketing as

> that phase or aspect of any economy that has to do with and results in the changes in custody of, responsibility for, and authority over goods, to the end that goods produced by many agencies are made available for the convenience and satisfaction of different users.[64]

PDM at this stage aimed to model the passage of goods from one place or company to the next, the shifting of responsibility for those goods right through to consumption, and to account for the many agencies that become involved in this process. In this manner, marketing was no longer limited to production and consumption, but became 'an element which penetrates throughout the entire economy'.[65] We can already begin to see the shift from marketing to marketisation, a creeping of the market form and the shift from customer to consumer as the final link in the supply chain. Smykay states that 'the marketing concept, a scientific expression of "consumer is king" rose concurrently with modern computer technology, military logistics, and physical distribution management'.[66] In this business literature after WWII, 'the marketing concept'

[61] We go into more detail on this emergent global economic order in the next chapter.
[62] See: Alexander Klose, *The Container Principle: How a Box Changes the Way We Think*, Infrastructures Series (Cambridge, Massachusetts: The MIT Press, 2015); Marc Levinson, *How the Shipping Container Made the World Smaller and the World Economy Bigger* (Princeton: Princeton University Press, 2006).
[63] Smykay, Bowersox, and Mossman, *Physical Distribution Management*, 5–6.
[64] E.D McGarry, 'Some Functions of Marketing Reconsidered', in *Theory in Marketing*, ed. R. Cox and W. Alderson (Homewood IL: Richard D. Irwin, 1950), 257.
[65] Smykay, Bowersox, and Mossman, *Physical Distribution Management*, 4.
[66] Smykay, Bowersox, and Mossman, 4.

revolved around the satisfaction of the discerning, rational customers' needs, aligning the functions of the company to meet those needs, and turning a profit by doing so over the long term. Smykay's marketing concept appears to relate these notions to the ability to treat production, distribution and consumption patterns with the linear programming and data analysis that came to define post-war science. It is the 'scientific expression' that so excited the proponents of PDM and the businesses that began to adopt these new technologies.

In 1966, James Constantin argued that while the idea of focusing on the operation of a business as a whole is not new – what is novel is 'the ability to build [logistics] in terms of a whole or system with optimum benefits and costs as a goal, granted by the current wide variety of transport and inventory choice … [and this] is yet to be fully exploited'.[67] The spatial and systematic aspect of PDM were two of the earliest areas of attention in its development. As Smykay argued, the spatial element and the problem of plant location for optimum physical distribution gained traction in business science in the 1950s.[68] Throughout the 1960's there was a marked improvement in the productivity of transport and these improvements, alongside plant and warehouse allocation theories 'redounded to the benefit of industrial firms who, when applying systems analysis, could so arrange plant capacity and warehouse facilities, with methods of inter-city movement, to hold costs at a minimum while meeting market requirements'.[69]

The focus on the use and analysis of systems as a way in which to optimise businesses and streamline costs is a consistent feature of the PDM and logistics literature of this time. The use of the term 'system' here, and across early PDM literature is rarely defined but taken as a given. Given the emergence of the literature on systems analysis out of OR and cybernetics, it is likely that these texts are referencing this conception of systems – as a somewhat abstract assemblage of human and non-human actors that communicate with one another through the medium of information and feedback, toward the given end of efficiency, stability and more specifically here, profitability. In fact, Constantin writes that

> Regardless of how broad the framework or how specific the consideration, the basic problem in physical distribution or logistics today is the development of an abstraction or generalization that spells out in a universal fashion the relationships between various components. ... *Logistics is the study of a system. It is the logic of relationships between the factors toward a given end.* [70]

[67] James A. Constantin, *Principles of Logistics Management: A Function Analysis of Physical Distribution Systems* (California: Appleton-Century-Crofts, 1966), xxii.
[68] Walter Isard, *Location and Space-Economy* (New York: John Wiley & Sons Inc, 1956).
[69] Smykay, Bowersox, and Mossman, *Physical Distribution Management*, 3–4.
[70] Constantin, *Principles of Logistics Management: A Function Analysis of Physical Distribution Systems*, xxii.

This is the earliest point in the literature, as far as I am aware, that an author of a text on PDM recognises logistics as a 'logic' in itself. Logistics then comes to be seen as a set of principles designed to be able to be abstracted and imposed on different kinds of businesses and organisations, in order to format them for the streamlining of services and greater efficiency, with measurement and feedback at the core of the systems operation. Here, Constantin represents logistics as a universal principle of organisation, a logic of pure means geared toward a pure end: the end of integration, cost-minimization and profit-maximization. This too can be thought alongside the particular form of capitalist expansionism of the time. With the shifting of the global economic order through programs like the Marshall Plan, the inauguration of supranational organisations and the rise of multi-national corporations (to be dealt with in detail in the following two chapters), what came to be understood as the global economy at once became simultaneously more homogenous and more diverse. The rise of what Tsing calls 'supply chain capitalism' was underway.[71]

Along with this widescale reorganisation of global economy, Donald Bowersox describes the need for a "philosophy of organisation" as a prerequisite for the reorganisation of departments in line with physical distribution management.[72] He expands references to systems theory into a series of basic "tenets" of Physical Distribution: first, it is the performance of the total system which is singularly important; second, expenditures on particular activities are of importance only as they relate to total cost and performance of the system – known as the 'total cost concept'; third, between areas of activity in any organisation there lies a functional relationship which can stimulate or hinder the systems performance – known as 'system trade off'; and finally, that these areas of activity, in linking together as part of an integrated system, can produce greater results than attainable by individual efforts.[73] It is in this way that Bowersox defines PDM as 'that management responsibility to *design* and *administer* systems to control raw materials and finished goods flow', that rests on the idea that 'all management function related to product flow must be totally integrated as a single control system'.[74] As we have seen, the language of single control systems, flows and feedback are the hallmarks of cybernetic theory. Although few if any of the early PDM scholars referenced cybernetics explicitly, the underlying assumptions and conceptualisation of the firm or the supply chain as a closed system relies on the cybernetic framework.

Correspondingly, Bowersox draws upon many of the same theories in the organisational sciences of the time, where the social and natural sciences were being drawn together in an attempt to

[71] Anna Lowenhaupt Tsing, 'Empire's Salvage Heart', *Focaal* 2012, no. 64 (1 December 2012): 36–50; Anna Tsing, 'Supply Chains and the Human Condition', *Rethinking Marxism* 21, no. 2 (April 2009): 148–76.
[72] Donald J Bowersox, 'Distribution Logistics: The Forgotten Marketing Tool', in *Readings in Physical Distribution Management: The Logistics of Marketing*, ed. Donald J. Bowersox, Bernard J. La Londe, and Edward W. Smykay (London: The Macmillan Company, 1969), 69–84.
[73] Bowersox, 69.
[74] Bowersox, 69–70.

create a kind of 'Unified Theory of Everything'. The logic of organisation Bowersox identifies is a pure means, with a single given end of increased efficiency and control. There are a number of interesting things that occur then in this movement of management and the reconceptualization of the firms' operations as a system extending beyond the physical limits of the factory. As Cowen argues, logistics becomes a means of producing space beyond territory – of administering beyond the space it originally occupies.[75] Expertise is moved away from the worker in managing operations and given to management.[76] This increases exponentially with the advent of networked digital computing.

Bernard LaLonde describes the beginnings of the development of the Logistics Information System (LIS) at this time, as a 'sub-system of a total management information system'.[77] The argument was that by organising external and internal information flows relative to customer orders (i.e. inventory, credit etc.) it would be possible to create a system that would be more efficient and provide management with information on an exceptions basis – with information 'randomly available for monitoring and controlling distribution activity'.[78] Concurrently, the possibility of on-line computer communications between manufacturer, customer and carrier was on the horizon. LaLonde writes that communications between these parties were already being experimented with by 'a number of large food companies in the United States', and that 'at the present time communication is on an offline basis, but plans are for an integrated communications network between all parties to the distribution process as a future direction'.[79]

It was with the computerization of transactions and record keeping that logistics planning and management digitally operationalised and expedited the theories and methods incorporated from cybernetics, OR and systems analysis. Digitization brought more supposed fidelity between the abstract models created to conceptualise the firm and the reality of its operations. From randomizing and optimizing storage in warehouses, to tracking and routing goods and transport, the efficiencies afforded by these technologies created a massive boom in logistics profitability, in research and funding and in the rapid increase in third party logistics providers. The acceleration of the development of this 'revolution' in logistics, and hence its inauguration as a business science was made possible by military advances in logistics and in networked computing. The entire conceptualisation of the "supply chain" and the business of its management

[75] Cowen, *The Deadly Life of Logistics*.
[76] We can see this particular movement of power in expertise in containerisation too; where dock workers prior to the standardisation of containers held more responsibility in loading and unloading goods and held more power in their union as a result. For detailed histories of the phenomenon of containerisation, see: Levinson, *How the Shipping Container Made the World Smaller and the World Economy Bigger*; Klose, *The Container Principle*, 2015.
[77] Bernard J. LaLonde, 'IDM: The American Perspective', in *Readings in Physical Distribution Management: The Logistics of Marketing*, by Donald J. Bowersox, Edward W. Smykay, and Bernard J. LaLonde (New York: Macmillan, 1969), 68.
[78] LaLonde, 68.
[79] LaLonde, 71.

is a direct result of these developments. Having looked at the imbrication of cybernetic logics in early business logistics, I will now demonstrate the way these logics travelled and settled in the US military, and its economic and political organisation. I will do so by tracing some key figures and institutions – namely John von Neumann, Jay Forrester, the RAND corporation and associates – to show the becoming-infrastructural of logistical logics of quantification, modelling, prediction and the epistemic grounding of world-as-data in the organisation of these distinct but interrelated fields.

Section Three: Institutions, Actors, Economics

This section discusses the application and influence of cybernetics, OR and systems analysis in the development of military computing and defence restructuring. I show that key to this was the RAND Corporation, early forms of networked computing and the restructuring of the US defence budget after WWII. I show that the central elements that make up logistical rationality outlined above came to influence federal policy in this period.

Paul Edwards analyses the development of weather system modelling as a way of understanding the rise of computers and their entanglement in military sciences.[80] For Edwards, the key to the complex science of weather prediction lay in the advent of the digital computer, which, as is well noted, was itself a product of the military.[81] John von Neumann – creator of Game Theory, consultant for RAND Corporation, and attendant at the Macy Conferences – was a member of the team working with the early ENIAC computer system, and a consultant to the top-secret Manhattan Project. He had previously used the system to mathematically simulate the 'Los Alamos' hydrogen bomb explosion in 1946 and recognised that both weather prediction and the hydrogen bomb were conceptually linked in the sense that they were both problems of fluid dynamics - both required nonlinear programming on a huge scale, involving massive amounts of data to model the complex relationships between many contributing factors. [82] It is here that William Aspray argues that the computer found its early justification – Neumann 'regarded [the computer's] application to meteorology as the crucial test of its scientific value, in large part because the hydrodynamics of the atmosphere is a prime example of those complex, non-linear

[80] Paul N. Edwards, 'The World in a Machine: Origins and Impacts of Early Computerized Global Systems Models', in *Systems, Experts, and Computers: The Systems Approach in Management and Engineering, World War II and After*, ed. Agatha C. Hughes and Thomas P. Hughes (Cambridge, Mass.: MIT Press, 2000), 221–53.
[81] Yasha Levine, *Surveillance Valley: The Secret Military History of the Internet* (New York: PublicAffairs, 2018).
[82] Edwards, 'Systems, Experts, and Computers', 224.

phenomenon that were previously inaccessible to mathematical study'.[83] Rendering these complex phenomena legible opened up broad new possibilities for modelling and prediction.

While von Neumann was working on the ENIAC, his colleague, Jay Forrester, was developing and applying computers to Cold War military problems. Widely recognised as a foundational technology in networked computing systems, Forrester led the team developing the Semi-Automatic Ground Environment (SAGE) system. Forrester worked at MIT in the Servomechanisms Lab, the academic home of Norbert Weiner. Despite not describing his work as part of the field of cybernetics, he structured all of his work on its main concepts and methodologies, including SAGE. In designing and implementing the SAGE system, Forrester worked alongside the US military, RAND corporation, and IBM amongst many others. One air force colonel described the system as 'a servomechanism spread over an area comparable to the whole American continent'.[84] Completed in 1961, the system was capable of using radar data to automatically plot and intercept the courses of enemy aircraft, of taking remote control of aircraft autopilot systems in order to guide them to their targets, and finally, of controlling the release of air-to-air missiles.[85] Vitally, SAGE 'marked the first effort to apply computers to large-scale problems of real-time *control*, as distinct from calculation and information gathering'.[86] From the late 1950s, this model spawned many similar computerised real-time command and control systems – largely for the US military. These included NORAD (the North Atlantic Air Defense Command), NADGE (the NATO Air Defense Ground Environment), and the WWMCCS (the World Wide Military Command and Control System) – which served, as Edwards writes, to extend 'the SAGE concept to create a world-encompassing surveillance, communications and control system'.[87] The rapid and expansive proliferation of these technologies shows us how important the notion of control had become for the military.

The National Weather Prediction model and various SAGE-based systems helped to cement the value of computers in complementary ways. The weather model operated near-real-time simulations of complex physical processes, while the SAGE system conducted real-time analysis and machine control through feedback, in conjunction with a human operator. It was a complex human-machine system, in the style of Wiener. The developments here were swiftly taken up in many other sciences including the social sciences, particularly within economics and in Forrester's later work on modelling cities and further, world society. The ontological assumption made by these developments in computing is that with the quantification or *translation* of the "real world" and the reduction of its complex problems and interrelations to sets and points of

[83] William Aspray, *John von Neumann and the Origins of Modern Computing* (Cambridge, Mass.: MIT Press, 1990), 152.
[84] Cited in: David F. Noble, *Forces of Production: A Social History of Industrial Automation* (London ; New York: Routledge, 2011), 52.
[85] Edwards, 'Systems, Experts, and Computers', 224.
[86] Edwards, 229.
[87] Edwards, 230.

data, one can apply a systems methodology to map and model it. Creating mathematical models of the world, von Neumann and Forrester both sought to render it legible, and thus more amenable to control.

INDUSTRIAL DYNAMICS

In the mid-1950s, Forrester changed careers paths from computer engineering to management science, accepting a position at MIT's Sloan School of Management, to further its mission to further develop a "scientific" approach to management. Again, employing cybernetic logics in his rethinking of the structures of management he firstly directed his attention to the factory, focusing on the case of General Electric in Kentucky. He argued that the company must be viewed 'not as a collection of separate functions but as a system in which the flows of information, materials, manpower, capital equipment, and money set up forces that determine the basic tendencies toward growth, fluctuation and decline'.[88] He wrote of the cyclical changes of boom and bust, arguing that it was less to do with the external economy and more to do with delays and amplifications in the "information-feedback system" of company management. This focus is a key development in this story. In reiterating the central place of cybernetics in Forrester's thinking, we track the percolation of these ideas into broader realms of thought. A business, including its supply chain was understood as an information-feedback system in which delays in the movement of information and amplifications – issues of managerial policy and organisation – were to blame for many of the problems these companies faced. This was an early step in the move toward contemporary just-in-time production lines. A key theorist in supply chain management theory, Forrester coined the study of what he terms 'Industrial Dynamics' in his 1961 book, as integrating

> [t]he separate functional areas of management - marketing, investment, research, personnel, production, and accounting. Each of these functions is reduced to a common basis by recognizing that any economic or corporate activity consists of flows of money, orders, materials, personnel, and capital equipment. These five flows are integrated by an information network. Industrial dynamics recognises the critical importance of this information network in giving the system its own dynamic characteristics.[89]

Industrial Dynamics as a system then is contingent on feedback as its central proposition for a more efficient and productive means of organisation. In fact, in the introduction, he states that modelling the business for productivity becomes possible as a direct result of 'the theory of

[88] Jay Wright Forrester, *Industrial Dynamics*, Student's Edition (Cambridge, Mass.: MIT Press, 1961), 52.
[89] Forrester, vii.

information-feedback systems', which 'gives us a basis for understanding the goal-seeking, self-correcting interplay between the parts of a business system'.[90]

Forrester notes that the foundations of modern modelling capabilities lay in the automation and simulation of military systems by means of digital computers, developed within the field of Operations Research. These foundations were primarily a by-product of military systems research, encompassing the theory of information-feedback systems, decision making processes, an experimental model approach to complex systems, and the use of the digital computer as a means to simulate reality based on mathematical models. The experimental model approach here refers firstly to air defence systems modelling (such as the SAGE system and its subsidiaries). Forrester believed that the models he constructed from industrial data relied on 'orderly underlying principles from which system behaviour derives', arguing that 'systems of information feedback control', or servomechanisms, were the fundamental organising principle of all complex entities – from social systems and biological organisms, to machines and computers. [91]

As a development in management science, Industrial Dynamics shows a significant move toward logistics as an organising principle, first through the lens of the company, but also in the sense of the move toward humans as component parts of the logistical framework. Forrester writes that here,

> We shall look upon the manager as an information converter. He is a person to whom information flows and from whom come streams of decisions that control actions within the organisation. Much human behaviour might be properly viewed as the conversion of information into physical action.[92]

In this quote we see the affinity that cybernetic logic has with nascent neoliberal economic logics.[93] The subject is figured as a rational economic agent, one who receives information, computes it, and makes optimal decisions based on that information. The trajectory of logistical rationality into the organisation of economics is a central theme of the next subsection, and

[90] Forrester, vii.
[91] Forrester, 15.
[92] Forrester, 93–94.
[93] There is a broad intellectual history that covers the history of economic thought in which the individual is seen as a rational information calculating computer that though touched upon, and extremely pertinent is sadly beyond the scope of this thesis. Hayek, for instance, used cybernetic concepts in his work and here we can see where the vision of the human as servomechanism, as 'information converter' can be rendered in terms of the economy as self-regulating. For an exposition of this influence in neoliberal economics, see: Maxine Ouelett, Jacqueline Best, and Matthew Paterson, 'Cybernetic Capitalism and the Global Information Society: From the Global Panopticon to a "brand" New World', in *Cultural Political Economy* (New York: Routledge, 2010), 177–96.

prefigures arguments on development economics in chapter three, and behavioural economics in chapter five.[94]

Industrial Dynamics serves as a key link with the forerunners of business logistics. Those writing early on in the field of Physical Distribution Management most certainly owe a great (if largely unspoken) debt to Operations Research, Industrial Dynamics and the concepts and epistemological & ontological framework elaborated in or developed by the field of cybernetics. Forrester developed his cybernetic, logistical mapping of industry as a series of information flows and servomechanisms into a general theory of system dynamics. After Industrial Dynamics came Urban Dynamics – the modelling of the city to increase the efficiency of its organisation. In 1971, Forrester was invited to a Club of Rome meeting – an organisation that was dedicated to saving the world from what they saw as the massive demands being placed on the earth's carrying capacity by overpopulation. Forrester believed that his systems dynamics could be used to identify and solve this predicament of mankind and set out to model the world's socioeconomic system. In the resultant book *World Dynamics,* he mapped interrelations between population, pollution, resources and food amongst other things. In this work, he predicted the imminent collapse of the world system without intervention through 'sweeping, long-term, world-scale planning, based on computer modelling.'[95]

Forrester's world dynamics then, developed out of the modelling of industry, figures the world as a cybernetic system; as a complex network of information, resource and capital flows. This recalls Franklin's earlier assertion of the flattening of the complexities of the world and their conceptualisation under cybernetic methodology, or as I argue, logistical rationality and the conceptualisation of the world-as-data. The world at large cannot be reduced to these abstract logics without committing to the principle that market relations and 'the forms of violent expulsion, expropriation, exploitation and subjectification that these relations entail' are natural and inevitable.[96] Forrester's career trajectory, moving from developing military technologies, through industry and management and on into world-systems or broader forms of governance is a recurring motif in key actors in the narrative of this thesis. It is also testament to the perceived applicability of the logistical model – or the fungibility it ascribes to the world to be organised by it – and its character as a logic of pure means, the means to rationalise all and any objects it is applied to.

[94] The framing of the subject as servomechanism is a central operation of logistical rationality. Chapter two demonstrates the assimilation of logistical logics into applied anthropology, resulting in the figuration of societies as cybernetic systems -as governable, or further, optimisable through the modulation of messages or information inputs. The fifth and final chapter picks these threads up in relation to the contemporary practices of Cambridge Analytica, and the broader project of Behavioural Economics and nudge theory. In each case, logistical rationality figures subjects, societies, worlds as optimisable servomechanisms.

[95] Edwards, 'Systems, Experts, and Computers', 222.

[96] Franklin, *Control: Digitality as Cultural Logic*, 42.

This intertwining of civilian science and the military becomes further complicated when we look at the funding of such projects. From the mid-1940s onward, OR departments began branching out into think tanks and consultancies, aware of the threat of the disbanding of OR departments and resultant ebb of funding in peacetime.[97] Military departments maintained levels of funding flowing from the chiefs of staff and the defense budget, streaming them into think tanks via large contracts for specific developments, or in the form of large grants, as in the case of RAND Corporation. RAND was one of the biggest beneficiaries of the military-industrial-academic-complex in OR after the war. One of American OR's greatest proponents, General 'Hap' Arnold, a high-level Air Force commander, set up Project RAND and attached it to the Douglas Aircraft firm. This on the one hand secured new aircraft contracts for the Air Force, and on the other, technological research for the aircraft firm. RAND was provided with a $10m wartime fund and given an apparently remarkable degree of freedom, 'with the power to accept or reject Air Force suggestions, strong financial support without pressure for tangible results, and scope to pose questions and analyse problems as the staff saw fit'.[98] Project RAND later detached itself from Douglas Aircraft, becoming RAND Corporation - an independent, not-for-profit think tank, however with continued ties to and large amounts of funding from the US military and Department of Defence (US DoD). RAND's place and relevance on the stage of military, public and economic policy development is central to the emergence and instantiation of logistical rationality.

David Hounshell notes that RAND members aimed to develop a "science of warfare", continuing work 'that had just started to emerge from … scientific and technical organisations such as the Statistical Research Group (SRG) of the Applied Mathematics Panel (AMP), which operated within the Office of Statistical Research and Development (OSRD), and the Office of Statistical Control (OSC), from the Armies headquarters in the war'.[99] Membership was dominated in its early years by physicists, engineers and mathematicians, but the early 1950s ushered in a large number of economists, convinced that systems analysis would take RAND forward as a go-to organisation for US DoD research contracts. This followed the contemporary expectation that operations research, and systems and cost-benefit analysis would increase efficiency and reduce and control uncertainty in complex decision making. Jardini writes that

[97] Fortun and Schweber, 'Scientists and the Legacy of World War II'.
[98] Robert J. Leonard, 'War as a "Simple Economic Problem"; The Rise of an Economics of Defense', in *Economics and National Security: A History of Their Interaction*, ed. Craufurd D. Goodwin (London: Duke University Press, 1991), 269.
[99] David A. Hounshell, 'The Medium Is the Message, or How Context Matters: The RAND Corporation Builds an Economics of Innovation, 1946-1962', in *Systems, Experts, and Computers: The Systems Approach in Management and Engineering, World War II and After*, ed. Agatha C. Hughes and Thomas P. Hughes (Cambridge, Mass.: MIT Press, 2000), 257.

> RAND staff members envisioned systems analysis as a 'rational', mathematically rigorous means of choosing among alternative future systems characterized by complex environments, large degrees of freedom, and considerable uncertainty. Originally created to evaluate possible nuclear weapons deployment scenarios, RAND's system analysis techniques are quintessential modern social science, incorporating both quantitative methods, especially mathematical modelling, and qualitative analysis involving a diversity of disciplines.[100]

Modelling information systems with an overarching focus on the prediction of outcomes in complex systems and situations was central to RAND's work. Researchers there developed numerous forecasting and decision-making techniques and methodologies.[101] The various programmes and techniques developed at RAND aimed to make traditional political decision-making a thing of the past; where instead systematic, mathematical and statistical inference-based decision-making tools would provide a bias-free, technologically superior mode of governance**.** Game theory, for example, intended to mathematically formalise processes of decision-making based on the assumption of self-interested, rational actors.[102] Developed by John von Neumann and Morgenstern in their time as consultants for RAND Corporation, it was a method of predicting Soviet movements and potential decisions regarding the deployment of nuclear weapons. It formulated nuclear war games along mathematical lines, providing some mathematical, strategic framework upon which to base decisions as momentous and literally earth shattering as instigating nuclear war.[103] The neoclassical assumption of the human actor as ultimately self-interested and, in particular, composed of a calculating, economic rationality, was central to game theory, and RAND Corporation's underlying ideology at large.[104] RAND at this time was the central think tank working on Cold War military and economic issues and came to hold great sway across the US scientific, academic and governmental scene.

One influential proponent of these methods and this ideology was Robert McNamara. Much like with Forrester in the previous section, a brief biography here can help to shed a different kind of light on their trajectory. McNamara had moved from studying at Harvard business school to teaching at the OSRD, and later, upon joining the war in 1943, he taught an OR program bringing

[100] Jardini, 'Systems, Experts, and Computers', 317.
[101] Some of the more prominent and prolific methods being the Monte Carlo & Delphi methods, Game Theory, systems analysis and more mathematical methods such as linear and non-linear programming.
[102] Robert J. Leonard, 'From Parlor Games to Social Science: Von Neumann, Morgenstern, and the Creation of Game Theory 1928-1944', *Journal of Economic Literature* 33, no. 2 (1995): 730–61.
[103] For a more thorough unpacking of what influence game theory had on the world in the Cold War and forms of rationality developing out of it, see: Paul Erickson, *The World the Game Theorists Made* (Chicago: University of Chicago Press, 2015).
[104] Erickson.

analytical approaches from business management studies to army officers in the US Air Force at the OSC. It was here that McNamara used his knowledge of statistical techniques to help make 'efficient' the firebombing of Tokyo and other Japanese cities.[105] He went on to become a high-profile manager at the Ford Foundation. Here he implemented systems analysis and statistical methodologies to such effect that he became the first CEO who was not a Ford – only to be asked by President Kennedy to become the Secretary of Defense. Drawing from his experience in the OSC and at Ford, he conceptualised the Department of Defense as a 'a massive and complex productive system, characterized by inputs and outputs that could be rationally organized and analysed so as to achieve optimal efficiency'.[106] For McNamara, his appointment was a perfect opportunity to apply the tenets of systems analysis at the state level in 'consideration of the entire national defense function and the allocation of the defense budget among its various components'.[107]

Charles Hitch (who we met earlier in the chapter), a senior OR analyst and economist at RAND since 1948, was poached by McNamara and brought into the department. Hitch, and another RAND analyst, McKean, wrote a memorandum for RAND Corporation entitled *The Economics of Defense in the Nuclear Age*, – which purported to outline a 'rational approach to defense policy making, seeking to replace the political basis of decision making with rigorous systematic analysis'.[108] Following a conception of the market as a self-regulating machine, they argued that within industry, the market and its flows of capital ensured an efficient and cost effective allocation of resources. In the military, however, and in the 'production of national security' with its politically determined budget, no such mechanisms were in place to regulate costs.[109] They proposed replacing this system with a rationally designed structure that would compensate for the lack of market forces, building in systematic analysis of alternative allocation options. They argued instead for a top-down restructuring of the defense budget, leaving the allocation of resources to an executive level and removing this privilege from the military commanders. They would implement systems and cost-benefit analysis to aid policy makers in making ostensibly depoliticised, scientifically guided decisions about the allocation of military resources.

[105] McNamara himself later admitted that the management science and decision-making methodologies and processes adopted by the OSC, directly contributed to the tragedy of the war in Vietnam – citing 'poor organization' and the 'failure to see the limits of high-tech equipment'. Applying these methods to the bombing of Japan led McNamara to opt for bombing techniques that would cause the most damage through rapidly spreading fire – efficiency here meant causing more destruction and loss of life, quicker. See: Robert S. McNamara, *In Retrospect: The Tragedy and Lessons of Vietnam* (New York: Times Books, 1995).
[106] Jardini, 'Systems, Experts, and Computers', 324.
[107] Jardini, 279.
[108] Jardini, 318.
[109] Jardini, 318.

US DEPARTMENT OF DEFENSE: THE PLANNING, PROGRAMME AND BUDGETING SYSTEM

The institutional arrangements within the government were reorganised so as to centralise the budget and military policy making under the Secretary of Defense. This was to be comprehensive *programme* budgeting, not simply budgeting for specific objects. The Planning, Programme and Budgeting System (PPBS) aimed to essentially separate military planning from the military and place it in the hands of a centralised civilian staffing. McNamara based the structure of this civilian staffing on the military, creating a chain of command to oversee and coordinate the budgeting of all branches of the armed services. Its *modus operandi* lay in conceptualising defence in an "economically rational" manner, which, reflecting RAND's economic modelling, would relate the 'inputs' of defence – e.g. weapons procurement, communication systems and personnel – to its 'outputs' – e.g. security, warfare, and deterrence.[110] Ultimately, the PPBS project aimed to reduce the uncertainty that was seen to accompany political decision making. It thus sought to translate qualitative problems to quantifiable issues of risk – for example, in assigning values amenable to risk-analysis, to 'benefits' such as 'security'.[111]

The system was deemed so successful that in 1965 under U.S. President Johnson, it was rolled out across federal government. Hitch and the rest of McNamara's 'Whiz Kids', recruited largely from RAND Corporation, rose to the highest reaches of political decision-making using 'ideas … based upon economic notions of opportunity cost and the equimarginal principle, yet they informed completely what was to become known as the McNamara Revolution.'[112] The concentration of power in the higher echelons of civilian management was structured around a programme of systems analysis, facilitating this centralisation by, as Jardini notes, 'compensating, apparently, for the alienation of decision-makers from the locus of operations. Through systems analysis, McNamara and his staff felt empowered to replace the complexity of real life with simplified models that were lent illusory precision by their quantitative bases'.[113]

Essentially, then, the PPBS was a model of an economy within an economy – one that, conceptualised as an open and complex system, assigned weights and numerical values to both quantitative and qualitative inputs and outcomes. It aimed to simplify and translate complex systems according to a "RANDian" economic rationality in order to forecast and optimise operational and budgeting outcomes. Again, what cannot be translated is either erased or

[110] P. A. DonVito, 'The Essentials of a Planning Programming Budgeting System' (The RAND Corporation, 1969).
[111] Richard Nolan, 'Systems Analysis and Planning-Programming-Budgeting Systems for Defense Decision Making', *Naval Research Logistics Quarterly* 17, no. 3 (1970).
[112] Leonard, 'War as a "Simple Economic Problem"; The Rise of an Economics of Defense', 280. The equimarginal principle explains the behaviour of consumers in the distribution of their limited income. It states that the consumer allocates money between different things so at to obtain the most satisfaction from them.
[113] Jardini, 'Systems, Experts, and Computers', 342.

shoehorned into a form that can be – in other words, ascribed an arbitrary value that would fit into its equations, metrics, and scores. PPBS as a budgeting system allowed for the conversion of the defence apparatus of the US away from political and "moral" normative judgements on the way in which it should be run, to a "rationally", "scientifically" organised system.

This system was firmly in place, and made its debut for the U.S. military, in the theatre of the Vietnam War. The threat of the Vietnamese nationalist revolution and the rising communist sentiments in the country were viewed as problems to be solved. PPBS shaped the way in which the government would measure progress in the war, by centring those metrics that were most easily reducible to quantification. As Chwastiak notes, 'given that death could be counted, an attrition strategy in which the goal was to kill the Viet Cong … (the term used by the U.S. for communist Vietnamese) faster than they could be reproduced became the primary means of evaluating the war's progress'.[114] This also came to be the lens through which the U.S. measured their attempts at winning the "hearts and minds" of the Vietnamese – here, the loyalty of the people was assumed to increase proportionately to the number of schools the U.S. built, the number of toothbrushes they distributed, the number of roads built, and so on.[115] Chapter two will look at the Hamlet Evaluation System that attempted to map these "pacification" efforts. What we see unfolding here, however, is a peculiar form of economic rationality, which decisively expanded the parameters of what economic modelling was deemed able, and useful to represent. In the following section I chart the same enthusiasm for the expansion of economic, statistical, logistical modelling in the Cowles Commission, an economic think-tank that shared both members and, resultantly, methodologies and ideologies, with the RAND Corporation.

COWLES COMMISSION AND ECONOMETRICS

The Cowles Commission for Research in Economics, founded in 1932 by Alfred Cowles, had as its original motto, 'Science is Measurement'. In 1952, this became 'Theory and Measurement', to capture the commissions intention to 'encourage and extend the use of logical, mathematical and statistical methods of analysis' in the fields of 'economics, finance, commerce, industry and technology'.[116] Affiliated with the Econometric Society, and with Alfred Cowles funding their journal 'Econometrica', the Cowles mission was a key institution in the establishment of a new kind of economics – one that welded together economics, mathematics, logic and statistical

[114] Michele Chwastiak, 'Rationality, Performance Measures and Representations of Reality: Planning, Programming and Budgeting and the Vietnam War', *Critical Perspectives on Accounting* 17, no. 1 (January 2006): 36.
[115] Christian G. Appy, *Working Class War: American Combat Soldiers and Vietnam* (North Carolina: University of North Carolina Press, 1993); James W. Gibson, *The Perfect War: The War We Couldn't Lose and How We Did* (New York: Vintage Books, 1986).
[116] Carl Christ, 'Economic Theory and Measurement: A Twenty Year Research Report 1932-1952' (Maryland: Cowles Commission for Research in Economics, 1952), https://cowles.yale.edu/sites/default/files/files/pub/rep/r1932-52.pdf.

analysis.[117] The Commission initially conducted research into economic forecasting, in the wake of the Great Depression and the failure of many forecasters to predict the crash. Cowles and his team set out to show that the forecasts of the time were no more accurate than 'simply shuffling cards and randomly drawing one', which, it turned out, at times brought about 'a better record of stock market prediction than following the professionals advice'.[118] The Commission's early series of monographs and reports compiled the results of extensive data gathering on the stock market; including the indexes of prices, yield expectations, dividends, and earnings on a large number of common stocks. They published numerous works on the analysis of economic time series. They tracked the movement of stock and bond prices at regular intervals and surveyed available methods to predict their future values.

Their work was focused on the creation of new, scientific methods of economic analysis that would recast a qualitative problem of *uncertainty* into a quantitative problem of mathematically determinable *risk*. They designed probabilistic frameworks, using equations to model economies, which, as Mirowski notes, was part of a paradigmatic turn away from neoclassical, *past-oriented* economic theory towards a mathematical, probabilistic, future-orientated economics instead.[119] He writes that this 'curious transformation' was demonstrated by the fact that after Friedman's Price Theory,

> it subsequently became commonplace to assert that *events which had not yet happened* could come to influence economic decisions in the present … the introduction of inductive statistics from the 1930s forward reinforced this dramatic seachange, in the sense that current values would henceforth be said to embody an irreducible component of prospective future risk.[120]

In this way, the Cowles project helped to cement a shift in economics toward the evaluation of riskiness, and the incorporation of an unknown, abstract future (often represented by random variables in the mathematical sense) into the complex statistical models and methodologies they developed. Mirowski writes that

[117] It must be noted here that the attempt to create a 'scientific' economics was not new – the generally accepted history states that this first emerged in earnest with the 'marginal utility revolution'. See, for example: Lars Cornelissen, 'The Market and the People: On the Incompatibility of Neoliberalism and Democracy' (Unpublished PhD Thesis, Brighton, University of Brighton, 2018); Phillip Mirowski and Edward Nik-Khah, 'The Role of the Cowles Commission in the History of Information Economics', *Methodological Studies* 36 (2016): 59–85.
[118] Walter A. Friedman, *Fortune Tellers: The Story of America's First Economic Forecasters* (Princeton: Princeton University Press, 2014).
[119] Mirowski and Nik-Khah, 'The Role of the Cowles Commision'; Mirowski, *Machine Dreams*.
[120] Mirowski and Nik-Khah, 'The Role of the Cowles Commision', 64.

> [o]nce probability theory was married to utility theory in the 1940s, a specialty at Cowles, their "knowledge" became knowledge about the future consequences of current decisions, and fed back directly into those decisions. If the inscrutable future was conceived to cause economic changes in the present, that "information" became the number one causal cue through which this happened.[121]

This is part of a broader informational turn in economics, and here the influence of the milieu and company that Cowles members kept becomes increasingly clear. The turn in economics towards precise measurement, statistical analysis and the corollary of all this, *prediction*, must be understood alongside wartime operations research, cybernetics and the cost-benefit systems analysis of RAND. In other words, as grounded firmly in the epistemic foundations of logistical rationality. RAND, in fact, had a great deal of influence on the Cowles Commission. Tjalling Koopmans, the head of Cowles research for a time, was a consultant researcher for RAND and a close associate of von Neumann. It was at this point that RAND was working closely on game theory and its various applications. They were having intense debates on the appropriate mathematisation of economics before they came across the Cowles Commission at a relative time of crisis. RAND picked up the tab for the Cowles Commission when other major sources of support were waning – and as Mirowski writes, the question of 'who pays' is inseparable from the type of research conducted or lines of inquiry followed:

> In the case of Cowles, the subvention from RAND, and the larger military initiative in the commissioning of economic research generally, coincided almost exactly with a profound sea change in the type of research being down at Cowles. ... it is no coincidence that the careers of Koopmans, Marschak, Hurwicz, and Arrow took a noticeable turn away from the earlier quest for an econometric validation of neoclassical theory and toward a reconceptualization of the 'rational' economic agent as an information processor.[122]

Cowles was in financial difficulty, losing funding from the Rockefeller Foundation and the Cowles family. Marschak, (another RANDite who had worked on problems of logistics), gave way to Koopmans as director. He brought with him close links to von Neumann and thus, the RAND Corporation. Neumann helped push for funding from the Office of Naval Research (a central patron of RAND at the time) for Cowles, and the Commission began working in line with his particular vision of operations research. The Commission's budget bloomed to $153,000 a year by 1951, with RAND covering 32% and the Office of Naval Research (ONR) covering 24%.[123]

[121] Mirowski and Nik-Khah, 64.
[122] Mirowski and Nik-Khah, 64.
[123] Mirowski, *Machine Dreams*, 220.

According to Mirowski, 'the new research program was dictated primarily by von Neumanns version of OR' and its funding brought about 'individual contracts [which] ranged from military applications of linear programming to the shape of the general American economy after an atomic war'.[124]

The economic theory and the models that came out of the Cowles Commission helped to shape the future of modern economics and capitalism more broadly – orienting it around measurement, statistical analysis, prediction and the inclusion and control of uncertainty in those models.[125] For instance, out of RAND and the Cowles Commission came the foundations of rational choice theory; a 'tool box of decision theoretic methods … including game theory, decision theory, and Herbert Simon's "satisficing"'. [126] Initially developed to solve strategic military problems, it was extrapolated out and came to be applied widely to economic problems. Kenneth Arrow, in particular, is considered one of the preeminent economists and operations researchers to come out of Cowles. He helped to centre economic theory on the principle of uncertainty; especially in how to manage it and valorise it. He was an integral part of the development of rational choice theory and its application to public policy, which, at base, advances the argument that individual, rational agents have consistent sets of preferences, and act to acquire that which will maximise and fulfil those preferences.[127]

Widely understood as advancing a Cold War ideological project of 'disproving' communism as a viable economic system and an alternative mode of governance, the rational choice theory developed here purported to provide mathematical proof of the 'logical impossibility of achieving collectively rational outcomes'.[128] As Amadae maintains, this theory 'pertains to both parametric environments and strategic environments with other self-interested rational actors, as well as to uncertain and risky circumstances'.[129] This means that it was written to apply to both statistical realities and political or external realities as well as situations in which uncertainty is a factor. The complex, abstract mathematics laid out to express this claim ultimately rely on an understanding of the human agent as a rational economic actor, as well as a set of base methodological assumptions: those of universal, objective scientific law, rational self-interest, and fundamental individualism. Ultimately, the PPBS and rational choice theory operate along the same ideological lines, and with the same sets of assumptions, affinities and a lineage with game-theoretic conceptions of cost-benefit ratios regarding actions and systems under constraint. They

[124] Mirowski, 220.
[125] Of the Cowles Project, the following won Nobel Prizes in economics for their work there: Tjalling Koopmans, Kenneth Arrow, Gérard Debreu, James Tobin, Franco Modigliani, Herbert A. Simon, Joseph E. Stiglitz, Lawrence Klein, Trygve Haavelmo, Leonid Hurwicz and Harry Markowitz.
[126] We will return to Herbert Simon in chapter five in unpicking the lineage of contemporary behavioural economics. S. M. Amadae, *Rationalizing Capitalist Democracy: The Cold War Origins of Rational Choice Liberalism* (Chicago: University of Chicago Press, 2003), 77.
[127] Kenneth Arrow, *Social Choice and Individual Values* (New York: John Wiley & Sons Inc, 1951).
[128] Amadae, *Rationalizing Capitalist Democracy*, 4.
[129] Amadae, 84.

attempt to reduce the uncertainties and complexities of life, and in particular, of the political, and recast them as problems of economics. Further still, as optimisable through systemic, mathematical treatment that would be, *desirably,* 'rational, objective, quantitative, depersonalized, de-bureaucratized, [and] depoliticized'.[130] In this light, all the world becomes a constellation of values – and the project then becomes how to optimise the relationships between them. In this world-as-data, these congenerous, flattening and regularising models are applicable across the organisation of industry, the military, the economic, and ultimately, the political.

Conclusion

Coupled with organisational sciences born of the entanglement of science and the military in this period, the advent of the digital computer accelerated the propagation of logistical rationality. The concept of control became a central issue of politics, economics and military governance, and information as machine-readable data was a key resource in this endeavour. It was through this that the management of industries, economies and societies came to be seen and operated, in Forrester's words, as an 'empirical art'.[131] A fundamental orientation toward the future underlies this shift, apparent in the newfound necessity of collecting vast amounts of data for ever more precise calculations and predictions for optimal decision-making under uncertainty. In attempting to predict and control an uncertain future, *that which has not yet come to be* falls under the remit of logistical organisation.

This chapter has outlined the early development of a logistical form of rationality emergent in the period during and after World War II, which simultaneously retained and recalibrated certain logics of coloniality that have framed and constituted the project of Western modernity. It has outlined the conditions of possibility for the 'revolution in logistics', demonstrating that cybernetics, and the underlying coloniality of its representational order was a central condition of possibility for this revolution. What this means, is that the foundation of logistical rationality relies on a fundamentally deleterious epistemological order – one that determines that the world should be organised according to a view that elides and erases that which cannot be translated into data. In forming the increasingly widespread underlying conceptual infrastructure for organisation, logistical rationality reimagines the world as networks of object-relations to be optimised for maximal efficiency. The world-as-data is thus organised according to a logic that at once erases and simultaneously obscures this erasure in its ostensible neutrality.

The next chapter will look at the emergence of the new global order in the period of the dissolution of European empire, elaborating on the elements of logistical rationality thus far

[130] Frederick C. Mosher, 'Program Budgeting in Foreign Affairs: Some Reflections', Memorandum (Washington D.C.: Subcommittee on National Security and International Operations, Committee on Government Operations, US. Senate 90th Cong. Government Printing Office, 1968), 17.
[131] Forrester, *Industrial Dynamics*.

outlined and how they hit the ground, so to speak, in Cold War social science and counterinsurgency. It begins theorising extraction as a key logic in logistical rationality.

TWO: APPLIED ANTHROPOLOGY, EXTRACTION AND THE NEW WORLD ORDER

Introduction

This chapter will trace the influence and application of logics of logistical rationality in the decades after the Second World War. First in the frame of the Cold War, second in nascent processes of decolonisation or anti-imperialist struggles more broadly, and third in the simultaneous construction of a new global economic and political order. This chapter will show that theories of modernisation emerging out of this specific milieu, their practice, and the economic theory undergirding them engaged many of the same techniques and absorbed the imbricated logics of logistical rationality outlined in the first chapter. This analysis will identify the methodological creep of cybernetics, systems analysis, and predictive technologies in the formulation of modernisation efforts and in the attempts to scientifically map and model social unrest in "developing" societies via mechanisms of information extraction in US Cold War social science. It was this mapping and modelling that legitimated the application of specific aid regimes to nations of particular geopolitical interest to the emergent world order. In this period, we witness a shift from an explicitly colonial "civilising" discourse to a legitimating logistical, neutral, technical discourse. This contributed to a rearticulation of formerly directly colonial, extractive, export-led regimes of control not as domination, but as *modernisation* and *development.*[1]

The central and tributary argument of this chapter is that logics of coloniality operated through the logistical rearrangement of Cold War applied anthropology and social science. This involved the extraction and the translation of complex lifeworlds first into data, and then into actionable knowledge, from the outside. The idea that communities can be represented through modelling and known through data renders them, according to this logic, amenable to intervention. This contributes to the shift in – and continuing dominion over – what counts as knowledge, and further, what counts as acceptable ways of being, living and organising. Populations rendered as data, and the social seen as optimisable system, again contributes to the epistemic order of world-

[1] The aid and development regimes in this period are widely argued to have homologized imperial and economic expansionist discourses and agendas. We will go into this in further detail in the next chapter, however, see, for example: Arturo Escobar, *Encountering Development: The Making and Unmaking of the Third World*, Princeton Studies in Culture/Power/History (Princeton, N.J: Princeton University Press, 1995); Ankie Hoogvelt, 'Globalization and Post-Modern Imperialism', *Globalizations* 3, no. 2 (June 2006): 159–74; York W. Bradshaw and Jie Huang, 'Intensifying Global Dependency: Foreign Debt, Structural Adjustment, and Third World Underdevelopment', *The Sociological Quarterly* 32, no. 3 (1991): 321–42; John Agnew, 'The New Global Economy: Time-Space Compression, Geopolitics, and Global Uneven Development', *Journal of World-Systems Research* 7, no. 2 (26 August 2001): 133–54; Larry Grubbs, *Secular Missionaries: Americans and African Development in the 1960s* (Massachusetts: University of Massachusetts Press, 2009).

as-data and the ordering of the world as such. What this amounts to, I argue, is a recalibration and rearticulation of coloniality, and the attempt to erase possibilities of knowing, being and doing otherwise.

Section one discusses the emergent world order, considering the dissolution of European Empire and the changing use of counterinsurgency to ensure the position of the US as global hegemon in its aftermath. This section begins with a study of the CIA's 1948 response to the impending 'Break-up of Colonial Empires', contextualising capitalistic modernisation as an aspect of this counterinsurgency in the Cold War.[2] In examining this CIA report, I demonstrate the necessity of undertaking study into applied anthropology and social science more broadly at this time, and (to be picked up in the following chapter) the nascent regime of "development" respectively.[3] I show that this report is emblematic of the turn to the population-centric counterinsurgency associated with late colonial administrations and Cold War social science alike, which highlighted the need to understand, predict and control social and political developments and unrest.

The second section discusses the rapid expansion of funding for social science projects linked to military and intelligence services and directed at the extraction of information about foreign populations of interest. This era saw the inauguration of area studies, applied anthropology and a host of other social science sub-disciplines that took on the particularities of the Cold War turn to quantitative, or natural-science like methods and frameworks.[4] Much US applied anthropology at this time was covertly funded by intelligence agencies or the military and was directed at, or had as its central object of study, processes of modernisation and associated social upheavals.[5] In parallel with the emphasis on the inculcation of these logics in (US) defence and economic policy in chapter one, this chapter articulates logistical rationality as a becoming-normative form of

[2] CIA, 'The Break-Up of Colonial Empires and Its Implications for US Security', [Confidential] CIA Report (Central Intelligence Agency, 3 September 1948), https://www.cia.gov/library/readingroom/docs/DOC_0000258342.pdf.

[3] While the emergent discourse of development had a significant influence on the shape that applied anthropology took – and vice versa – this will be explored in more depth in chapter three with particular regard to the extractive architectures of debt they established.

[4] Although this chapter has an emphasis on applied anthropology, one of the hallmarks of social science in the Cold War period was its interdisciplinarity. The case studies presented throughout this chapter are no different. See: Trevor J. Barnes and Matthew Farish, 'Between Regions: Science, Militarism, and American Geography from World War to Cold War', *Annals of the Association of American Geographers* 96, no. 4 (December 2006): 807–26; David H. Price, *Cold War Anthropology: The CIA, the Pentagon, and the Growth of Dual Use Anthropology* (Durham: Duke University Press, 2016); David H Price, 'Soft Power, Hard Power, and the Anthropological "Leveraging" of Cultural "Assets": Distilling the Politics and Ethics of Anthropological Counterinsurgency', in *Anthropology and Global Counterinsurgency*, ed. John D. Kelly et al. (Chicago: University of Chicago Press, 2010), 254–70.

[5] The CIA funded a wide range of cultural projects, art and media throughout the Cold War as propaganda or more accurately, what we have come to call 'influence operations'. We will attend to contemporary influence ops in chapter five. For more information on the CIA's Cold War cultural endeavours see: Frances Stonor Saunders, *The Cultural Cold War: The CIA and the World of Arts and Letters* (New York: New Press, 2013).

reason, pervading the social science disciplines that shaped foreign intervention and acted as counterinsurgency or rather, as counterrevolutionary action.[6]

Section three demonstrates these logics through an examination of a number of applied anthropological and social science studies and begins to theorise the extractive logic of logistical rationality. In so doing I expand the notion of extraction advanced by Sandro Mezzadra and Brett Neilson in order to investigate the politically motivated, often violent translating tendencies of social science in this period.[7] Extraction here refers not only to 'the operations of capital [that] plunder the materiality of the earth', but also that 'draw upon forms and practices of human cooperation and sociality that are external to them.'[8] Through an interrogation of a series of formative anthropological experiments and simulations, I demonstrate the methodological and epistemological manifestations of logistical rationality as they mapped populations as social systems. I focus here on the capture, and, using Rolando Vazquez's notion, the *translation* of forms of life, and how this fed into the reconceptualization of the social as system, and concurrently, the world-as-data. I show that the translation of rich, detailed, qualitative knowledge on the lifeworlds of the people studied into quantifiable data became a cornerstone of counterrevolutionary social engineering.

Section One: Counterinsurgency and the end of Empires

THE CIA ON COLONIAL EMPIRES

In 1948, the newly formed CIA drew up a confidential report – 'The Break-Up of Colonial Empires and its Implications for US Security', a document outlining the geopolitical necessity of struggling over post-colonial loyalties, by arguing that the

> shift of the dependent areas from the orbit of the colonial powers not only weakens the probable European allies of the US but deprives the US itself of assured access to vital [military] bases and raw materials in these areas in the event of war.[9]

[6] It is important to note here that these two terms mean the same thing – counterinsurgency has always been counterrevolutionary action. The point must be made that counterinsurgency is often a sanitised circumlocution, eliding its longer history and theoretical and practical inception in anti-colonial and anti-imperial wars. I will use these terms interchangeably as a result and where appropriate.
[7] Sandro Mezzadra and Brett Neilson, 'Extraction, Logistics, Finance: Global Crisis and the Politics of Operations', *Radical Philosophy*, 2013, 8–18.
[8] Sandro Mezzadra and Brett Neilson, 'On the Multiple Frontiers of Extraction: Excavating Contemporary Capitalism', *Cultural Studies* 31, no. 2–3 (4 May 2017): 188.
[9] CIA, 'The Break-Up of Colonial Empires and Its Implications for US Security', 1.

The report goes into great detail as to the necessity of cementing the loyalties of former colonial states, centred around the active suppression of global communist stirrings, directly relating this to the vying for access to raw materials, military bases and trade relations. The report echoes the concurrent Marshall plan's rally against emergent economic nationalism in the wake of World War II.[10] It argued that growing economic nationalism was a significant threat to U.S. hegemony, and was the result of 'underdeveloped' former colonial nations finding that while they had achieved some political independence, their 'undeveloped' economies - producing mainly raw materials - were still tied to the industrialised Western nations that provided markets for them. They were, in essence, 'still semi-colonial areas, for their economic dependence upon the metropolitan economies tends to vitiate their political independence'. [11]

The report identified and elaborated what the CIA believed to be the five primary causes of anti-colonial, nationalist liberation movements; the rising level of political, economic and social development; an increasing awareness of extant inequalities resulting from "shortsighted" colonial policies and their discriminatory treatment of subject populations – including the exploitation of colonial resources without benefit to those populations.[12] They also cite a 'deep-seated racial hostility of native populations to their white overlords' due to these policies, (uncritically) alongside the exposure of native peoples to 'Western ideas of nationalism and the right to self-determination', and finally, the rise of Japan having defeated European colonial powers in the Russo-Japanese war.[13] The US recognised the importance of collecting and collating knowledge of colonial peoples, particularly in territories that were either geopolitically significant in terms of the Cold War, or in relation to the continuous project of multilateralism and global free trade that would ensure their economic dominance. The emphasis in this document on the *reasons* for the cultural and political developments in the dissenting colonies is just one example of the growing discursive legitimation for the expansion of governmental funding in the social sciences and anthropology at the time. The study of social, cultural and political attitudes contributed to counterinsurgency by providing valuable information as to how the US might shift developments in their favour, or more broadly, in favour of a particular political and economic project of a stable, prosperous and dominant Euro-American world.

The anxiety of communism spreading to "underdeveloped" nations in this document is clear: the 'gravest danger to the US is that friction engendered by these issues may drive the so-called colonial bloc into alignment with the USSR', and consequently, 'the good will of the recently liberated and emergent nations becomes a vital factor in the future strategic position of the US in the near and Far East'. [14] The report goes on to state that 'the restoration of the economic

[10] The Marshall Plan and its role in determining the structure of the emergent economic order will be dealt with in detail in the next chapter.
[11] CIA, 'The Break-Up of Colonial Empires and Its Implications for US Security', 7–8.
[12] CIA, 5.
[13] CIA, 1.
[14] CIA, 2, 3.

contribution of their colonies is important to the economic stability of the Western European powers, which the US is endeavouring to create'.[15] This report used Cold War tensions to justify subsequent modernisation and development regimes as a form of counterrevolution. The necessity of fostering loyalties from former colonies was at least twofold – to continue to benefit from the raw materials and strategic military base placements, and as a "soft power" economic counterinsurgency against any potential communist uprisings in those parts of the world.

Counterinsurgency is an umbrella term that covers 'military, paramilitary, political, economic, psychological and civic actions taken by a government to defeat insurgency', according to the first US dedicated counterinsurgency field manual of 2006.[16] It is worth noting here that counterinsurgency in all its contemporary forms has a deep-rooted history in colonial domination and administration. Modern counterinsurgency as a set of strategies was developed in imperial conquest and later against the colonies, as Laleh Khalili demonstrates in *Time in the Shadows.*[17] Her genealogy of the tactic of confinement traces the development of various strands of counterinsurgency from an analysis of colonial wars, manuals and strategists. In so doing she points to the building of infrastructure throughout various empires as both an expedience for military campaigns and as a kind of loyalty building in the colonised state. Unpicking the colonial lineage of what was to become "population-centric" counterinsurgency, Khalili shows that military strategists from as early as 1898 were arguing for direct violence to be 'held in reserve and carefully calibrated', so as to not create a hostile and ruined land for future settlers to move in to.[18] She highlights the career of Sir Robert Grainer Ker Thompson, a key strategist and writer on counterinsurgency in the 20th century. He advised on various counterrevolutionary efforts including the Rhodesian government's fight against anti-colonial insurrectionists and the Vietnam strategic hamlet concept.[19] A key principle of Thompsons' counterinsurgency is that 'the government must give priority to defeating the political subversion, not the guerrillas'.[20]

Khalili shows that distinguishing "soft power" from "hard power" denies the interrelatedness of less directly violent forms of domination with those militaristic and imperial assertions of violent power. She writes that

[15] CIA, 3.
[16] 'Army Field Manual 3-24: Counterinsurgency' (United States: Department of the Army, 2006), 1–1.
[17] Laleh Khalili, *Time in the Shadows: Confinement in Counterinsurgencies* (Stanford, California: Stanford University Press, 2013).
[18] Khalili, 25.
[19] We will come once more to look at the strategic hamlet concept later in the chapter.
[20] Robert Thompson, *Defeating Communist Insurgency: The Lessons of Malaya and Vietnam* (New York: Frederick A. Praeger, 1966), 55.

> at a strategic level, to deny that liberal counterinsurgencies still serve the basic geopolitical interests of major powers is to disavow the fundamental calculus of power that still lies at the root of that violent culmination of politics, war.[21]

In fact, ostensibly liberal, specifically "population-centric" counterinsurgency strategies disguise 'an intent to co-opt and pacify intransigent populations' and are 'in the last instance innovations in indirect forms of rule, where coercion is not so much displaced by as dressed in the garb of hegemony'.[22] Following this, I argue that we can discern the persistence of colonial forms of domination in modernisation theory and its processes, particularly as directed through social science information operations. The CIA document under consideration demonstrates the geopolitical context for the expansion of these counterinsurgent or counterrevolutionary tactics, and the necessity of finding *outwardly liberal* ways of retaining and cementing the position of the US as global hegemon. George Kennan, an American diplomat and historian who played a major role in both the Truman administration's anti-Soviet policy and the Marshall Plan, wrote in a confidential paper in 1948 that the U.S. held

> about 50% of the world's wealth but only 63% of its population … In this situation, we cannot fail to be the object of envy and resentment. Our real task in the coming period is to devise a pattern of relationships which will permit us to *maintain this position of disparity* … To do so, we will have to dispense with all sentimentality and day-dreaming; and our attention will have to be concentrated everywhere on our immediate national objectives. … We should cease to talk about vague and … unreal objectives such as human rights, the raising of living standards and democratizations.[23]

Kennan, however, recognised the need to use these "vague and unreal" objectives as tools of propaganda both domestically and internationally. Espousing these objectives, modernisation theory and the regimes implemented in its service worked as an attempted mode of pacification, whilst simultaneously ensuring the continued dominance of the US in economic and political terms.[24]

---

[21] Khalili, *Time in the Shadows*, 4.
[22] Khalili, 10.
[23] George F. Kennan, 'Review of Current Trends [in] U.S. Foreign Policy', in *The State Department Policy Planning Staff Papers 1947-1949*, vol. 2 (New York: Garland, 1948), 121–22.
[24] Michael E. Lathtam, *Modernization as Ideology: American Social Science and 'Nation Building' in the Kennedy Era* (London: University of North Carolina Press, 2000); Zaheer Baber, 'Modernization Theory and the Cold War', *Journal of Contemporary Asia* 31, no. 1 (January 2001): 71–85; Price, 'Soft Power, Hard Power'.

The Cold War, the break-up of European empires and concurrent struggles for independence, the self-creation of new nations and resultant shifting topography of global political economy meant that constructing bodies of knowledge about peoples in these emergent spaces became a politically important endeavour. It formed the basis and legitimating theoretical ground for various forms of counterinsurgency. It was deemed so crucial that the US government poured funding into the social sciences, most notably in area studies and applied anthropology. David Price uncovers the many ways in which the military and intelligence agencies quietly shaped the development of applied anthropology in the United States during the first thirty years of the Cold War.[25] I take this analysis a step further and look at how this contributed to and emerged in tandem with logistical rationality, constituting the assertion of new modes of control and domination in the period of decolonisation. Though the broader field of anthropology has its own long and contested colonial history, what remains pertinent is that the collection and analysis of information about nations of the Global South in the Cold War period played a role in *mapping* what would now be termed, in counterinsurgency doctrine, the *human terrain* of these societies.[26]

Section Two: Modernisation and Cold War Social Science

COLD WAR ANTHROPOLOGY AND SOCIAL SCIENCE

Preceding the Second World War, anthropology and area studies were relatively minor academic disciplines, however, throughout the war anthropologists 'worked as spies, educators, cultural liaison officers, language and culture instructors, and strategic analysts'.[27] In the years circa 1945 and onwards, they experienced a huge funding drive. Hundreds of anthropology and area studies departments, funding bodies and associations were formed during this time.[28] For example, in 1951, Massachusetts Institute of Technology (MIT) established the Center for International Studies, 'linking the dual use needs of scholars conducting international research and of American

[25] Price, *Cold War Anthropology*. Price's research traces the links and connections between social science funding bodies, the US military and philanthropic organisations – and highlights the Office of Strategic Services (OSS), the American Anthropological Association (AAA), Special Operations Research Office (SORO), Office of Naval Research (ONR) and others that played a defining role in developing cybernetics, OR and systems analysis as part of this same web of military funding. This is of course not to say that all US social science at this time embraced anti-communist modernisation and counterinsurgency knowingly or uncritically, but that those who wielded funding inevitably held power over what *sort* of projects ran, and where. Researchers also had little control over *how* their data was used, or over the policies implemented as a result of that data being collected.

[26] For more history connecting anthropology to counterinsurgency under the banner of 'human terrain' operations, see: Roberto J. Gonzalez, *American Counterinsurgency: Human Science and the Human Terrain* (Prickly Paradigm Press, 2009); For the explicit connection to the Vietnam era CORDS and hamlet systems, see also: Jacob Kipp et al., 'The Human Terrain System: A CORDS for the 21st Century.', *Military Review*, 2006, 8–15.

[27] Price, *Cold War Anthropology*, xvii.

[28] For a comprehensive study of these bodies, return to David H. Price ; David H Price, 'Gregory Bateson and the OSS: World War II and Bateson's Assessment of Applied Anthropology', *Human Organization*, 57.4 (1998), 379–84.

military and intelligence seeking informed input for their own projects.'[29] Max Millikan was the former Director for Economic Research for the CIA and headed MITCIS from 1953-1969. In correspondence with the Ford Foundation, one of the main funders of Cold War US anthropological work (alongside the CIA, Rockerfeller and Carnegie), Millikan wrote that the research MITCIS set out to conduct would identify 'strategic factors' for a country's development – and that

> by a strategic factor – (cultural, institutional, ideological, or administrative) – we mean both one that has an important effect in causing political and economic changes and one that can be influenced by the conscious policies of the governments of the countries, of the American government, of private organisations, or of international agencies.[30]

The Center was established with the priority of promoting economic development through the theorisation and deployment of modernisation schemes. Alongside Millikan, it employed several renowned economists including Walt Rostow, a highly influential modernisation theorist. MITCIS's early projects were made up of 'interdisciplinary teams of social scientists, physicists, chemists, engineers, economists, and political scientists' that sought new forms of political, economic and psychological warfare.[31] The approach of the Center was hybrid, combining classified and declassified information, and its funding source shifted from the State Department to secret CIA funding alongside help from the Ford Foundation. Harold Lasswell, a psychological warfare expert who was involved in an experiment at Vicos to be discussed later in the section, sat on the International Communication Planning Committee for MITCIS. To highlight the links between different actors in these networks is not to argue that the elevation of these logics is down to individual career paths or actions, but to indicate the way these logics travel through these networks, are reworked for different purposes and settle in different fields. The point is to highlight the particular in order to get at the abstract operations of power.[32]

Alongside the entanglement of science and the military throughout WWII highlighted in the previous chapter, there was a broad push for more rigorous systems of research into overseas territories. This was often aimed at amalgamating the military-social-scientific developments of operations research, systems analysis, structuralist Parsonian sociology, demography and

[29] Price, *Cold War Anthropology*, 89–90.
[30] Max Millikan, cited in: George Rosen, *Western Economists and Eastern Societies: Agents of Change in South Asia, 1950-1970* (Baltimore: Johns Hopkins University Press, 1985), 32.
[31] Price, *Cold War Anthropology*, 90.
[32] This is again not to say that all social science and anthropological projects that received funding from these bodies followed a single line or ideology in their research or that they were never critical of contemporary geopolitics, but that those who were able to choose where the majority of funding went inevitably held a great deal of power over the *sorts* of projects that eventually ran even if there were not explicit instructions as to what research could be carried out. Researchers also rarely had control over what happened to their outputs nor over the policies implemented as a result of their data.

statistics to provide the kinds of precise, 'scientific' and 'apolitical' kinds of knowledge as a basis for intervention.[33] The epistemological certainty and perceived superiority of these recently developed logistical and scientific modes of study, and the already extant positioning of the 'West' and the countries of the 'Third World' on an apparent 'development' continuum made possible an understanding of modernisation – or the optimisation of human life – as having 'a progressive, orderly, and stable character'.[34] Indeed, the general project of development after WWII saw the world on a spectrum from 'primitive' or 'underdeveloped' to 'developed', with the 'Western' model of multilateral capitalist, industrialised and urbanised society as its end point, or goal – and this was the foundation for Walt Rostow's widely propagated theory of modernisation.[35]

Rostow's *Stages of Economic Growth: A Non-Communist Manifesto* was taken up widely in applied anthropology and policy making.[36] Based on a broadly generalised economic history of the world, its main thesis was that there are five distinct stages in the transition from 'traditional society' to the end-goal of the 'age of high mass consumption'. The second, 'pre-conditions for take-off', occurs in the shift from agrarian to industrial production, when there is an external demand for natural resources and raw materials and infrastructure is developed to facilitate their export. This model is predicated on free-market capitalism, and builds in a logistical imperative to build transport and logistics infrastructure, extract resources and export them.[37] The next stage, 'take-off', is corollary to this – industrialisation and urbanisation increase as a result and technological change and innovation will necessarily lead to the 'drive to maturity'; a diversification of the industrial base, further development of transport infrastructures and, only at this point, investment in social infrastructure. Finally, the 'age of mass consumption', the 'developed' society, can be achieved.[38] Despite this model being harshly criticised for its ahistorical universalism and its inability or unwillingness to account for cultural and historical heterogeneity, it was so broadly

[33] Parsonian sociology here relates to Talcott Parsons, a renowned sociologist who used systems theory in his work in attempting to outline a general systems theory of society. Talcott was an anti-communist scholar and American exceptionalist, who read the cybernetic theories of Weiner and Ashby, greatly influencing his work. Parsons was participant in the Macy Conferences as referenced in the first chapter. Roland Robertson and Bryan S Turner, eds., *Talcott Parsons: Theorist of Modernity* (London: SAGE Publications, 1991).

[34] Timothy Mitchell, whose ideas of representation and replication we met in the first chapter also writes on the coloniality of the linear temporalities underpinning development. We will return to this in chapter four. Escobar, *Encountering Development*, 38.

[35] Walter W. Rostow, *The Stages of Economic Growth: A Non-Communist Manifesto*, 1st ed. (Cambridge: Cambridge University Press, 1960).

[36] Baber, 'Modernization Theory and the Cold War'; Latham, *Modernization as Ideology: American Social Science and 'Nation Building' in the Kennedy Era*; Piki Ish-Shalom, 'Theory Gets Real, and the Case for a Normative Ethic: Rostow, Modernization Theory, and the Alliance for Progress', *International Studies Quarterly* 50, no. 2 (2006): 287–311.

[37] I elaborate on the developmental imperative to build logistical infrastructure further in the next chapter.

[38] Rostow, *The Stages of Economic Growth: A Non-Communist Manifesto*.

taken up at least in part due to its correspondence with the interests of the powerful in implementing particular kinds of development programmes.[39]

Rostow's work influenced development policy and policy-driven disciplines such as economic anthropology thereafter. In 1957, Rostow and Millikan wrote a book together prescribing foreign policy based on this theory of modernisation and its potential to shape loyalties in the Cold War era.[40] While Rostow's influence cannot be denied, it should be noted that 'it was not Rostow who determined Kennedy's agenda or priorities; that agenda had already been set and what remained was to identify people to help execute it, that is, people with similar attitudes and opinions, with similar ideology' that would help legitimate programs of modernisation that would ultimately benefit US interests.[41] Zaheer Baber too shows how despite various criticisms of the underlying and undeniably 'Western'- and econo- centrism of modernisation theory, the discursive legitimation persisted in the construction of development programmes throughout this period, and further, into contemporary society.[42] Working on this assumption, these programmes focused on financing extractive industries and their attendant infrastructures as a way in which 'developing' countries could kick-start their economies.

As we come to in more detail in the next chapter, Arturo Escobar notes that within the World Bank (or International Bank of Reconstruction and Development), the conception of development was one based on a particular frame of scientism, where countries could be modernised according to 'scientifically ascertained social requirements' – indeed, that 'the most significant aspect of this phenomenon was the setting into place of apparatuses of knowledge and power that took it upon themselves to *optimize life* by producing it under modern, 'scientific' conditions'.[43]. This too has a lineage in European imperialism and colonial administration where one justification for colonisation was the purported technological and moral superiority of the 'West' and hence, the colonised must be guided in the direction of "civilised", European culture.[44] Crucial for my argument is that the turn to applied anthropology in this context recognised or was based on the assumption that you needed to *change the behaviour* of people – of whole populations, ultimately, in order to modernise and simultaneously maintain stability or, in other words, subvert dissent.

[39] Ish-Shalom, 'Theory Gets Real, and the Case for a Normative Ethic: Rostow, Modernization Theory, and the Alliance for Progress'.

[40]Rostow was also appointed Special Assistant to the President for Security Affairs under both the Kennedy administration and the Johnson administration. Walter W. Rostow and Max F. Millikan, *A Proposal: Key to an Effective Foreign Policy* (New York: Harper & Brothers, 1957).

[41] Ish-Shalom, 'Theory Gets Real, and the Case for a Normative Ethic: Rostow, Modernization Theory, and the Alliance for Progress', 297.

[42] Baber, 'Modernization Theory and the Cold War'.

[43] Escobar, *Encountering Development*, 23.

[44] For a brief overview of the changing justifications for colonisation see: Camilla Boisen, 'The Changing Moral Justification of Empire: From the Right to Colonise to the Obligation to Civilise', *History of European Ideas* 39, no. 3 (2013): 335–53.

This was central to the population-centric turn in counterinsurgency in general, developing out of colonial administrations attempt at quelling anti-imperial struggles.

In sum, controlled modernisation was seen as necessary for the consolidation of power in the emergent and continually contested world order; so much so that the US military and intelligence agencies poured an unprecedented amount of resources into the social sciences and applied anthropology.[45] In this way, the extraction of information through both small- and large-scale research expeditions and projects, and its subsequent manufacture into bodies of detailed cultural, political and economic *knowledge* became central to modernisation programmes and the project of US hegemony. Where the next chapter will elaborate on the extractive themes of development and how the resultant architectures of debt should be seen as a mode of indirect rule, here I deal with information extraction and modelling as a central logic of Cold War social science as counterinsurgency.

EXTRACTION AND TRANSLATION

Expanding our understanding of both extraction and translation here helps us to delineate and unpack colonial legacies in the extraction of information as data, and its rendering productive as knowledge about cultures and social relations. In their recent work, Sandro Mezzadra and Brett Neilson theorise extraction as a particular set of logics that act as both descriptor and metaphor for processes that aim to extract value for the benefit of a party that is not the technical 'owner' of the raw material. This raw material, in the expanded sense, does not necessarily have to be material *as such*. They argue, in contemporary times, that 'the expanding panoply of practices in data mining is an important register of the pervasive penetration of extraction into spheres of human activity that lie beyond the familiar domains of mining and agribusiness'.[46] Their conceptualisation discusses specifically modern practices of data-mining conducted through algorithmic processes and the extraction and analysis of digital data.

My contention is that this understanding can be further expanded to include older, analogue forms of the collection and treatment of data. Where they argue that 'human activity inscribes multiple traces into digital environments, creating huge deposits of data that prepare the ground for properly extractive activities', I argue that again, this logic can be seen in the preparation of systematic models of societal unrest and insurgencies in the following examples, where, 'gathered into databases, their analysis generates correlations which, beyond the logics of causality and interpretation, bear the potentiality to anticipate behaviours, generate insights, and thus produce

[45] State funding for the social sciences in the US rose by a factor of 20 during the Second World War and quadrupled in the 1950s. For a detailed exposition of funding bodies see: M. Heymann and J. Martin-Nielsen, 'Introduction: Perspectives on Cold War Science in Small European States', *Centaurus* 55, no. 3 (2013): 221–42; Price, *Cold War Anthropology*.

[46] Mezzadra and Neilson, 'On the Multiple Frontiers of Extraction', 194.

value'.[47] Making this connection of extraction between anthropology and the social sciences, enables us to decipher and excavate the underlying coloniality; in the invention of the "third world", "poor" subject in need of modernisation; in the attempt to rationalise, organise and direct social relationships; and in the abstraction of the human – where Diane Lewis writes,

> For the colonizer, the colonized "does not exist as an individual." Similarly the anthropologist, in his concern with patterns, ethos, structures, is several levels of abstraction removed from the raw data of individual motivation, attitude, and behavior. The most acclaimed and prestigious work in the discipline deals with complex theories and models in which individuals are lost sight of as people.[48]

Applied anthropology in this period 'retain[ed] a kind of colonial imprint', whereby the 'centre of gravity' of knowledge about societies undergoing modernisation programs was located outside of those nations, and broadly for reasons of counterinsurgency.[49] The crux of the argument here is that this work to actively accumulate and translate information on the lifeworlds of the target populations was done in order to predict and control social unrest.

The notion of translation I use here can be thought of as a process of incorporation and erasure, in which the extraction of information and its manufacture into *knowledge*, serves to render legible and in so doing, re-writes different practices, life forms and forms of knowledge, erasing that which cannot be incorporated into this legibility. Rolando Vázquez develops the notion of the 'epistemic territory of modernity' to describe the space of this legibility.[50] Translation operates to perform a border keeping role here – one that both maintains and expands its borders and the capacity for incorporation into forms of knowledge that are consonant with coloniality/modernity. Translation involves a double movement which, on the one hand, serves to expand modernity's 'epistemic territory' and, on the other, delineates the borders of that territory by rendering invisible and *unreal* all that lies outside its domain. Translation then is a process that transforms and incorporates *what it can* of the complexity, nuance, and ways of being, doing, and knowing into something legible to or as part of coloniality/modernity's epistemic framework. All that is not amenable to such translation is erased from the representational order, from *what is counted as knowledge*. We saw this movement in the translation of the world into cybernetic language and models, and in the notion of the black box in the previous chapter, for example. Translation is then a vital part of the process of

[47] Mezzadra and Neilson, 194.
[48] Dianne Lewis, 'Anthropology and Colonialism', *Current Anthropology* 14, no. 5 (1973): 585–86.
[49] Mezzadra and Neilson, 'On the Multiple Frontiers of Extraction', 191; Johan Galtung, 'Scientific Colonialism', *Transition*, no. 30 (1967): 10–15.
[50] Rolando Vázquez, 'Translation as Erasure: Thoughts on Modernity's Epistemic Violence: Translation as Erasure', *Journal of Historical Sociology* 24, no. 1 (2011): 27–44.

representation and replication – the means by which the world can come to be organised as the world-as-data. Powerful representations are *constructed on* this diminished, circumscribed, translated knowledge, that itself gains the epistemic legitimacy and claims to truth and objectivity associated with modernity.

In what follows, we shall see how processes of the extraction and translation of lifeworlds comes to bear on forms of social organisation and control. I now look to a set of examples that help to methodologically and conceptually clarify the connections between extraction, translation, and the logistical methods and logics identified in the last chapter. I first look to two experiments explicitly modelled on cybernetics; one at RAND's Systems Research Lab with a military command, and one aimed at modernising a hacienda community in Peru. I then look to the large-scale Project Camelot, which sought to model social unrest in Chile, and the spin-off studies that used similar methods and research frameworks elsewhere. Next I look at another project which sought to *simulate* social unrest and government responses in 'Latin America' broadly speaking. Finally, I look to the Vietnam war, and the US Army's Hamlet Evaluation System. I show that these experiments are indicative of a set of practices and logics that represent the settling of logistical rationality and its use as the legitimation for, and a means of, intervention and control. They each rely on a worldview or epistemological understanding of the world, of reality, as representable by data – or again, as I ventured in the first chapter, as the rendering of the *world-as-data*. In the cybernetic-logistical view of societies or populations as complex systems, subjects are rendered as objects to be ordered optimally, as equivalent, interchangeable and manageable with the right messages and feedback. According to this view, this is the case whether at the micro-scale of individuals in a single community, or in the attempt to map and control social unrest at the scale of the nation.

Section Three: The Social as System and Insurgency Prophylaxis

RANDTHROPOLOGY

To demonstrate the relationship between applied anthropology and the development of logistical techniques and modes of understanding as outlined in the first chapter, I want to take a spiral to loop back around to the RAND corporation in order to look at a particularly illustrative set of related experiments. John Kennedy, one of their most valued psychologists, had been conducting experiments for the Systems Research Laboratory (SRL) in the early 1950's, as a response to the 'inability of formal, mathematical approaches to cope with the intricacies of human interaction'

in man-machine, or cybernetic, systems.[51] Kennedy critiqued game theory as having the vital weakness of ignoring those aspects of human behaviour that were not rational – arguing that if mathematical treatments of social interaction showed limitations, it was because they did not have *adequate information*.[52] In these experiments, a group of military personnel were tasked with simulating the defence of a given territory from incoming aircraft, both hostile and friendly.[53] The aim was to observe the way the group handled incoming information and how they coordinated themselves and the dissemination of important information, in order to optimise this behaviour. With this particular research and in the SRL, 'the work of Kennedy and his team had shifted … to a curious form of social engineering: scrutinising groups, recording and analysing their protocols, making them behave better'.[54] The group themselves were seen as a closed cybernetic system, that if optimised for information processing, could be managed to a particular end of efficiency, reliability, and predictability.

After moving on from RAND to a brief stint in consultation in business and personnel management (tellingly demonstrating the cross-fertilisation between military, business management and governance), in the mid-1950's, Kennedy began working on an anthropological experiment run by Alan Holmberg and Cornell University through the Center for Advanced Study in the Behavioural Sciences.[55] It was aimed at understanding – and undermining – indigenous resistance to a massive hydro-electric project.[56] The Peruvian government had invited them to study and intervene in the community of Callejon de Huaylas near Vicos, in which there remained a quasi-colonial system of serfdom or peonage. Here, indigenous peoples worked land on a hacienda in return for the right to live on the land and to farm for their subsistence.[57]

The aim of the study was to understand resistance to modernisation, and, in effect, propel the community into "modernity" through guided rapid cultural and technological change. There was

---

[51] Robert Leonard, *Von Neumann, Morgernstern, and the Creation of Game Theory: From Chess to Social Science, 1900-1960* (Cambridge: Cambridge University Press, 2010), 330.

[52] In chapter five, we will deal with the contemporary iteration of these assumptions on rationality in Behavioural Economics.
John L. Kennedy, 'The Uses and Limitations of Mathematical Models, Game Theory, and Systems Analysis in Planning and Problem Solution.', in *Current Trends in Psychology in the World Emergency*, ed. John C. Flanagan (Pittsburgh: University of Pittsburgh Press, 1952), 97–116.

[53] Robert L. Chapman et al., 'The Systems Research Laboratory's Air Defense Experiments', *Management Science* 5, no. 3 (April 1959): 250–69.

[54] Leonard, *Von Neumann, Morgernstern, and the Creation of Game Theory: From Chess to Social Science, 1900-1960*, 332.

[55] Deborah A. Wood, 'Direct Cultural Change in Peru: A Guide to the Vicos Collection' (New York, 1975), Department of Manuscripts and University Archives, Cornell University Libraries.

[56] Again, though temporarily focusing on a particular actor in this story, the emphasis here is not on the individual but on the way in which these logics *travelled* and *settled* in other disciplines. John L. Kennedy, 'A Display Technique for Planning', in *Symposium on Air Force Human Engineering, Personnel and Training Research* (Committee on Military Psychology, Division of Anthropology and Psychology: National Academies, 1956), 201–5.

[57] Haciendas, in the Spanish colonies, were estates on which there were plantations, mines or factories. These were worked by free labour, or on a peonage system in colonial times and on into the 20th century.

a large hydroelectric project, funded by French capital, being developed 50 miles away. This was expected to provide electricity for the valley, and roads and communications were being improved and established with the coast. Holmberg signed the lease for the hacienda, becoming 'patron', and establishing as a result 'the dominant legal and effective authority in the community'.[58] They argued that 'because his political control over the community has been and can be used to achieve experimental or scientific control over the community, as well as encourage industrialization, research possibilities are unique.' [59] They explicitly reference Kennedy's previous experience within air defence centres at RAND's Systems Research Lab as the precursor to this work, taking 'the further step of making *a laboratory out of a community and region*'.[60]

Kennedy, in a report for the RAND Corporation wrote that

> The Indians (Indians make up about 70% of the population of Peru) aren't ready for modern technology – either culturally or politically. To *avoid the extremes of revolution* on the one hand and *race extinction* on the other, plans were made to carry the Indians of Hacienda Vicos from feudalism to political and cultural participation in modern Peruvian life in the relatively short time of ten years. To do this, planned experiences, or 'interventions' were started in 1951.[61]

This statement is indicative of what Ross argues was anthropology's central role in cementing the paradigm of modernisation. It aimed to foster the widespread myth that (Latin American) peasants – despite being recognised as a 'reservoir' of potentially powerful agents in radical political transformation – were too culturally conservative or 'traditional' to be trusted with their own modernisation.[62] Ross argues that the experiment at Vicos 'helped to develop arguments that denied the role of the peasant-driven, radical agrarian transformation and how, within the accepted framework of modernization theory, it gave stature to an alternative, gradual process of what the Vicos personnel liked to call 'controlled change''.[63] Again, we see the explicit assumption of an (imperially defined) linear model of evolutionary development, from the "primitive", here the 'Indians', who are not 'ready' for the contemporaneous 'modern'. This task was seen as an extension of a personnel 'management problem' – the indigenous community was seen as a complex system of interacting variables that could be controlled with the right information. With

[58] Allan Holmberg et al., 'Experimental Research in the Behavioural Sciences and Regional Development', Proposal (Cornell University, 1955), 1, https://hdl.handle.net/1813/11758.
[59] Holmberg et al., 1.
[60] Holmberg et al., 2. Emphasis my own.
[61] Kennedy, 'A Display Technique for Planning', 201.
[62] E. B. Ross, 'Reflections on Vicos', in *Vicos and Beyond: A Half Century of Applying Anthropology in Peru*, ed. Tom Greaves, Ralph Bolton, and Florencia Zapata (Plymouth: AltaMira Press, 2011), 130.
[63] Ross, 132.

a striking similarity to the above experiment at SRL, this research plotted the 'target and actual values of the economic, social, and attitudinal variables to be changed' among the indigenous community.[64] Conceptualising the community as a cybernetic system that could be optimised was the methodology or technique by which this end goal of acceptance or enjoinment in modernity could be planned and reached.

The experiment constructed a physical cybernetic space – a room in which the 'planners' of the experiment would create a map of past, present and future representations of 130 different variables of cultural change, under the headings 'Government', 'Economics', 'Social Relations', 'Education and Mass Media', 'Health and Welfare', and 'Attitudes'.[65] They aimed to control and predict said changes in true cybernetic form – through information feedback and benchmarking – evident where Kennedy writes that

> the prediction reinforcement takes place over a period of time, since the map continuously compares the predicted status of the variables with the actual status … the map room is, in one sense, a 'learning machine'. The parts of the machine that do the thinking and adapting involved in learning are, of course, men – the planners. But they are aided by a display that responds to the issues before it by making the complete context of the decisions readily available and by quickly assimilating current information, decisions, and predictions. [66]

What this indicates is a conceptual information system feedback loop, whereby the subjects – the indigenous Peruvians – were to provide the initial data for the construction of a model that was eventually to be abstracted and extrapolated to various other foreign aid and technical development programs. The US government, via USAID, 'contracted with members of the CPP for studies on how to most effectively execute foreign aid programs directed toward cultural change.'[67]

These experiments, conceptually and ideologically linked to the RAND Corporation and a particular cybernetic-systems view of human and social interaction, show that this subset of applied anthropology was imbued with similar logistical logics that radiated out from Operations Research and the 'cyborg sciences' after the Second World War. The Kennedy & Holmberg experiments at SLR and at Vicos respectively attempted to create cybernetic, systemic models of communities that could closely measure behaviours and attitudes; in order to firstly observe

[64] Holmberg et al., 'Experimental Research in the Behavioural Sciences and Regional Development', 1.
[65] Kennedy, 'A Display Technique for Planning', 202.
[66] Kennedy, 204.
[67] Wood, 'Direct Cultural Change in Peru: A Guide to the Vicos Collection', 8.

social organisation and optimize behaviour in line with a (Western) model of development, and secondly, to direct cultural change and quell any social unrest that might result from these programmes.

What this shows, is that in this cybernetic, *logistical* rationality, what matters is the model – the formulation of a model that purports to represent the reality of a community renders its behaviours legible, and hence optimisable. The fundamental thesis then is that social, cultural and political formations can be rationalised – translated into variables, with the right inputs and interventions, the behaviour of these communities-cum-cybernetic systems can be modulated and controlled. In the representation of the world-as-data, the perfect conditions for orderly development and ultimately, *the modern,* can be replicated. In order to accurately predict, control and guide uncertain situations to a specified end, the translation of qualitative information into quantifiable data was vital. The transposability of cybernetic models, already used in attempts to understand and control fighter & jet animal-machine systems as in Weiner's operations research, to group dynamics within the military, and *further*; to those 'economic, social and attitudinal variables' of a community, demonstrates both the perceived transmutability and trajectory of these ideas to ever broader aspects of social existence and its control. I will now look to another attempted experiment, this time in Chile, to highlight the scaling up of these processes from community to entire nation.

PROJECT CAMELOT

In 1964, a project that was to be the largest and most well-funded social study at the time attempted to model societies and in particular, social unrest, on a much grander scale. Project Camelot was an operation headed by the Special Operations Research Office (SORO). [68] The project sought to employ psychologists, sociologists, anthropologists, and economists, with the aim of creating a 'general social systems model which would make it possible to *predict and influence* politically significant aspects of social change in the developing nations of the world'.[69] This model was to be a developed with the aim of predicting and controlling insurgencies and revolutionary movements initially in Chile. However, much like the experiment at Vicos, it aimed to provide a model to be applied across other 'developing' countries. Camelot and its intended

[68] Initially created in 1956, SORO was a quasi-independent research institution in the American University that relied on military and CIA funding to produce handbooks detailing the social structures, economic and political systems, and potential for insurgency and revolution.
House Committee on Foreign Affairs US Congress, 'Behavioural Sciences and the National Security, Report No.4, Together with Part IX of Winning the Cold War: The US Ideological Offensive' (Washington D.C.: Subcommittee on International Organizations and Movements, 6 December 1965).
[69] 'Guidelines for Project Camelot' 1964, reprinted in: Irving Louis Horowitz, *The Rise and Fall of Project Camelot: Studies in the Relationship Between Social Sciences and Practical Politics* (Cambridge: MIT Press, 1967), 47. Emphasis my own.

spin-offs aimed to pre-empt and quash movements in reaction to programmes of modernisation and economic restructuring.[70]

The reliance of the research design on systems analysis reflected the broader belief in and preference for 'stable' social systems – in effect, the study was a bid to be able to undermine *any cause* for instability, regardless of its reason. In the documents planning the study, social unrest was understood as a tacit ill. The language of the study readily uses the rhetoric of immunization – revolution was a disease that must be managed lest it lead to a pandemic – referring to this project of social science counterinsurgency as an 'insurgency prophylaxis'.[71] Here I think we can recognise this language as heavy with an implicit reference to biological racism. The reduction and characterisation of resistance as pathology, as a form of catching disease implies its agents as incapable of having legitimate political concerns and brushes them off as some unthinking, virulent outbreak. Moreover, intervention in the form of pre-emption and 'prophylaxis' must be conducted from the outside. The legitimate and implicit 'good', was the top-down, economic restructuring and further, US military, political and economic intervention. Social unrest and importantly, disequilibrium, were cast as 'internal war potential', and explicitly associated with and deemed to be at risk of communist sensibilities. The study's primary aim was developing the means for the 'measurement of internal war potential: a means for identifying, measuring and forecasting the potential for internal war'.[72]

The proposal memo that was circulated in the recruitment stages of Project Camelot stated that

> In the past, an insurgency has been perceived primarily, if not entirely, as a matter of internal security in the nation concerned to be countered when it became overt by military and police actions. In the present framework of modernization however, the indicated approach is to try and obviate the need for the insurgency through programs for political, economic, social and psychological development. Military support of such programs can be a significant factor in the nation-building process.[73]

Camelot conceptualised 'the country and its problems as a complex social system', and would involve 'the refinement of social conflict theory through the use of a research design which [would integrate] data from analytic case studies, social system studies, and manual and machine

[70] It is also worth noting that covert CIA action in Chile was underway from 1963 onwards – specifically in order to discredit Marxist-leaning political leaders – in particular, Allende. For the declassified documents released in 2000, see: 'CIA Activities in Chile — Central Intelligence Agency' (Central Intelligence Agency, 18 September 2000), https://www.cia.gov/library/reports/general-reports-1/chile/.
[71] Reprinted in Horowitz, *The Rise and Fall of Project Camelot: Studies in the Relationship Between Social Sciences and Practical Politics*, 48.
[72] Reprinted in Horowitz, 47.
[73] Reprinted in Horowitz, 51.

simulation'.[74] It was to draw insights from mathematics, economics, political science, sociology, psychology, anthropology and operations research 'in a coordinated study of the problem of internal war potential and the effects of alternate government actions.'[75] Thus, despite stating that 'it will not form value statements concerning the adoption of any particular policy', and asserting that 'it is an objective, fact finding study', the study aimed to concern itself with 'what is and onto what *ought* to be'.[76]

The project itself, however, became a great controversy when the Army and Department of Defense origins of the sponsorship for the program began to be made public – a Norwegian sociologist, Johan Galtung was offered work on the project but had misgivings about the politics built into the structure of the research aims and questions. Galtung argued that the project amounted to 'scientific colonialism'.[77] He informed his Chilean colleagues, who, 'appalled by the project … refused indignantly to participate in it'.[78] Word travelled quickly, and the scandal appeared in the headlines across Chile and US. The project was investigated, and ultimately cancelled. In Galtung's account,

> If Project CAMELOT had been launched as intended it would have led to the end of Latin American social science for, say, ten or twenty years. The suspicions the radical left always has entertained in Latin America as to the true nature of non-Marxist sociology would have been confirmed: a design to perpetuate the capitalist system internally and the imperialist system externally.[79]

Though Project Camelot never came to fruition in the way that it was hoped, several other studies appeared in the years following its demise – all based on the same basic objectives and research patterns, though different in important ways. In 1965, SORO launched the unfortunately titled 'Project Colony', with a focus on Peruvian Army efforts to modernise and integrate Andean communities.[80] The results of the study in Peru were also intended to 'assist the U.S. Army to develop its 'civic action' doctrines for military assistance to the armies of developing nations'.[81]

---

[74] Reprinted in Horowitz, 53; 60.
[75] Horowitz, 62.
[76] Reprinted in Horowitz, 62.
[77] Galtung, 'Scientific Colonialism', 13.
[78] Galtung, 12.
[79] Galtung, 13.
[80] Note that the Peruvean Army were also involved in the project at Vicos in a limited capacity. See also: Price, *Cold War Anthropology*.
[81] Seymour J. Deitchman, *The Best-Laid Schemes: A Tale of Soial Research and Bureacracy* (Cambridge, Mass.: MIT Press, 1976), 185. Deitchman was in fact special assistant for counterinsurgency programs in the Department of Defence under the Johnson administration. He was an architect of much social science research in this time. It is also worth bearing in mind the study at Vicos discussed earlier in this chapter – and the association of the Peruvian Army and military generals sitting on the board of the Indigenous council who were involved in both studies.

In Colombia, Project Simpatico began in 1965 (though was planned much earlier), and aimed to help the Colombian Army 'pacify the ubiquitous banditry and terrorism … by gaining the support of local villagers'. Its research method used 'structured questionnaires and such psychological "instruments" as the thematic apperception test' in order to 'learn the villagers' attitudes toward the government, and the army'.[82]

However, the importance of the theories developed here and across social science at this time lay not in 'whether they work as advertised, it is that the dream can be sold while building cult-like reputations of the salespeople selling them in the closed, non-peer-reviewed settings of the military'.[83] The point is not whether these theories and the projects they structured were a "success", in the narrow sense of the word – the point is that they tell us something about the burgeoning logistical order and how the translation of people, whole cultures and lifeworlds has them rendered and organised as objects in this schema. There is thus violence in this translation into logistical legibility, in the act of translation in itself; in the reduction of complex life into objectified form; and where this becomes a legitimating basis for intervention. Counterinsurgency via these means is then shielded both by a veneer of scientific objectivity and rationality, and as benevolent aid or development projects.

POLITICA

Where Project Camelot had been squashed in Chile, in 1965, ARPA (the Advanced Research Projects Agency) and the U.S. DoD contracted Clarke Abt (advisor on the Camelot study, and owner of Abt Associates) to put together a team to design a simulation to attempt to do what Project Camelot was set out for: to monitor, predict and intervene in revolutionary movements. The game, 'POLITICA', set out

> to reproduce the role of the military and other factions in the politics and economic dynamics of a nation by structuring the roles of major national actors and groups, placing them in conflict or cooperation in a game environment and identifying from the resulting interaction the societal and human variables relevant to the study of incipient insurgency.[84]

Initially, this game was held in the flesh – in a series of rooms in the company, before later being translated into a computer simulation. All iterations of the game set out, '[b]y sequential search

[82] Deitchman, 130–31.
[83] Price, 'Soft Power, Hard Power', 258.
[84] Martin Gordon et al., 'CoCon - Counterconspiracy (POLITICA): The Development of a Simulation of Internal National Conflict under Revolutionary Conflict Conditions. Volume 1': (Fort Belvoir, VA: Defense Technical Information Center, 1 October 1966), iiii, http://www.dtic.mil/docs/citations/AD0644519.

of various patterns of variables under various initial conditions … to highlight those variables decisive for the description, indication, prediction and control of internal revolutionary conflict'.[85] The aim of the game was to forecast the responses of specific actors and groups – in a similar fashion to von Neumann and Morgenstern's game theory. Through expressing hundreds of game variables numerically, it also worked to suggest 'the feasibility of man-machine simulation with computers augmenting human players'.[86] Specifically, the game was focused around military action: it was set out as an interplay between four main groups – the military, and the civil government comprised of 3 parties, all *based on* characteristics of different Latin American countries. Other actors in the game included foreign capitalists, students, peasants, and workers. Set out in four regions – the Capital, the Provincial city, the Agricultural region, and the Industrial region – the game had clauses for the disruption of the railroads (under the control of the workers) and telecommunications (under the control of the government). The game consisted of 35 main actors, who took the roles of vital individuals and groups in a 'non-specific' Latin American nation. They could 'speak to other actors, lie, cheat, steal, bribe, kill, make announcements over the media, … tax, open and close the university, vote, act in coalition with other actors, disrupt communications, bomb, assassinate…' in order to play out and model different scenarios of power struggles.[87] Each actor or set of actors had a profile according to which they must base their actions in the scenarios.

One engineer who worked on the project, Daniel Del Solar, wrote that

> In order that computers could play realistic versions of POLITICA, I created a preliminary list of "social variables and personality characteristics." The list included such traits as cohesiveness, (tendency to remain in association), economic group interest, political economic goals (influenced by other values such as nationalism), social weaknesses (inadequacies in the intra- and inter-group situation), perception of need for standing alone or in coalition, group style or ways of doing things in regard to violence/persuasion, honor/opportunism, unity/individualism, and so forth. The list included more than forty characteristics.[88]

After designing and naming the game in 1965, it was submitted to ARPA. At this point, it was supposed to be a 'pure research tool', and again, non-specific. However, in 1967, when Del Solar returned to Abt, the game had been made classified, and had begun to be used with country-

[85] Gordon et al., 185.
[86] Gordon et al., 2.
[87] Daniel Del Solar, 'The "POLITICA" Game: Playing It for Keeps', *The Berkeley Barb* 18, no. 10 (14 September 1973): 2.
[88] Del Solar, 3.

specific data to run simulations. He goes on, 'In the United States, the portrayal of the situation in Chile is that the upsets there are purely local and [homegrown]. I believe it is otherwise'.[89] Del Solar came forward at the time of the assassination of President Salvador Allende in Chile, writing that

> Having Knowledge of POLITICA, I believe that the United States is at war with Chile. POLITICA, paid for by the D.O.D, in 1965 and 1966, was used by officers at the Pentagon and other training centers. The current events in Chile include assassination of labor leaders and military officers, including those military men who work loosely with the president, the disruption of roads and the destruction of vitally needed trucks and other equipment, sabotage of fuel supplies, and so on.[90]

He continues that 'the news coming from Chile these past two months reads like the game log of one of those early games of POLITICA. These early logs recorded the assassination of leaders in the military and other sectors of society, the disruption of roads and communications … as well as providing money for key national actors and paramilitary troops'.[91] Del Solar believed that it was the playing of POLITICA with country specific data for Chile that predicted that the country would remain stable even after a military take-over and the assassination of Allende. He cites the offer of a $1m bounty from the company I.T.T to the CIA to 'remove' Allende in 1969 – and recently declassified documents from the CIA reveal that the company had financially helped Allende's opponents.[92] He also cited the nationalisation and strategic stockpiling of copper – in the 1970 election, nationalization without compensation was a key issue – as another reason that the U.S. intervened in the coup. With hindsight and the declassification of documents from the CIA, it is clear that the U.S. *did* intervene in Chile and help to orchestrate the overthrow of the socialist Allende government, through a series of interventions that do indeed read like a game of POLITICA.[93]

This is absolutely not to say that the coup, nor intervention in Chile was only made possible by POLITICA, or that something similar would not have happened without it. The point is that simulations like POLITICA, and experiments like Camelot, are emblematic of the confidence in logistical rationality in determining *the most efficient, effective* form of intervention and organisation. It points to a growing expectation that one can determine and hence control the

[89] Del Solar, 8.
[90] Del Solar, 8.
[91] Del Solar, 8.
[92] Del Solar, 3; 'CIA Activities in Chile — Central Intelligence Agency'. ITT owned 70% of the Chilean Telephone Company Allende sought to nationalise and funded a right-wing newspaper 'El Mercurio'. In 1973, the activist group The Weather Underground bombed the ITT offices in New York City in retaliation for the coup d'état.

future if information and uncertainty are treated in the right way. It points to the epistemological certainty of the fidelity of data and reality, and the attempt to organise the world in its image.

The role assumed by these kinds of studies, as well as the digitized forms like POLITICA, depend on the quantifying, systematising and extractive techniques of logistical rationality. Not only this, but there is coloniality and epistemic violence in the process of extraction and the abstraction of complex social life. The extraction of data from other countries, where that data is exported and manufactured into 'knowledge', or more precisely, into *societal cybernetic models*, can be correspondingly articulated as what Galtung terms 'scientific colonialism'; or 'whereby the centre of gravity for the acquisition of knowledge about the nation is located outside the nation itself'.[94] It occurs where a nation can 'claim the right of unlimited access to data from other countries', and where data about the country is exported 'to one's own home country to have it processed there and turned out as 'manufactured goods', as books and articles'[95]. This is congruent with the extraction of raw materials, their export, and their re-importation at a high price as manufactured goods. Social science knowledge about nations in the hands of larger powers can be a 'dangerous weapon', which 'contributes to the asymmetric patterns already existing in the world because it contributes to manipulation in the interests of big powers'.[96]

The experiments here attempted to extract and translate knowledge about populations of interest into data, rendering the human and the sociality caught within the bounds of their closed system as servomechanisms – information feedback loops to be modulated toward a given end. The end here is a particular conception and trajectory of stable or controlled modernisation, which, in replicating the conditions for 'Western' modernity, was supposed to translate directly into pacification. In figuring subjects in this way, as manipulable objects in a system in need of external inoculation against a pathologized conception of dissent, these experiments and the logistical rationality that animates them attempts to erase the agency, political will, and self-determination of the people they sought to influence. To reiterate – these experiments were either directly funded by the US military and intelligence agencies or had significant links to them. They were conducted on foreign populations of geopolitical interest to the US in ways that echo colonial techniques of experimentation in the colonies. The final project outlined here highlights logics of data extraction, modelling and again, the coloniality of translation, representation and replication in the Hamlet Evaluation System during the Vietnam War. This experiment is seen as foundational to modern counterinsurgency and the precursor to the Human Terrain System trialled in Iraq and Afghanistan in the second Gulf War.[97]

[94] Galtung, 'Scientific Colonialism', 13.
[95] Galtung, 13.
[96] Galtung, 14.
[97] A key innovation in this being the systematic use of computers, surveillance and statistical analysis to predict and pacify insurgent activity. See: Kipp et al., 'The Human Terrain System: A CORDS for the 21st

THE HAMLET EVALUATION SYSTEM

The issue of the modelling of populations, the extraction of data and its translation into actionable, predictive, computational knowledge about them for the purposes of counterinsurgency and control is the central focus of this chapter. Thus far we have looked to applied anthropology and social science more broadly as a central avenue through which narratives of modernisation, themselves structured by and structuring what I have termed logistical rationality, were promulgated and served the interests of US hegemony in the early years of the Cold War. I now want to look to these same logics as they were deployed through the Strategic Hamlet Program, or more specifically, in the Hamlet Evaluation System in the Vietnam war. I do this for three reasons: to highlight the operations of the McNamara defence administration and RAND corporation involvement noted in chapter one; to demonstrate the ease with which these logics and technologies traverse between business, academia and the military; and fundamentally, to draw out the epistemic violence that translation and abstraction lend themselves to, and that is a foundation upon which direct, physical violence is enacted.

The Hamlet Evaluation System (HES) was a systematic way of collecting and collating what Oliver Belcher terms the new object of 'digital population data' – information about the inner life of villages and hamlets in Vietnam. They used Military Advisors trained in how and *what to* collect on the Vietnamese villagers. Strikingly similar to the Kennedy experiment at Vicos, the programmers of the HES

> developed a matrix of six categories by which the security and development statuses of the hamlets were qualitatively assessed: VC Military Activities; VC Political and Subversive Activities; Security/Friendly Capabilities; Administrative and Political Activities; Health, Education and Welfare; Economic Development. Within each category, three criteria indicators were assigned, totalling 18 indicators, which the Advisor scored from E (worst) to A (best).[98]

Belcher describes the Advisors operating as data collectors on the ground as 'embodied sensors', making up human-machine assemblages with the HES reporting system. They were deployed specifically to report on the 'subjective' dimensions of war, the qualitative social and political knowledge produced to be translated into 'objective' digital reporting systems. Over time, in the collection (or extraction) of this complex socio-technical data on 11,355 hamlets across Vietnam,

---

Century.'; Gonzalez, *American Counterinsurgency: Human Science and the Human Terrain*; Belcher, 'The Afterlives of Counterinsurgency: Postcolonialism, Military Social Science, and Afghanistan 2006-2012'.

[98] Here VC stands for Viet Cong, the moniker given by US forces for Vietnamese insurgents. Oliver Belcher, 'Sensing, Territory, Population: Computation, Embodied Sensors, and Hamlet Control in the Vietnam War', *Security Dialogue* 50, no. 5 (October 2019): 426.

these datapoints were to accumulate as 'raw material for statistical analysis of hamlet "patterns of life"' – explicitly foreshadowing the technology and strategy of contemporary drone operations.[99] McNamara coveted a higher resolution reporting system, one that could analyse life at the hamlet level, at 'a scale that was now achievable *because of advances in business computing'*[100]*.* McNamara is here referring to the advances in business logistics outlined in the first chapter, and which he developed in part at Ford prior to his ascension to the Department of Defense. This once again highlights the irreducibility of military and business logistics – the two sectors learned from and informed the other in ways that necessarily shaped both the expansion of logistical rationality to the governance of both the operations of global industry and of war.

McNamara worked closely with Walt Rostow, the author of *Stages of Economic Growth*. Together they pushed for a 'population-based' counterinsurgency strategy which aimed at winning the loyalty of the Vietnamese. Rostow was a central advocate of modernisation and development as a form of counterinsurgency throughout his time in a position of governmental influence. While a more complete history of the evolution of counterinsurgency is beyond the scope of this thesis, we can highlight two points: although counterinsurgency has a complex genealogy, perhaps its most significant incubator was in the colonies of European Empire; and that in the mid-20th Century there was a marked shift away from direct violence to this "population-centric" approach. As noted, this coincides with the massive reorganisation of social science in the period of the Cold War, and as we see here, with the emerging capabilities related to the translation of qualitative information into machine-readable data.

Belcher's point, and a central contention throughout this chapter is to denote the necessity and tension of both simplifying and attempting to capture the complexity of life on the ground. The aim of the HES and the other simulations and experiments above was to allow for the complexity of population dynamics and political and cultural variables whilst producing a workable model which would simplify, *while supposedly accounting for,* major motivations and points of intervention. In the HES, Bayesian statistical analysis was used in order to model complex dynamics in *real-time,* overlaid on a map of Vietnam produced by Vietnamese cartographers.[101] Comparing the activities of the 11,355 hamlets across geographical locations meant that the US military could deploy systems analysts to disclose previously unseen dynamics and ultimately make data-based predictions that Belcher argues should be seen as an 'important genealogical precursor of late-modern "big data" analytics'.[102]

[99] Belcher, 418.
[100] Belcher, 417.
[101] For a historical exploration of the historical and contemporary influence of Bayesian Statistics, see: Thomas Hoskyns Leonard, 'A Personal History of Bayesian Statistics: Bayesian History', *Wiley Interdisciplinary Reviews: Computational Statistics* 6, no. 2 (March 2014): 80–115.
[102] In concert with the central problem of this thesis, Belcher here questions the lack of investigation into the development of computer hardware and programming for the purposes of population control in post- and neo-colonial Cold War contexts. Belcher, 'Sensing, Territory, Population', 419.

The central question the analyses of this chapter orbit around lies in the epistemic violence of the translation of rich, complex forms and ways of life into objectifiable, abstract data. Belcher's concern is not so much rooted in the 'narrative subjections of the "Other", but in the pure abstraction of life into a digitally stored data trace'.[103] I argue that first, this form of epistemic violence is a continuation or corollary of the narrative subjection of the 'Other', thinking through Mitchell and the coloniality of representation and replication presented in the previous chapter. The subjection of the 'Other' and the *rendering* of difference goes hand in hand with the desire and perception of the ability to objectively *represent* it. In the world-as-exhibition and now, in the world-as-data that I argue the logistical logics outlined here represent, the rendering of the world as a system of objects and the attempt to organise those objects as a system becomes the means of the production of 'imperial truth'.[104] It is the technique of world-making representation: 'everything collected and arranged to stand for something, to represent progress and history, human industry and empire … always evoking somehow some larger truth' in turn 'rendering history, progress, culture, and empire in "objective" form'[105]

Translating the rich lifeworlds of populations into data is necessarily a process of incorporation and erasure. What cannot be rendered legible is made invisible, erased out of representation which is then necessarily bereft. To represent gives rise to replication – to produce something like "the real" as a fixity, as distinct from but faithfully represented *by* the representation, and it is in this way that modernity continues to position itself as the contemporaneous "real" of the world. The western discourse of representation transforms difference into attributions of certainty with unambiguous, fixed meanings.[106] These in turn reify a colonial view of culture: in the cases outlined above, from Peru to Chile to the hamlets of Vietnam, social, political and cultural life is represented by data for the purposes of continual, corrective intervention. Like the world-as-picture and world-as-exhibition so too the world-as-data requires an observer, a spectator. This is the subject for whom the world exists, for whom difference is staged, and subsequently, the party capable of and tasked with intervention.

Conclusion

In this chapter I have drawn attention to the precursors of contemporary practices of targeted population data extraction and counterinsurgency, to demonstrate the coloniality of the logics that are infrastructural to them. From analogue to digital modes of data collection and treatment, the fundamental, logistical rationality that undergirds them organises the world so as to represent it. The forms of extraction that logistical rationality deploys overlap. This chapter has

[103] Belcher, 420.
[104] Mitchell, *Colonising Egypt*, 1988.
[105] Mitchell, 6, 7.
[106] Mitchell, *Colonising Egypt*, 1988; Said, *Orientalism*.

demonstrated the extractive nature of often state-sponsored forms of anthropological experiments, showing how the methods and techniques of logistical rationality were taken up and used as a counterinsurgency. Through an exposition of the Kennedy experiments, Project Camelot, POLITICA, and the Hamlet Evaluation System, this chapter has shown that the attempt to extract and abstract information about the lifeworlds and culture of target populations is a violent reduction of complexity. This is an epistemic injustice that leads to the attempted erasure of ways of being, knowing, and organising that do not fit into the schema of logistical organisation. This is particularly evident in the above examples of social science and modernisation as counterinsurgency. However, I chose these examples as they are indicative of the becoming-infrastructural of a set of logics, a set of logics that we will continue to trace throughout the rest of this thesis.

In the next chapter, we will how extraction in the expanded sense outlined here helps to prepare the ground for literal, violent, destructive and exploitative processes – either forms of extractive industries and their attendant logistical infrastructure, or in terms of extractive debt. We will see in more detail how development programs and their financing from the post-war period focused on the expansion of extractive industries, and the logistical infrastructure needed to connect these industries to wider networks of production, manufacture, and distribution. The extractive, export-oriented models of development deployed globally in this period were reliant on and justified through theories of modernisation; most emphatically through Walt Rostow's *Stages of Economic Development*, which despite its many criticisms is argued to have heavily informed development discourses, programs and policies for decades after it was written. The result of this was the erection of architectures of extractive debt. Over this and the next chapter then, I theorise extraction in a number of overlapping ways: first, as the extraction of data and its subsequent transformation into workable knowledge about a population, from the outside; second, as logistical extractive industries in the material sense; third, in terms of the resultant debt as an extractive mechanism; and finally, in demonstrating that inherent to these extractive processes are violent colonial histories and forms of power, which re-emerge and recalibrate coloniality in the deployment and application of logistical rationalities.

THREE: EXTRACTION, DEVELOPMENT, AND GLOBAL ARCHITECTURES OF INDEBTEDNESS

Introduction

This chapter concludes the broad and historical argumentative arc advanced through chapter one and chapter two: that the "revolution in logistics" should be understood as a counterrevolution to anti-imperialist struggles and imposed forms of modernisation. These three chapters together show the ways in which logistical rationality was instantiated in the military, economics, applied social sciences, foreign policy and development, and establish how the latter three worked either explicitly or implicitly as counterinsurgency. In elevating and entrenching logistical rationality as a normative form of reason – as the only logical, rational, scientific, *proper* and efficient way of knowing and organising the world – possibilities of knowing or organising otherwise were occluded, denied and erased, or reconstructed in extractive terms. The previous chapter established the way in which logistical rationality came to influence Cold War applied anthropology, and the resultant perception of (Other) social systems as cybernetic and hence *optimizable* from the outside, in line with particular political and economic goals. In this view, populations could be intervened upon with the right inputs, to be scientifically ascertained through the extraction and translation of sociality into data and variables for optimal intervention. The present chapter will show how these same logistical logics of extraction, translation, prediction, and standardisation come to bear on the field of development and hence in the global economy during the same period.

The present chapter sets out to delineate distinct but interrelated moments, conditions or episodes in the rise of logistical rationality to the level of global governance. Section one seeks to demonstrate that these logistical logics, deployed by the Global North in terms of foreign policy and relationships of credit and debt, have contributed to the maintenance of economically and politically dominating relationships with the Global South, through the epistemic and material infrastructures of logistics in the discipline and programmes of "development" and in global financing. It thus shows the *becoming-infrastructural* of logistical rationality as a specific normative form of reason that shaped the emergent world order in the years after the Second World War – specifically, the years of the Cold War, and the period of the dissolution of European empires. In section one I outline the Marshall Plan and the influence of development discourses with its focus on extractive industries, logistical infrastructures and export-focused prescriptions on "developing" economies.

In section two I show how the material and epistemic infrastructure of logistics, both via programmes of development *as well as* via their concretization in the *economic infrastructure* of

the emergent world order, established and maintained global architectures of indebtedness. I briefly trace a history of the rise of credit ratings and their imbrication with logistical logics, and how they became secured as a mechanism of domination. Recalling the way in which logistical logics of measurement, prediction and the control and valorisation of uncertainty rose to ascendancy in economic theory and policy rendered in chapter one, this section will critique credit ratings as emblematic of the *becoming-infrastructural* of logistical rationality in the material and disciplinary architecture of the global financial system.

The chapter concludes with an unpacking of what I demonstrate to be a clear instantiation of the coloniality inherent to logistical rationality: a powerful assemblage that works to entrench these logics through the maintenance of extractive architectures of debt – Export Credit Agencies (ECAs), the Paris Club, and the IMF. What must be made clear is the violence inherent in these processes – the valorisation of uncertainty and risk in terms of credit given or denied, or in the movement, sale or restructuring of debt, is itself a form of structural violence that has disproportionate material effects on possibilities of life. The standardisation and naturalisation of this way of governing the world economy as scientifically ascertained – as the only rational way of organising the world – necessarily occludes, denies and erases other possibilities. We can read this moment as a continuation of colonial power by other, logistical means – and particularly for this chapter, through a complex of economic technologies that serve to obscure and reinscribe the underlying coloniality in these structures.

Through tracing developmental loans and bonds for infrastructural projects and their attendant metrics and ratings, the final section of this chapter demonstrates that these enduring colonial relationships are underpinned by recursive technologies of extractive debt and finance. It will show how credit ratings, both corporate and sovereign, continue to act as a powerful assemblage in the maintenance of relationships of domination. This too can be understood as a process of translation – moving from logics of logistical rationality, to their embodiment in financial technologies, to (re)colonisation through the replication of economic policies and in the guise of development and participation in modern capitalism. As an example of processes of translation, representation and replication, credit ratings render this mode of organising global finance as fact. As such, this assemblage reproduces and perpetuates both the material and symbolic order of coloniality, through the at once paternal, moral and yet outwardly 'objective' programme of nation-state-level metrics and ratings. Where in chapter two I demonstrated how extractive logics harvested data and produced knowledge about individual lives and bodies as part of the logistical recalibration of coloniality, this chapter shows these processes as they operate at the macro level.

Section One: The Marshall Plan and Economic Development

THE MARSHALL PLAN

The Economic Recovery Program (ERP), better known as the Marshall Plan, was an aid programme that dispensed around $13 billion dollars between 1948 and 1952 to Western European countries to reconstruct after the war. It was developed and initiated at around the same time as the CIA text outlined in the previous chapter was written. Three threads relevant to this and to our purposes in this chapter are worth highlighting, in order to frame what follows. Firstly, that the Marshall Plan and development aid were in part a response to colonial tensions at the time, recognising that the downfall of European empires, and therefore the potential loss of colonial revenue were matters of national interest to the US. Secondly, that the US sought to foster an economic multilateralism and global trade relations favourable to itself and to its allies. Finally, that aid, and concomitantly, debt, were established as a means by which to secure this aim. The CIA document insists on the geopolitical necessity of establishing the social, cultural and political reasons for the changing times, and for maintaining the upper hand in these processes. The focus on 'growing economic nationalism' in that document highlighted in the "underdeveloped" countries and further, in the rationale for the drive toward European integration at this time, highlights this US desire for multilateralism – that is, for open international markets within which to expand its own, capitalist-logistical economy, and temper the threat of the opposing communist world ideology. Reconstruction and development loans were not only intended to incubate this desire, but to double up as or economic coercion or counterinsurgency:

> The economic nationalism of the underdeveloped nations conflicts sharply with US trade objectives and these countries tend to resent US economic dominance. On the other hand, they urgently need assistance in their economic development, and the US is at present the only nation able to supply it. The desire for US loans and private investment will have some effect in tempering the antagonism of these states toward US policies.[1]

The construction of a new international order thus consisted of the careful positioning of the US as the only nation capable of dispensing large amounts of reconstruction funds, as well as on the

[1] CIA, 'The Break-Up of Colonial Empires and Its Implications for US Security', 8.

conditions attached to their repayment – it was not simply the desirability of the loans that would cement these relationships, but also the debt that would accrue as a result.[2]

The Economic Cooperation Administration (ECA), a US government agency, was set up between 1947-8 to help administer the Plan. The central aims behind it, according to Alex Callinicos, were to foster European integration, and, via the ECA, to 'create a continental market and to limit national antagonisms among the different European states, and of seeking to export American style corporate liberalism'.[3] This plan was outlined at the Bretton Woods Conference, alongside the vision for the new international institutions that leaders in the US succeeded in establishing: the United Nations, the World Bank, the International Monetary Fund, the International Trade Organisation, and NATO, amongst others.[4] The planning done here, in turn, would have profound implications for the Global South. It established the structure of aid programmes and the foundations for the emergent and enduring post-war global economic order:

> … the Economic Recovery Program was not simply about Europe or recovery; it was much more ambitious than that. In reality, the Marshall Plan's uniqueness was that it addressed the breakdown of the prewar economic order with a vision — backed up by a wide range of programs around the world — of a reconstructed set of economic relations binding Europe, North America, and the Third World. The boldness — and real success — of the Marshall Plan lay in its contribution to the construction of a new international order, not in the quantity of capital and raw materials it provided to Western European industries.[5]

[2] Concurrent to the Economic Recovery Program, the Soviet Union's rival 'Molotov Plan' of 1947 dispensed post-war aid to the Soviet Bloc of Eastern Europe, attempting to extend Soviet influence in a way similar to the relationships secured for the United States the following year under the Marshall Plan. The Soviet Union too was involved in development as counterinsurgency, and many argue its own imperial project, regarding the assurance of loyalties and the propagation of the idea that communism could provide more adequate and fairer development for 'underdeveloped' nations. This was tied heavily to anti-colonial sentiments at the time, and developing countries came to be, for all intents and purposes, a battleground upon which capitalism and communism could spar and demonstrate their efficacies. The struggle between these great ideologies in this particular juncture would warrant its own thesis if discussed in a level of detail proper to its complexities, and as such can regrettably only act as a backdrop to this discussion. Geoffrey Roberts, 'Moscow and the Marshall Plan: Politics, Ideology and the Onset of the Cold War, 1947', *Europe-Asia Studies* 46, no. 8 (January 1994): 1371–86.

[3] Alex Callinicos, *Imperialism and Global Political Economy* (Cambridge: Polity Press, 2009), 171.

[4] The Bretton Woods system was the first example of a negotiated monetary management system amongst independent states. The system regulated external exchange rates through tying international currencies to gold and the U.S. dollar. In setting this system up, the Bretton Woods Conference and the accords created therein established the IMF and the IRBD in order to regulate the new international monetary system. See Naomi Lamoreaux and Ian Shapiro, eds., *The Bretton Woods Agreements: Together with Scholarly Commentaries and Essential Historical Documents* (Yale: Yale University Press, 2019).

[5] Robert E. Wood, *From Marshall Plan to Debt Crisis: Foreign Aid and Development Choices in World Economy* (Berkeley: University of California Press, 1986), 30–31.

This is not to say, however, that raw materials were not a determining factor in these relations. The Marshall Plan came in the early days of processes of decolonisation, and Western European countries were not only in great debt following the war and subsequent reconstruction; but many colonies, which were perceived as important sources of colonial income and cheap materials were now in, or threatening with, open rebellion. As a result, the Economic Recovery Program contained built-in mechanisms for the extraction and stockpiling of raw materials – for example, the US could use 5% of the counterpart funds its aid generated to purchase 'strategic materials' from colonial caches.[6] In 1951, during a series of congressional hearings on the future of the foreign aid programme (following the onset of the Korean War and the resultant sharp increase in prices for raw materials), Nelson Rockerfeller attested that 73% of US strategic materials came from 'underdeveloped areas'.[7] Up until the colonies gained independence, the sale of the raw materials they produced went through the metropole and, in many cases, the profits generated went directly into the Marshall Plan and other reconstruction loan repayments. The continuity of access to cheap raw materials, then, was a key consideration in the planning and execution of reconstruction plans in this period.

As Zaheer Baber argues, the planning and execution of the Marshall Plan imbued economists and social scientists with confidence that it was indeed possible to re-develop battered economies with the help of loans, investment policies and rational economic planning.[8] Baber makes the case that key economists and social scientists came to believe in (and convince the US administration of) their ability to produce 'instrumental knowledge' that they could use to 'direct the process of economic development and social change in accordance with its own strategic, ideological and economic interests'.[9] This confidence, and the desperation to debunk communism's charge that capitalism was incapable of raising living standards across the world, helped to engender the environment in which US President Truman proposed a global aid regime. This was the Point IV program of technical assistance, in which the US would 'embark on a bold new program for making the benefits of our scientific advances and industrial progress available for the improvement and growth of underdeveloped areas'.[10] The program identified anthropologists and economists as important agents in its development, and crucially, made it abundantly clear that aid would not be delivered where private capital could be offered. As Robert Wood argues, a key purpose of the technical assistance it offered was to pave the way for private capital; 'it provided an official platform for American spokesmen to emphasize the crucial function of private investment. (In fact, congress added "the improvement of investment climates" as a second basic objective of the program)'.[11] In conjunction with the Marshall plan, the import of

[6] Wood, 42.
[7] Wood, 43.
[8] Baber, 'Modernization Theory and the Cold War'.
[9] Baber, 74.
[10] Harry S. Truman, 'Harry S. Truman: Inaugural Address. Thursday, January 20, 1949', Bartleby.com, accessed 22 January 2020, https://www.bartleby.com/124/pres53.html.
[11] Wood, *From Marshall Plan to Debt Crisis: Foreign Aid and Development Choices in World Economy*, 47.

this lies in the revision of extant European colonial-capitalist policies to include the US as a significant benefactor:

> The role that the ECA envisioned for the underdeveloped areas – particularly the overseas territories – reinforced and provided new sanctions for the type of export-oriented development that had always been the basis of European colonial policy. The difference was that the overseas territories were to be opened more to U.S. investment and their exports directed more toward the United States and other 'hard currency' areas.[12]

What the above examples of the Marshall Plan and the previous chapter's exposition of the CIA response to the break-up of colonial empires demonstrate is the geo-political ground of the development discourse. This discourse was wholly situated in Cold War tensions and at the same time emerged out of a desire to maintain US hegemony, and a renewed need to secure access to cheap raw materials and military bases in the wake of the breakdown of European Empire.[13] The Marshall Plan signals the dawn of a new era of the use of economic and technical aid as a form of population-centric counterinsurgency, and the drawing of a blueprint on Europe that would go on to structure and justify aid and development interventions across the world. The CIA document shows an early attempt to consolidate knowledge about the social, cultural and political climate of former colonies.[14] As we have seen, the following period of 'Cold War social science' signalled a shift in the newfound necessity of creating future-oriented social, political and economic knowledge as a form of counterinsurgency. This has been read as an attempt at social engineering, directing economic and political developments in the post-WWII period. [15] Both examples here frame the central argument of this chapter – that these disciplines discursively and technically obscured, legitimated, informed and put into practice refigured colonial practices of extraction and logistical organisation.

[12] Wood, 52.

[13] Again, though the Cold War rested on rival visions of global economic systems, both relied on a version of modernity that negated its constitutive, colonial underside. Both espoused development, industrialisation & modernisation, along an evolutionary continuum that has its root in colonial temporalities.

[14] CIA, 'The Break-Up of Colonial Empires and Its Implications for US Security'.

[15] See: Mark Solovey and Hamilton Cravens, eds., *Cold War Social Science: Knowledge Production, Liberal Democracy, and Human.* (New York: Palgrave Macmillan, 2012); Price, *Cold War Anthropology*; Baber, 'Modernization Theory and the Cold War'; Barnes and Farish, 'Between Regions'; Eric B. Ross, 'Cold Warriors without Weapons', *Identities* 4, no. 3–4 (June 1998): 475–506.

DEVELOPMENT

This subsection discusses the *becoming-infrastructural* of logistical rationality in the decades of "development" after WWII and on into the Cold War. As we saw in the previous chapter, development and modernisation programmes were figured by many as a "weapon" - as counterinsurgency. I argue that logistical rationality here too works as a normative form of reason, advancing the ideals and epistemic violences of Western modernity, and its underside, coloniality, in development discourses and the kinds of intervention they made possible. Here I underscore development as a form through which logistical rationalities came to shape and organise the world through foreign policy and intervention. This section will highlight the first example of a coherent development programme figured on Colombia. The case presented here provides access to the complex interplay between extraction, logistics, development and anthropology, and forms of domination that rely most forcefully on extractive industries and corporate power.

Again, it was in part off the back of the successes of the Marshall Plan and of operations research that the idea that the *external,* "scientific" restructuring of economies and societies was achievable and desirable became established (although this was part and parcel of colonial administration proper). It came to be a powerful tool of domestic and international propaganda that given the right information, and with the right guidance and tools, the end goal of economically advanced, industrialised, western-style post-colonial nations that would fit seamlessly into multilateral capitalism and the global trade network might be achieved. The reality, however, was to be very different from these claims. The focus of modernisation theory and the development programmes that emanated out of institutions like MITCIS and the World Bank were to create an architecture of extractive debt that would recalibrate but retain global relations of inequality and domination after the end of formal imperialism.

Arturo Escobar's foundational work on the relationship between anthropology and development is premised on a definition of development

> as it was understood in the early post World War II period: the process to pave the way for the replication in most of Asia, Africa and Latin America of the conditions that were supposed to characterize the more economically advanced nations of the world – industrialization, high degrees of urbanization and education, technification of

> agriculture, and widespread adoption of the values and principles of modernity, including particular forms of order, rationality and individual orientation.[16]

Escobar explicitly frames the development discourse arising out of the 1940s and 1950s as a 'colonialist move' – the production of discourse under conditions of unequal power – citing Chandra Mohanty and Homi K. Bhabha in situating it within the Western epistemological framework. For them, this is a regime of truth in which 'an objectivist and empiricist stand … dictates that the Third World and its peoples exist 'out there,' to be known through theories and intervened upon from the outside'.[17] The duality of anthropology and development studies, then, is about the simultaneous recognition and negation of difference – 'Third World' subjects are understood as Other, while this Otherness is sought to be obliterated precisely through the mechanism of modernisation and development. In other words, perhaps, through a translative process of incorporation and erasure into the realm of what is circumscribed and, clearly policed as, modernity. This peculiarly circumscribed understanding 'defines the hegemonic worldview of development, a worldview that increasingly permeates and transforms the economic, social, and cultural fabric of Third World cities and villages, even if the languages of development are always adapted and reworked significantly at the local level'.[18] Following Escobar, development can thus be understood as a set of discourses, practices, institutions and apparatuses of knowledge production that rearticulated colonial power and discourse as a neutral, rational scientific programme of progress. As I will go on to show, this conception of progress was irrevocably tied to the production of extractive, logistical infrastructure, and how heavy investment in said infrastructure led to the creation of a global architecture of extractive debt.

That hegemonic conception of development rose to frame the level of both federal and public discourse with the establishment of the World Bank (formerly known as the International Bank of Reconstruction and Development, or the IRBD) in 1948 at Bretton Woods; where new discourses about global poverty were created. Indeed, the World Bank brought in new statistical measures and defined those countries that annually earned below $100 per capita as 'poor'. This by default reinscribed almost two-thirds of the world's population as 'poor subjects', naturalising the notion that an essential trait of the Third World was poverty, and simultaneously prescribing the remedy – 'if the problem was one of insufficient income', Escobar notes, 'the solution was clearly economic growth'.[19] This simultaneous move of, on the one hand, the assignment of the label 'poor' to most non-western countries, and on the other, making imperative the use of

[16] Arturo Escobar, 'Anthropology and Development', *International Social Science Journal* 49, no. 154 (1997): 497.
[17] Chandra T. Mohanty, 'Under Western Eyes: Feminist Scholarship and Colonial Discourses', *Feminist Review* 30 (1988): 61–88; Homi K. Bhabha, *The Location of Culture*, Routledge Classics (London ; New York: Routledge, 2004); Escobar, *Encountering Development*, 8.
[18] Escobar, *Encountering Development*, 18.
[19] Escobar, 24.

economic policies to 'rectify' this condition sets the conditions of possibility for intervention. The IRBD set about conducting economic and anthropological research and development "missions" across these regions, creating wide-ranging reports on the workings of their economies and social systems in order to make policy prescriptions and recommendations for economic growth.[20] In conceptualising progress in terms of a linear development directed almost exclusively toward industrialisation and economic growth as per modernisation theory, 'this development strategy became a powerful instrument for normalizing the world,' and further, replicating the conditions of logistical, colonial modernity. [21]

IRBD MISSION TO COLOMBIA

In 1949, the IBRD began an economic mission to Colombia for the purpose of generating a comprehensive plan of development loans and construction.[22] Known as the Currie Mission, this was an initial attempt at constructing an entire economy around these early development theories – a trial mission that employed techniques of systems analysis, Keynesian economic theory and methods of quantification and prediction in order to map out a model form of developing economies. It employed what it argued was a necessarily intensive analysis of the relationships between the various and complex sectors of the Colombian economy in order to make it conform to pre-existing notions of what an economy should do. In this, 'not only poverty, but health, education, hygiene, employment, and the poor quality of life in towns and cities were constructed as social problems, requiring extensive knowledge about the population and appropriate modes of social planning'.[23] The Currie Mission report made political and social assessments and, subsequently, policy recommendations in its development plan for Colombia; whilst at the same time claiming to maintain scientific objectivity. The report ended with the assertion that

> One cannot escape the conclusion that reliance on natural forces has not produced the most happy results. Equally inescapable is the conclusion that with knowledge of the underlying facts and economic processes, good planning in setting up objectives and allocating resources, and determination in carrying out a program for improvements and

[20] It is worth pointing out the long history of 'missions' as a form of colonial and imperial expansion. Religious missions were an extremely widespread form of cultural imperialism that are now widely recognised as an integral part of the imperialist machinery. See, for example: Achille Mbembe, *A Critique of Black Reason*, trans. Laurent Dubois (Durham: Duke University Press, 2017); Mignolo, *The Darker Side of Western Modernity: Global Futures, Decolonial Options*; Wynter, '1492: A New World'.
[21] Escobar, *Encountering Development*, 26.
[22] IBRD Mission to Colombia, *The Basis of a Development Program for Colombia. Report of a Mission Headed by Lauchlin Currie and Sponsored by the International Bank for Reconstruction and Development in Collaboration with the Government of Colombia*, Second Printing (Baltimore: Johns Hopkins University Press, 1950).
[23] Escobar, *Encountering Development*, 23.

> reforms, a great deal can be done to improve the economic environment by shaping economic policies to meet scientifically ascertained social requirements … In making such an effort, Colombia would not only accomplish its own salvation but would at the same time furnish an inspiring example to all other undeveloped parts of the world.[24]

The colonial discourse embedded within this conclusion to the report on the development programme is particularly stark. It purports that in order to break free from the darkness and futility of relying on 'natural forces', Colombia need only emulate the neutral and universal tools and methods of 'Western' rationalism, planning, and industrialism to find its 'salvation' in modernisation.[25] Here too logistical forms are advanced as the rationale for development. The confident espousal of the 'scientific ascertainment' of the optimum manner of organising society represents Escobar's 'colonialist move' – the positioning of scientific-logistical rationality as the common sense, second-nature, value-free, even benevolent mode of discerning and meeting the 'underdeveloped' peoples' needs. Here needs are determined by methods of quantitative and systemic analysis conducted from the outside. Despite being constructed as a neutral exercise of best-practice and benchmarked against industrial models of the Global North, the plan for Colombia is situated in an epistemological framework that sees economic growth and logistical connectivity as the most vital aspect of development. The plan positioned the construction of expensive transport, heavy industry and extractive infrastructures as the most urgent and requiring of loans from the IRBD and foreign private investments.

The report called for a comprehensive and 'internally consistent program' that aimed to modernise the country rapidly through, primarily, the construction and maintenance of more efficient transport networks to connect sites of production for export.[26] As Hartwig notes, the conservative and military regimes in power in Colombia in the 1950's adopted the more general 'World Bank position that the absence of adequate transport infrastructure was the key obstacle to economic progress'. [27] Initially, in 1950, the plan was for the World Bank to finance a comprehensive development plan for Colombia – to the tune of $200m over a five-year period – until in 1951 Robert Garner, the vice-president of the Bank, changed his mind. According to the main researcher on the report, Lauchlin Currie, upon realising the implications of the plan he exclaimed, 'Damn it Lauch. We can't go messing around with education and health. We're a

[24] Mission to Colombia, *The Basis of a Development Program for Colombia. Report of a Mission Headed by Lauchlin Currie and Sponsored by the International Bank for Reconstruction and Development in Collaboration with the Government of Colombia*, 615.
[25] Again, the use of theological language in finding 'salvation' in modernisation highlights some underlying relation to civilising missions and the entangled history of Christianity as a tool of imperialism.
[26] Mission to Colombia, p. xv.
[27] Richard E. Hartwig, *Roads to Reason: Transportation Administration and Rationality in Colombia.* (Pittsburgh: University of Pittsburgh Press, 1983), 61.

bank!''.[28] The subsequent abandonment of the comprehensive programme and shift in lending policies in favour of 'project loans for roads, railroads, electric power plants' was decisive in shaping the remit of the World Bank in the decades to come.[29]

What this means, then, is that from this point on the IRBD and other development aid agencies began to fund mainly logistical infrastructure and heavy extractive industries. This in turn helped erect architectures of debt as extraction, pushing export-led economies as the most rational path to development, benefiting the Global North that bought exports at reduced prices. This is not to say that transport and logistical infrastructural projects didn't do any good for the people. However, that they were focused on the modernisation programmes legitimated by Rostow, Millikan and the like – in which social development comes last, after the economy has 'taken off' and after the terms of trade had been set by the wealthier nations wielding the majority of power in supranational organisations.

A general requirement for development, Rostow argued, was in the application of high- and quick-yielding techniques to increase the productivity of 'natural productive resources', and that 'capital imports can help, of course, but in the end, loans must be serviced; and the servicing of loans requires enlarged exports'.[30]

> And, above all, the concept must be spread that man need not regard his physical environment as virtually a factor given by nature and providence, but as an ordered world which, if rationally understood, can be manipulated in ways which yield productive change and, in one dimension at least, progress. All this and more is involved in the passage of a traditional to a modern growing society.[31]

The emphasis on extractive enterprise and its inherent orientation toward future wealth to be produced was to attract international finance – and in fact, as Jeanette Graulau states, 'presupposes opening the mining sector to foreign capital. Only in this way could traditional societies transform their natural productive resources into their comparative advantage'.[32] The infrastructural development in the period after the Second World War required vast amounts of capital. This capital would be loaned by the World Bank, other development banks, Export Credit Agencies or other private enterprise – usually meaning multinational corporations (MNCs) that

[28] Hartwig, 120.
[29] Hartwig, 120.
[30] Rostow, *The Stages of Economic Growth: A Non-Communist Manifesto*, 22.
[31] Rostow, 19.
[32] Jeannette Graulau, '"Is Mining Good for Development?": The Intellectual History of an Unsettled Question', *Progress in Development Studies* 8, no. 2 (April 2008): 139.

would provide the initial capital and/or the technology and machinery for the heavy industries.[33] This necessarily kept 'peripheral', raw material producing at the level of production, where the MNCs kept the *means* or rather the *technologies* of production, while the 'developing' nations would need to continually intensify extractive operations in order to service the debts generated.[34] As we've seen, the injections of capital from private enterprise most generally went to constructing the infrastructure of and surrounding extractive industries – roads, railroads, ports and energy facilities were constructed to facilitate the removal of raw materials for export, rarely stimulating other sectors of the economy or welfare, which was/is widely argued to be the prerequisite for helping to create a stable and self-sustaining economy at large.[35] Again, these were the economic recommendations made by the Currie Mission in Colombia and advanced by Rostow, Millikan and their colleagues in organisations like the MITCIS (and its network of covert funding).

The exposition of the extractive operations of global aid and finance over the remainder of this chapter require a careful excavation of the coloniality of power that forms their foundations. This chapter recognises debt as an extractive mechanism alongside physical extractivism, as a form of global control that recalibrates and re-entrenches enduring inequalities precisely because of the ongoing construction of the project of Western modernity or, as Timothy Mitchell would have it, its staging as *the modern*. It is not enough to analyse the material relations of power, or the actions of states or the transnational capitalist classes: we must recognise the constitutive underside of modernity – and its project of universalising itself – as coloniality, and further, as advancing through logistical projects that promised its global actualization.

DEBT AS EXTRACTION

The credit extended to industrialising nations from industrialised, capitalist regions and development banks should then be articulated as a form of extraction. The debt accrued and the rising costs of interest payments on said debt should be seen as a mechanism through which value, and profit, is generated and extracted. As noted, the capital required to kickstart these

[33] See, to name a few: Wood, *From Marshall Plan to Debt Crisis: Foreign Aid and Development Choices in World Economy*; Mark T. Berger, 'From Nation-Building to State-Building: The Geopolitics of Development, the Nation-State System and the Changing Global Order', *Third World Quarterly* 27, no. 1, (2006): 5–25; Bradshaw and Huang, 'Intensifying Global Dependency: Foreign Debt, Structural Adjustment, and Third World Underdevelopment'; Elisa Grandi, 'International Financial Credit and Economic Development in Colombia', n.d., 21.

[34] Wallerstein was one of the first to conceptualise global political economy in terms of 'centre' and 'peripheral' states and the unequal relations between raw material producing, and more industrialised manufacturing states. See: Immanuel Wallerstein, *The Modern World-System* (New York: Academic Press, 1989).

[35] See, for example: James Petras, 'Brazil: Extractive Capitalism and the Great Leap Backward', *World Review of Political Economy* 4, no. 4 (2013): 469; Stephen G. Bunker, 'Modes of Extraction, Unequal Exchange, and the Progressive Underdevelopment of an Extreme Periphery: The Brazilian Amazon, 1600-1980', *American Journal of Sociology* 89, no. 5 (1984): 1017–64.

heavy industries meant industrialising nations needed to take on significant debt, which required the intensification of extractive operations in order to service the debts and the interest payments they accrued. The extractive industries then rely heavily as well on the control of uncertainty, or more accurately, the valorisation of risk, in the sense that interest payments on debts are directly influenced by the perceived 'riskiness' of the lending. The remainder of this chapter deals with the delineation of this riskiness in closer detail, but suffice to say for now, there is a clear relationship between the extractive industries proper and the extractive propensities of the operations of capital that fund them in the Global South.

Extractive industries are, by definition, speculative – in the past, such speculation may have related primarily to the amount of resource discovered that could be extracted, which was especially prevalent in practices of colonial prospecting.[36] With financialisation, speculation finds its value creation in stock markets and derivatives amongst other rapidly proliferating financial technologies.[37] These are, put simply, gambles on future wealth to be produced – as forms of insurance against loss of investment, derivatives shape the future they propose to gamble on. Ultimately, uncertainty in these industries is valorisable in the sense that the risks involved in investing in them themselves make money – under the regime of financialisation, risk produces insurance products, which are themselves a form of wealth extraction. In this way value is created from the very notion of risk and the potential of its mitigation.

Mezzadra and Neilson articulate extractive financial operations in contemporary capital as reliant on a *command of the future* and *wealth to be produced*. This is not limited to contemporary processes of financialisation but intersects with logistical operations.[38] To be sure, there is a specificity to contemporary, financialised relations of capital and their operations – however, this prospecting logic draws a line from colonial extractivist operations through development and its associated politics of debt, to date. The future-oriented economics that arises in tandem with logistical rationality (outlined in chapter one) links closely together with the extractive nature of debt, not only in terms of speculation on profits to be made from extractive industries, but in terms of the colonisation of the future.[39] This entails thinking about debt as a means of securing future profits and also as a means of controlling the present – a nation in debt must service said debt, and must work within its constraints before it can move past them. On the one hand, indebted nations in the Global South under this regime of development are oriented toward the future – through modernisation programmes, through the building of logistical infrastructure

[36] See, for example: Edmund Teale, 'THE CONTRIBUTION OF COLONIAL GEOLOGICAL SURVEY TO THE DEVELOPMENT OF THE MINERAL AND OTHER RESOURCES OF EAST AND WEST AFRICA', *Royal Society for the Encouragement of Arts, Manufactures and Commerce* 93, no. 4689 (1945): 245–56.
[37] Cedric Durand, *Fictitious Capital: How Finance Is Appropriating Our Future*, trans. David Broder (London: Verso, 2017); Brett Scott, *The Heretic's Guide to Global Finance: Hacking the Future of Money* (Pluto Press, 2015).
[38] Mezzadra and Neilson, 'On the Multiple Frontiers of Extraction'.
[39] Lysandrou, 'The Colonization of the Future'.

outlined above with the goal of reaching or *catching up with* the contemporaneous 'Modern' West. On the other, they are forced to remain in the past – servicing debts accrued and relinquishing sovereign control over their own territories in what many have called neo-colonial economic takeovers conducted through economic restructuring programmes such as those enforced by the IMF, as we will see in the remainder of this chapter. [40]

Development, then, acted as an avenue through which logistical modes of organisation attempted to map, model and reconstruct the Third World in the image of the 'core', or industrialised nations, both in terms of material industrialisation and in reworking colonial discourses of modernisation. It was a mechanism by which colonial discourses could be redeployed as a constructive, difficult to contest, liberal force for good through the construction of a globalised supply chain economy. There is a tension here between the attempt to modernise in the image of the West, and the actual perpetuation of relations of domination and the entrenchment of inequality. This ensured that a new global economic order was developed and became entrenched in the years following the Second World War. The order that emerged was one that, predicated on logistical epistemology and attendant technological discourses, ensured that the "developed" nations, former colonising states, or industrialised nations retained cheap access to raw materials and not only preferable trade terms, but the ability to determine them. This shaped an extractive system of debt under which "developing" countries would have to keep intensifying extractive operations to service the debts that funded the initial infrastructural ventures. Development at this juncture thus helped to elevate extractive-logistical-developmental policies and plans to the level of global foreign aid policy and finance. Development programmes and the subsequent effort to valorise the risk posed by those programmes fundamentally relies on the translation of complex worlds into logistical legibility. The next section aims to show how logistical techniques of measurement, metrics and prediction came to hold dominion over the structure of financing development aid, and hence of extractive debt in the Global South.

Section Two: Credit Ratings, Riskiness and Metrics

This section writes a 'history of the present' of Credit Rating Agencies (CRAs) that highlights central elements of logistical rationality as they emerge in the global finance sector. In thinking through the logics of measurement, calculation, prediction, and thus the *control* and resultant *valorisation* of uncertainty it unpicks how these aspects of logistical rationality came to reconstitute and mutate colonial relationships and modalities of power in the emergent global economy. I show how alongside the discussion above, the Credit Ratings Agencies reconstitute

[40] Asad Ismi and Halifax Initiative Coalition, *Impoverishing a Continent: The World Bank and the IMF in Africa* (Halifax, NS? Halifax Initiative Coalition, 2004); Nicola Bullard, Walden Bello, and Kamal Mallhotra, 'Taming the Tigers: The IMF and the Asian Crisis', *Third World Quarterly* 19, no. 3 (1998): 505–55; Bradshaw and Huang, 'Intensifying Global Dependency: Foreign Debt, Structural Adjustment, and Third World Underdevelopment'.

colonial relationships of economic power, (re)colonising through the use of metrics and the resultant creation and maintenance of global hierarchies and architectures of debt.

The economic and financial methodologies developed in the Cowles Commission constitute a significant part of the lineage of the methodologies that today contribute to the metrics used by powerful Credit Ratings Agencies (or CRAs). These methodologies are used to gauge the credit risk, and importantly, the *creditworthiness* of both corporate and sovereign entities. While the specific technical methodologies that the CRAs use to rate this creditworthiness are shrouded in proprietary secrecy and thus cannot be known, I show that these practices are a corollary of the project at RAND and the Cowles Commission. With their overarching aims of economic forecasting, cost-benefit analysis, and the control (read: valorisation) of uncertainty and risk, I show that these too are the guiding principles or foundations of the CRAs that today hold a such a great deal of power.

The CRAs use metrics and benchmarking to rate sovereign entities in an extremely opaque fashion, using both 'scientific' or mathematical metrics and formulae based on financial data, but, also, and equally, by forming opinions and judgements on the *willingness* of a sovereign government to service its debts. In doing so, they construct and maintain a hierarchical ranking system that determines the premiums and interest rates on loans and debt restructuring, and the value of bonds for the market. In doing so, they erase longer histories of the suppression of development or reasons for "underdevelopment". In short, these ratings determine who gets to participate, and how easily, in modern logistical capitalism – and the rules and policies which they must adhere to or implement.

A BRIEF HISTORY OF CREDIT RATINGS

This subsection will show how credit ratings expanded their remit to the level of sovereign ratings and now act as both regulatory and disciplinary mechanisms in global sovereign debt and default. The use of sovereign ratings established itself in the 1970s at the time of the end of processes of decolonisation and off the back of a huge lending spree and debt crisis across Latin America and the Global South.[41] The generally accepted purpose of CRAs is to collate information on the financial performance of corporations, state and local governments, sovereign governments and, most recently, mortgage securitisers – in order to determine the "credit quality" of the bonds that they issue, or in other words, to gauge the probability of default.[42] The

[41] This is important to contextualise – it was off the back of OPEC forming and realising that the commodity they had to sell was worth more than they were getting for it – and so hiked oil prices up. The OPEC oil crisis is vital for understanding extractive debt relationships and the crisis of the 70s, and the structural adjustment programs thereafter. See for some context: Tom Cutler, 'Recycling Petrodollars to the Third World: A Critique of the IMF Oil Facility', *World Affairs* 139, no. 189–205 (1977): 18.

[42] Bonds are essentially certificates of debt – a debt investment whereby an investor loans money to the issuer at a fixed or variable interest rate, that matures at a fixed date. These bonds can be traded, as can

first publicly available bond ratings were published by John Moody in 1909, and took the shape of manuals that were specifically focused on railroads.[43] Levich et al. write in their history of credit ratings that it was the rapid expansion of the private railroads and companies in this period that necessitated the development of a huge market – both national and international – in the bonded debt of US railroad corporations. In the expansionist railroad business, extending into lesser-known and indigenous territories across the US in the 1800's required huge amounts of finance (and racialised labour).[44] Again, the interconnectedness of logistical infrastructure, territorial expansion and finance is central.

Moody was an entrepreneur who earned vast sums with his railroad ratings manuals and also through economic forecasting. His methods were haphazard and he never subscribed to a particular model or theory. Moody's began rating US state and local government bonds in 1919, and Standards and Poor's (the next largest ratings company) as late as the 1950s. The bond market was already very large, valued at around $2 billion at the turn of the 20th century. In the early period of credit ratings, Moody's, Standard and Poor's and Fitch all earned their revenue by selling their creditworthiness ratings to potential investors. In the 1930s, major changes occurred in the relationship between credit rating agencies and the US bond markets. In 1934, the Securities and Exchange Commission (SEC) was created and began requiring corporations to issue standardised financial statements. Bank regulators passed sets of regulations that

> culminated in a 1936 decree that prohibited banks from investing in "speculative investment securities" as determined by "recognized ratings manuals". … thus banks were restricted to holding only bonds that were "investment grade" – in modern ratings, this would be equivalent to bonds that were rated BBB – or better on the Standards and Poor's scale. … *Essentially, the creditworthiness judgements of these third-party raters had attained the force of the law*.[45]

Over the next few decades, state insurance regulators established minimum capital requirements that further imbricated the 'big three' ratings agencies in the bonds markets, and by 1975 the SEC

---

other forms of debt, and the actual market price of the bond can differ from the issuance price of a bond – depending, for example, on the credit rating of the issuer; the time left until maturation, and the contractually stated interest rate in comparison to the real-world interest rate at the time. Bonds have been being bought and sold for at least three centuries and have a complex history in imperialism and the slave trade. For more on the history of bonds and CRAs, see: Zenia Kish and Justin Leroy, 'Bonded Life: Technologies of Racial Finance from Slave Insurance to Philanthrocapital', *Cultural Studies* 29, no. 5–6 (3 September 2015): 630–51; Timothy J. Sinclair, *The New Masters of Capital: American Bond Rating Agencies and the Politics of Creditworthiness* (Ithaca: Cornell University Press, 2005).

[43] Richard M. Levitch, Giovanni Majnoni, and Camen Reinhart, *Ratings, Ratings Agencies and the Global Financial System*, vol. 9, The New York University Salomon Series on Financial Markets and Insitutions (New York: Springer Science & Business Media, 2002), 31.

[44] Manu Karuka, *Empire's Tracks: Indigenous Nations, Chines Workers, and the Transcontinental Railroad* (California: University of California Press, 2019).

[45] Lawrence J. White, 'Markets: The Credit Rating Agencies', *The Journal of Economic Perspectives* 24, no. 2 (2010): 213.

modified the minimum capital requirements for broker-dealers (including major investment banks and securities firms). These requirements reflected the risks of the broker-dealers asset portfolios, and thus meant to link the bond ratings from the agencies as the indicators of said risk. To do this, and to supposedly mitigate the risk of fraudulent ratings companies springing up and offering high ratings for a premium, they created a new category – the "Nationally Recognised Statistical Rating Organization" or NRSRO. Only the ratings of these NRSROs were valid for these minimum capital requirements. The parameters, however, to become a NRSRO were unpublished – there were no set formal requirements, and the status was given on a case by case basis. Moody's, Standard and Poor's, and Fitch were all immediately given the status of NRSRO. It was at this time that the CRAs also moved to the practice of charging the *issuers* of bonds for ratings, as well as the subscribers. There are numerous theories as to why this happened when it did – one of which argues that due to the regulatory measures taken by the SEC and insurance regulators, the CRAs knew that in order for a company to have their bonds bought by investment banks, they *had* to have them rated.[46]

Credit rating agencies thus steadily gained power and importance in the decades after Moody's first started publishing its railroad manuals, issuing and selling their ratings to the investors in, and issuers of, bonds across corporate and municipal markets.[47] Due to the legislation passed by the SEC, CRAs became regulatory mechanisms first for national, then global financial circuits of debt and credit. With this they found themselves with the power to determine (to some extent) the value of debt, and along with it, the premiums and interest rates that applied. For the borrower – particularly borrowers with lower credit ratings – these ratings necessarily affect the cost of borrowing. The lower the credit rating, the higher the risk premiums and the higher the interest rate.[48] A premium is effectively compensation to the investor for the risk they undertake in loaning capital. Higher premiums and higher interest rates mean higher costs to the borrower; and as such, become extractive mechanisms whereby the *risky* tend to become *riskier,* and where that elevated risk is valorised and capitalised on by the creditors. These mechanisms thus necessarily increase the chance of default. This feeds back into the rating, in turn creating higher premiums, interest rates and thus creates a circular mechanism of valorised risk.

From the very start of the ratings business, ratings were compiled from a mixture of publicly available and private insider commercial information about corporations. Statistical inferences forecast the likelihood that they would be able to pay back on time. What is clear is that mathematical inferences form only one arm of the ratings. Mixed in with the apparently objective criteria for ratings were oblique sets of subjective criteria that shape the final letter grade of

[46] White, 'Markets: The Credit Rating Agencies'.
[47] Levitch, Majnoni, and Reinhart, *Ratings, Ratings Agencies and the Global Financial System*.
[48] International Monetary Fund, 'The Uses and Abuses of Sovereign Credit Ratings', in *Global Financial Stability Report October 2010: Sovereigns, Funding and Systemic Liquidity* (International Monetary Fund, 2010).

investments. The next section will show how this has continued to play out in sovereign credit ratings, where numerous factors including "political risk", "institutional strength" and "legitimacy" are included in the final rating.[49]

SOVEREIGN RATINGS

Understanding how CRAs developed and rose to become important regulatory and standardising technologies in the machinery of the US national and international debt markets, I will now analyse how this plays out across the world and in developmental projects and sovereign debt. This section unpicks the techniques of discipline, prediction and control in credit ratings and credit rating agencies (CRAs) as an aspect of global technologies of control that incorporate the logics of logistical rationality outlined so far in this thesis.

Country ratings extended outward from Moody's, Fitch and Standard and Poor's enterprises and local government bond ratings services, beginning in earnest in 1919. At this time, ratings were generally restricted to countries in Latin America, Europe and North America. All ratings were, and (generally) continue to be, benchmarked against US Government securities – rated in a class of their own, as virtually risk-free. In the Great Depression and in the period during and soon after World War II, sovereign default after sovereign default collapsed the business for some nearly 40 years. Bond markets were dominated by American firms and US municipalities, and foreign sovereign bonds were treated with suspicion until the mid-1970s. Importantly, 1974 marks the repeal of the Interest Equalization tax of 1963, which had taxed investments by US firms in foreign securities. Sovereign ratings before this point were sporadic at best, and it was only after the repeal that S&P and Moody's took off. [50]

The methodologies and practices used in the corporate sector for the analysis of risk against both municipal and corporate bonds were upscaled and augmented for sovereign ratings. It was also

[49] Bartholomew Paudyn, *Credit Ratings and Sovereign Debt: The Political Economy of Creditworthiness through Risk and Uncertainty*, International Political Economy Series (New York: Palgrave Macmillan, 2014); 'Sovereign Ratings Methodology' (Moody's Investors Service, 25 November 2019), https://www.moodys.com/researchdocumentcontentpage.aspx?docid=PBC_1158631; 'Criteria, Governments, Sovereigns: Sovereign Rating Methodology' (S&P Global, 18 December 2017), https://www.spratings.com/documents/20184/4432051/Sovereign+Rating+Methodology/5f8c852c-108d-46d2-add1-4c20c3304725.

[50] There are a number of reasons for the restarting of the business – one being the cancellation of the 'interest equalisation tax' in 1974, which was put in place by Kennedy in 1963: taxing foreign investment, to correct the balance of payments deficit. Secondly, the explosion of debt problems and defaults in the 1970-80s, elsewhere widely attributed to cheap lending and Robert McNamara's huge increase in lending from the World Bank throughout the 1960s and 70s. This, as noted earlier, is also attributed to the 1973-4 'oil crisis', which led to oil-exporting countries having unprecedented surpluses. Through 'petrodollar recycling', a large proportion of these funds were in turn lent to oil-importing countries to help finance these energy imports. In response to the second oil price hike, Global North countries instigated tight fiscal controls which led to huge inflation and soaring interest rates on these sovereign debts. Also, see Sinclair, T. 2010, 97

the case that sovereigns had to pay to be rated – and in so doing, allow the ratings companies greater access to their financial data. From their early days the big CRAs utilised data from the World Bank and the IMF that was collected through the development programme profiles and the concurrent borrowing and repayment schedules that were undertaken in the 1950s and 60s.[51] In contemporary ratings practices, one particularly important metric by which the CRAs gauge creditworthiness of a sovereign is their ranking in the Logistics Performance Index, or LPI – a metric established in 2007 by the World Bank, in which nations are graded on their 'logistics friendliness' both nationally and internationally.[52] The LPI rating is also composed of both qualitative and quantitative data, which has been reduced to a numerical score.

As Bartholomew Paudyn notes,

> the 'importation' of tenets and methodologies from the corporate sector into the sovereign domain has served to enhance the prevalence and sustaining power of sovereign ratings through their alignment with a defendable, utilitarian calculus of risk. More tractable to rational choice modelling, to a great extent, risk's appeal rests on the claim that its ergodicity and 'machine like' ability can fragment and minimize interfering variables, such as human discretion, and thus reduce volatility from the equation. ... Devoid of these idiosyncrasies, the calculation of an indeterminate (fiscal) future purportedly becomes more feasible and accurate; thereby bringing us closer to some 'objective truth' about an exogenous reality.[53]

We must bring together here the history of corporate bond ratings and stock manuals outlined thus far as methods developed to predict and manage the risks involved in investing, with the study of econometrics that proliferated in direct response to the Great Depression and the imprecision of economic methods of estimation at the time. As I outlined in chapter one, Alfred Cowles funded the journal *Econometrica* and founded the Cowles Commission explicitly against this backdrop, to depart from, in his view, unscientific economics – to tie political economy to calculable statistical measures and metrics that would provide an objective model of economies that approximated reality better. These models, abstract and mathematical, served the purpose of translating complex phenomena about the human and about the collective. This enabled the fragmentation and minimization of 'interfering variables' in order to make calculable an 'indeterminate future'. This transforms qualitative problems of uncertainty into calculable

[51] Paudyn, *Credit Ratings and Sovereign Debt: The Political Economy of Creditworthiness through Risk and Uncertainty*.
[52] 'Sovereign Ratings Methodology'.
[53] Paudyn, *Credit Ratings and Sovereign Debt: The Political Economy of Creditworthiness through Risk and Uncertainty*, 18.

problems of risk; an attempt at translating the future into logistical legibility and control. In this, we can trace a clear methodological and ideological through-line between the Planning, Programming and Budgeting System of McNamara and the US Department of Defense, the econometrics of the Cowles Commission, and practices of credit rating. In essence, all three are predicated on the 'importation of tenets and methodologies' that can be traced back to the RAND Corporation and operations research and, in particular, the underlying ideological structure of rational choice theory.

The notion that one can accurately or even semi-accurately represent the world through these methods is one that Mitchell reminds us requires an "objective" observer. Ratings are a clear example of the ordering of the world-as-data so as to represent it, and hence the relationship between the metrics and the states they purport to represent is a world-making one. In delineating the benchmarks of creditworthiness, CRAs act as another force delineating and replicating the structure of national economies. What I mean by this, is that the metrics come to stand in for the nations they represent, reifying and replicating structures of Western modernity. Again, this is a process of translation of complex life and histories into logistical legibility. In the case of sovereign ratings, this is apparent in the reduction of intensely complex political criteria to that which can be made amenable to statistical risk modelling. Sovereign credit ratings, as practiced by the larger CRAs, claim to '[measure] the risk that a government may default on its own obligations in either local or foreign currency. It takes into account both the ability and the *willingness* of a government to repay its debt in a timely manner'.[54] That the "willingness" of a government to repay debts can be translated into an AAA or BBB letter grade is something that requires further unpacking. This measurement acts as a 'specific form of authoritative knowledge', that sediments, circumscribes and reproduces a particular architecture of debt and economic control.[55] It does this through the creation and deployment of economic metrics that set the standards, and hence the requirements, terms and conditions for participation in modern capitalism or contemporary modernity.

The big CRAs, and their status as nationally and internationally recognised institutions, bring with them a veneer of scientific objectivity. As stated, the ratings process and their specific methodologies are proprietary and countless papers have been written attempting to retroactively determine the precise metrics and determinants through which they arrive at their ratings, and to which metrics or variables they give the most weight.[56] One concrete issue with

[54] Moody's, 2006. Cited in: Levitch, Majnoni, and Reinhart, *Ratings, Ratings Agencies and the Global Financial System*.

[55] Paudyn, *Credit Ratings and Sovereign Debt: The Political Economy of Creditworthiness through Risk and Uncertainty*, 8.

[56] See R. Cantor and F. Packer, *Sovereign Credit Ratings*, Current Issues in Economics and Finance (New York: Federal Reserve Bank of New York, 1995); R. Cantor and F. Packer, 'Determinants and Impact of Sovereign Credit Ratings', *Federal Reserve Bank of New York Economic Policy Review*, 2.2 (1996), 37–54; H Reisen and J. von Maltzan, *Boom and Bust and Sovereign Ratings* (OECD Development Centre, 1999); S. V. Bhatia, *Sovereign Credit Methodology: An Evaluation* (International Monetary Fund, 2002).

this is that the quantitative aspect of sovereign ratings is just that – one aspect. Qualitative and subjective data and information are translated into judgements about the creditworthiness of a state. The qualitative measures used to judge country or sovereign risk are then collapsed into the quantitative measures, allowing the CRAs to give a letter grading on a smooth hierarchical scale, where subjective 'component factors are turned into quantifiable metrics and criteria are homogenized across rated institutions'.[57] This "commensuration exercise" necessitates the translation of these judgements into the assignment of numerical metrics for "institutional strength" or "legitimacy" in Moody's ratings, or in the "political score" of Standard and Poor's, to determine the "willingness to pay" factor of a government.[58]

Again, as with early securities where the standard benchmark was US securities, the benchmark is the agencies' own representations of a functioning free-market economy.[59] S&P's, for example, denote the 'stability and *legitimacy* of political institutions; *orderliness* of leadership successions; prosperity, diversity and degree to which economy is *market-oriented*; protectionism and other non-market influences; and popular participation in political processes' as part of their 'sovereign ratings methodology profile'.[60] Moody's and S&P's do grant that that they exercise judgement – for which they employ analysts to 'identify and discriminate what constitute as *relevant* criteria and how these quantitative and qualitative factors should combine' to formulate a letter grade.[61] This necessarily requires the making of assumptions – which, in the words of S&P's, are the 'projections, estimates, input parameters to models, and all other types of qualitative or quantitative expectations that [CRAs] use to arrive at a ratings opinion'.[62] Although it is impossible to speculate on the exact methods by which analysts determine the weights, one can make the case, as Paudyn does, that 'given the preponderance of statistical back-testing as a means of validation by CRAs, one can argue that these projections reflect risk-based forecasts'.[63] These techniques are used alongside subjective judgements that bring with them historical and ideological assumptions, benchmarks and relationships. This reduces complex, qualitative issues into numerical values and hence calculability; it translates uncertainty into valorisable risk. In so doing, CRAs erase complex histories and reaffirm their status as objective observers and arbiters of truth.

---

[57] Marion Fourcade, 'State Metrology: The Rating of Sovereigns and the Judgement of Nations', in *The Many Hands of the State: Theorizing Political Authority and Social Control*, ed. Kimberly J. Morgan and Ann Shola Orloff (Cambridge: Cambridge University Press, 2017), 111.
[58] International Monetary Fund, 'Uses and Abuses of Sovereign Credit Ratings'.
[59] Fourcade, 'State Metrology: The Rating of Sovereigns and the Judgement of Nations'.
[60] 'Sovereign Credit Ratings: A Primer' (New York: Standard & Poor's, 2008). Emphasis my own.
[61] Paudyn, *Credit Ratings and Sovereign Debt: The Political Economy of Creditworthiness through Risk and Uncertainty*, 119.
[62] 'Sovereign Credit Ratings: A Primer'.
[63] Paudyn, *Credit Ratings and Sovereign Debt: The Political Economy of Creditworthiness through Risk and Uncertainty*, 115.

METRICS

The global extension of practices of sovereign credit rating, and the prescriptive and normative nature of the ratings categories outlined here, advance a standardising blueprint for the replication of governmental and economic organization and policy. As shown, one way that this project is advanced is through the enmeshment of "objective" and "subjective" methods of the CRAs to rate sovereign countries. The outward elevation of the objective criteria over the subjective serves to obscure the overarching political project that sovereign ratings feed into. This translates into the subsequent positioning of sovereigns along a hierarchy in terms of investment grades, and thus determines economic opportunity on the global stage. Sovereign credit ratings then act as regulatory and disciplinary mechanisms that, in conjunction with other facets of the global debt apparatus as I will go on to show, circumscribe the limits of sovereignty through economic measures and policies. This is the point at which the universalising project of the standardisation of economic technologies feeds into the maintenance of unequal, extractive architectures of debt.

In her essay on the pressures and metrics that bear down upon and constrain states in global political economy, Marion Fourcade outlines the manner in which the dominant entities of "world society" have set themselves the task of detailing what states should be and do in order to be recognised and considered legitimate, sovereign entities. [64] Thinking this alongside the imperative to an industrialising conceptualisation of modernisation, 'universalized ideals of state effectiveness compel countries to expand their extractive capacities and implement budgetary or regulatory policies' that often come at great financial, environmental and social cost.[65] We must then read credit ratings and other state metrics alongside the history of modernisation theories and programmes in the Global South. They underpin the ideal of a universalising, objectivist and empiricist regime of truth that orders the world so as to represent it, delineating the conditions of possibility for entrance and acceptance into modernity.

These metrics and indicators act as a 'second-order form of control', which not only array sovereign entities along economic and social lines of best practice but render states as representable by data. They make the shapes of hierarchies and rankings, which themselves carry implicit moral injunctions. The CRAs and the deployment of credit ratings carved out a role similar to 'international experts and policy makers' that 'express concerns and devise plans for countries to move up the ladder implicitly accepting the externally imposed symbolic order as an internal guide'.[66] This order, as I have argued, is necessarily based on the ideals and interests of

[64] Fourcade, 'State Metrology: The Rating of Sovereigns and the Judgement of Nations'.
[65] Fourcade, 104.
[66] Fourcade, 104. Though CRAs themselves tend to carry the injunction that they simply provide 'opinions' on the probability of default, and that this should not be used as the sole information on which to base an

those at the top of these hierarchies, and shape the foundational rules of the ranks. Of course, another fundamental problem with a system of ranking like this is the same as the fundamental critique of meritocracy – that by definition, positionality within the ranks is *always* relative to others, meaning some must be at the bottom for others to be at the top.

Put differently, 'states "represent" social collectives and thus *stand in* for more than themselves ... the state not only *literally* emanates from a social collective through a process of political "representation", it also *stands in, symbolically*, for that collective'.[67] Where these forms of measurement are constantly, implicitly gauging societies against the "benchmark" of the highly industrialised and financialised nations, they are also 'operating a metrological reduction of collective histories and their attendant representations. In short, the rating and scoring of states reflects on society by encoding certain perceived characteristics of the nation into a simplified categorical framework.'[68] Returning to our use of Mitchell in earlier chapters, we can recognise that that the metrological representation of states as symbolically 'standing in' reaches all the way back to colonial representation, relationships and legacies. Through this representation, metrics stand in for nations and contribute to the logistical-epistemic order of the world-as-data. In this, whole nations are cast as 'risky' populations and investments against the standard of highly industrialised and financialised states. This entails the erasure of complex colonial and imperial legacies from the output of ostensibly neutral future-oriented metrics.

The reorganisation of these histories via the mechanism of credit ratings is thus an active part of the logistical representational order of world-as-data, and the becoming-infrastructural of logistical rationality to contemporary global political economy. Borrowers must yield to the technological, economic, and metrological machinery of more powerful, creditor nations. The paternalism of economic dependencies emanates from these relationships. Borrower countries are subject to external scrutiny, and importantly, economic and political reconfiguration in line with the material and symbolic order of industrialised, OECD, and market-oriented countries. The world is constantly remade in the image of the metrics, and the inequalities they delineate are reinforced by the economic and political reconfigurations they legitimate. The criteria of the ratings process determine advanced economic science as the detailed blueprint for the "correct" way of organizing economies. These criteria, and the faith in the scientific methods by which they arrive at their ratings, ordain the CRAs with the ability to determine the 'legitimacy' of a nation's political institutions, and to stack this up against the extent to which their economies are modelled on the 'universal' ideal of the free market. That these categories go some way to determine the price of both debt and capital for sovereign nations must be recognised as a form of power – unwarranted, but shored up by colonial imaginaries of scientific, technological, and

investment decision, these 'opinions' have decisive effects on the 'investability' of government bonds, particularly in the case of 'developing' countries.

[67] Fourcade, 104.

[68] Fourcade, 104–5.

humanitarian development. They prescribe a set of standards and conditions to meet in order to participate in the global economy.

We can see the coloniality in the logics of representation and replication throughout the process of credit rating for the demands of global trade. What these projections and forecasts do is act as disciplinary measures that, as we shall explore further below, forge a standardised model for the running of economies. The blueprint for higher ratings is fashioned directly from presuppositions about what a 'developed' economy should look like, how the market should be run and how amenable, open and favourable that economy is to the exigencies of global, logistical networks of trade. This is a standardising project, one that seeks to replicate the economic and political structures of Western modernity. In so doing, nations are forced into accepting economic policy that has direct and violent effects on their possibilities of life. This becomes clear in the next section, where I unpack the disciplinary assemblage of the Export Credit Agencies, the Paris Club and the IMF.

Section Three: The ECA-Paris Club-IMF Assemblage

EXPORT CREDIT AGENCIES (ECAS)

Export Credit Agencies are exempt from the Organisation for Economic Co-operation and Development's (OECD) regulations on government subsidies for private sector support. This means that the member countries of the OECD are able to determine for themselves how much support they will give ECAs. They are usually national entities, linked with the state, for the support of private sector exports originating from the home nation. ECAs usually hold a number of functions. Firstly, in insuring the exports of the home business, in order that if the importing party – usually (but not always) a company or government of a developing nation in which the business is attempting to open up new markets – defaults on their payments, the business can be paid in full or part by the ECA. ECAs also issue loans to importing countries for their home nation's exports, in order that they can buy the products being imported.

The terms and conditions for these credits largely rely on methodologies and practices extremely similar to those of Moody's, Standard and Poor's, and Fitch. At least as of the late 1990's, ECAs also had the freedom to set their own gauge of creditworthiness. In the case of the US, they still relied on the CRAs' corporate data of default probability and interest spreads.[69] As of 1997, OECD nations – and more specifically, participants in the arrangement on Officially Supported Export Credits – have established a partially standardised methodology and set minimum premium rates

[69] M. A. Weiss, 'The Paris Club and International Debt Relief', CRS Report for Congress (Congressional Research Service, 2013).

for countries of a certain perceived 'riskiness'.[70] This is calculated by what they term a 'Country Risk Assessment Model' (CRAM). As with the private CRAs, it is formulated both through a quantitative model and a qualitative assessment, as a score from 1-8, which affects the minimum interest rates and risk premiums. The risk indicators they use for the CRAM are 'the payment experience reported on by the Participants, the financial situation and the economic situation based primarily on IMF indicators.'[71]

The oft-stated purpose of the ECAs is to support the private sector in retaining a "competitive edge" in the global market, by guaranteeing expected revenues if the importing business in the borrowing country defaults. ECAs can also put pressure on the government of the country of the importing business to either fulfil the agreements made or guarantee the trade itself. ECAs also support domestic companies to offer loans for projects or capital ventures abroad, generally in 'high risk' – which is to say, so-called 'developing' countries – and are able to do so with no specific reference to sustainable development or poverty reduction. This allows them to provide backing for projects that would not receive funding from development institutions.[72] ECAs have very few, if any, legally binding agreements on the environmental, human rights, and social impacts of the projects they fund. They have been known to have subsidised arms and military equipment deals to dictatorial regimes – for example, to Suharto's regime in Indonesia; and to have funded environmentally and socially damaging projects – like the Ilisu Dam in Turkey (which has displaced thousands of Kurds); as well as projects that were non-viable or were never completed.[73]

The determining conditions of the ECAs' loans and agreements are generally not publicly disclosed. A report from the European ECA Reform Campaign warns that governments and companies might accept some agreements out of fear, due to the potential damage that declining could do to international trade prospects and investment relations between themselves and industrialised countries.[74] The majority of cases of bilateral trade of investment agreements include the protection of ECAs – essentially granting them the ability to pass on the responsibility and risk of a private company to the host governments of 'developing countries'. It is through this mechanism that ECAs are able to turn the *business risks* of the *private sector* in a 'core' industrialised country into *public debt* in the 'periphery'. Where bilateral agreements between

[70] Organisation for Economic Co-operation and Development, 'Arrangement on Officially Supported Export Credits. TAD/PG(2018)1' (OECD, 1 January 2018), http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?doclanguage=en&cote=tad/pg(2018)1.

[71] 'Country Risk Classification - OECD', accessed 29 January 2020, http://www.oecd.org/trade/topics/export-credits/arrangement-and-sector-understandings/financing-terms-and-conditions/country-risk-classification/.

[72] Wiert Wiertsema, 'Export Credit Debt: How ECA Support to Corporations Indebts the World's Poor', Briefing Note (European ECA Reform Campaign, June 2008).

[73] Wiertsema.

[74] Wiertsema.

nations include the protection of ECAs, the government of the hosting country is asked to assure or guarantee the investment, meaning that if the company defaults, the host government is liable for the debt of the sum of the *expected revenues*, including interest payments on the loans, from public coffers. ECAs have their own debt collection departments shrouded in secrecy, that pressure, negotiate and enforce debt repayment schemes.[75]

THE PARIS CLUB

This is where the Paris Club steps in. If an indebted nation has to default on their loans, they are taken to the Paris Club – a group of representatives from OECD industrialised nations and the IMF. Given that ECAs are national entities, the Paris Club is composed of creditors – so effectively, the Paris Club members sit as judges in the arbitration of their own cases. The debtor country must negotiate the rescheduling, restructuring or cancellation of their debt with these representatives. According to Lex Rieffel, the Paris Club 'represents a set of procedures currently used for negotiating arrangements to defer payment obligations on credits extended or guaranteed by creditor-country government agencies to both public-sector and private-sector borrowers in debtor countries unable to meet fully their external debt obligations'.[76] The first Paris Club meeting to reschedule debt took place in 1956, when Argentina met with its official creditors to discuss debt relief and rescheduling on officially supported export credits. Rieffel states that 'Argentina returned twice, and Brazil, Chile, and Turkey together went to Paris five times in the late 1950s and early 1960s to obtain debt relief on obligations to governments, because the creditors had been overzealous in promoting exports to these rapidly modernizing countries.'[77]

In order to receive debt restructuring, cancellation or rescheduling, debtor nations *must* submit to and implement IMF programs for macro-economic restructuring – including economic liberalisation, or the privatisation of public or national resources – in other words, 'structural adjustment' programmes that purport to be oriented to short-term fundraising and help debtor governments to service their debts. As Mountfield, a treasury official and active member of the Paris Club asserted, 'these days it is a golden rule of the Paris Club that we will not consider rescheduling without an IMF programme in place'.[78]

---

[75] Øygunn Sundsbø Brynildsen, 'Exporting Goods or Exporting Debts? Export Credit Agencies and the Roots of Developing Country Debt' (European Network on Debt and Development, December 2011).

[76] Alexis Rieffel was an active participant in negotiations with borrower countries; an economist in USAID; an ambassador for the U.S. to the OECD; and at one point, the executive director at the IMF. Before this, he was an officer in the Navy in Vietnam, after which he volunteered in the Peace Corps in India.
Alexis Rieffel, *The Role of the Paris Club in Managing Debt Problems*, Essays in International Finance, no. 161 (Dec. 1985) (Princeton, N.J: International Finance Section, Dept. of Economics, Princeton University, 1985), 3.

[77] Rieffel, 3.

[78] Peter Mountfield, 'The Paris Club and African Debt', *IDS Bulletin* 21, no. 2 (April 1990): 45.

Rieffel writes:

> rescheduling in the Paris Club is an unpleasant affair, and the official creditors must keep it unpleasant as an incentive to debtors to honor their debt obligations. Rescheduling is unpleasant primarily because it forces countries to take policy measures (in connection with their IMF standby arrangements) that imply a reduction of domestic consumption and slower economic growth. It is also unpleasant because the debtors are negotiating from a position of weakness and are rarely offered terms that appear generous to their citizens.[79]

It is not difficult to read the disdainful, disciplinary and paternalistic sentiments in this statement. That Rieffel – an active participant in the Paris Club negotiations – details in a public document the need to '*keep it unpleasant*' in order that debtors are *incentivised*, implies a paternalism and generalised superiority that echoes colonial disciplinary relationships. This statement is just one example of the cultivation of historical and political amnesia around the circumstances of sovereign debts in the Global South. It constructs the issue as a problem of 'incentive'; debtor nations are simply not *trying hard enough* or worse still, *cannot help themselves*, a non-argument that dredges up racist justifications for the project of colonialism. Rieffel clearly outlines that the economic take-over of the debtor nations is, firstly, a forceful affair that leads to a reduction in "quality of life" and slower overall economic growth in real terms; and secondly, as usually involving terms that are rarely acceptable to the citizens of said nations. Debtor nations must simply hand over sovereignty – they must allow an external party (the IMF – which has its own whole set of neo-imperialist, or neoliberal critiques to reference) to set governmental policy, or go bankrupt. [80]

Riefell notes that the Paris Club faces "challenges"; importantly, that 'a number of debtor countries appear to be caught in a form of 'debt trap' that brings them back to the Paris Club year after year'.[81] The language here implies incredulity – a sense of the 'debt trap' as apparition denotes no sense of cause, and certainly no implication that the IMF's economic policies, upon which the debt restructuring is conditional, might set the infrastructure of such a trap. When writing about this technical failure of the Paris Club to actually help countries stay out of imminent default, the author argues that this is due firstly because they only grant relief 'in respect of payments falling due during a single twelve-month period.'[82] This is because 'not only

[79] Rieffel, *The Role of the Paris Club in Managing Debt Problems*, 15.
[80] To name just a few: David Harvey, *The New Imperialism* (Oxford: Oxford University Press, 2003); Teresa Hayter, *Aid as Imperialism* (Harmondsworth: Penguin, 1971); Alfred Zack-Williams, 'Neo-Imperialism and African Development', *Review of African Political Economy* 40, no. 136 (2013): 179–84.
[81] Rieffel, *The Role of the Paris Club in Managing Debt Problems*, 26.
[82] Rieffel, 26.

is it difficult to forecast balance-of payments developments more than a year ahead, but the Paris Club creditors want to strengthen incentives for effective implementation of its adjustment program by keeping the debtor country "on a short leash"'.[83]

DEBT RESCHEDULING & THE IMF

The 'debt rescheduling negotiations are organized from the perspective of the creditors, not the debtors'. [84] It is also clear that geo-politically important indebted countries usually receive better deals than countries that hold comparatively large debt but less political importance. The case of Iraq is a prime example of politically motivated debt relief – in 2005 US government representatives in the Paris Club argued for a 100% debt cancellation – while other governments advocated a cancellation of not more than 60% – in the end, they agreed at an 80% cancellation at $39bn from the Paris Club creditors.[85] Although initially the Bush administration argued that this was necessary on the grounds of 'odious debt', this line was swiftly dropped – lest other countries still paying off the debts of earlier repressive regimes follow suit.[86] The debt relief was conditional on the acceptance of an IMF programme, and, concomitant with the 'Coalition Provisional Authority' put in place after the invasion, pushed through staggering trade liberalisation and privatisation initiatives. These include the privatisation of state-owned industries, the end of subsidised food rations, and the liberalisation of both food prices and foreign investment laws.[87] In the comparable case of Nigeria, the Club granted a cancellation of only 60%, with 40% to be repaid by the Nigerian government.[88] This is not a cancellation of the *total* sovereign debt, but only that which had been accrued before the *first* visit to the Paris Club.[89] Interest on debt payments thus continues to accrue on the rescheduled debt, regardless of capacity to pay. Debt owed by Sudan, for example, is estimated at $51bn, of which the majority

[83] Rieffel, 26.
[84] Rieffel, 2; See the following report for more information: Øygunn Sundsbø Brynildsen, 'Exporting Goods or Exporting Debts? Export Credit Agencies and the Roots of Developing Country Debt' (European Network on Debt and Development, December 2011).
[85] Brynildsen, 'Exporting Goods or Exporting Debts? Export Credit Agencies and the Roots of Developing Country Debt'.
[86] For example: Indonesia is still paying off debt accrued from arms deals under the Suharto regime; South Africa is still paying debts from the Apartheid era, to name two particularly troubling examples. For a legal exploration of these issues, see: Andrew Yianni and David Tinkler, 'Is There a Recognized Legal Doctrine of Odious Debts?', *North Carolina Journal of International Law and Commercial Regulation* 34, no. 4 (2007): 749–72.
[87] Eric Herring and Glen Rangwala, 'Iraq, Imperialism and Global Governance', *Third World Quarterly* 26, no. 4/5 (2005): 667–83; David Whyte, 'The Crimes of Neo-Liberal Rule in Occupied Iraq', *The British Journal of Criminology* 47, no. 2 (2007): 177–95.
[88] Brynildsen, 'Exporting Goods or Exporting Debts? Export Credit Agencies and the Roots of Developing Country Debt', 4.
[89] Nicholas Hildyard, 'Snouts in the Trough: Export Credit Agencies, Corporate Welfare and Policy Incoherence', Corner House Briefing 14 (ECA Watch, June 1999); Michiel van Voorst, 'Debt-Creating Aspects of Export Credits', Paper for NGO ECA-Group (Eurodad, August 1998).

derives from ECAs, half of which is owed to Paris Club creditors.[90] According to the Eurodad report, some *90% of this* was interest accrued after Sudan defaulted on, and hence stopped servicing, its debts in 1984.[91]

This debt is understood as 'non-performing' debt, although it certainly performs for some. The Paris Club negotiates 'cancellations' of debt, or debt relief, out of the Official Development Aid budgets of the OECD participant creditors. What this means, is that creditor nations can subsidise their own ECAs with their own aid budgets – for the *total* amount of debt owed – including interest, and way above the actual market value of the debt. In other words, 'debts owed by developing countries which were often only on the books and that creditors were not even hoping to recover are suddenly counted as part of the donors' commitments to [aid]'.[92] The travesty, as the report states, is that 'while debt cancellation to Sudan will *not* imply any real costs to governments since these are non-performing debts and the majority of the outstanding debt corresponds to interests accrued over the last three decades, real financial transfers *will* be made from aid budgets to the ECAs or Finance Ministries when Sudan's debt is cancelled.'[93]

The methods and data from the 'big three' CRAs also wind up here, in the calculation of the sum of funds to be repaid. In the case of the US, one report for Congress notes that

> Some analysts, including the Government Accountability Office (GAO), raise concerns about the official process for estimating the cost of foreign loans to the United States, and thus the cost needed to forgive foreign debt. [Office of Management and Budget] OMB's current methodology uses rating agency corporate default data and interest rate spreads in a model it developed to estimate default probabilities and makes assumptions about recoveries after default to estimate loss rates. According to GAO, the methods that OMB employs may calculate lower loss rates than may be justified for the sovereign debt of emerging countries.[94]

[90] 'Sudan: Staff Report for the 2016 Article IV Consultation - Debt Sustainability Analysis' (International Monetary Fund, 2016).
[91] Brynildsen, 'Exporting Goods or Exporting Debts? Export Credit Agencies and the Roots of Developing Country Debt'.
[92] Brynildsen, 12.
[93] Brynildsen, 13.
[94] M. A. Weiss, 'The Paris Club and International Debt Relief', CRS Report for Congress (Congressional Research Service, 2013), 5.

In other words, when the OMB calculates a lower loss ratio based on CRA metrics, it pushes *up* the total amount costed as debt cancellation to be repaid to the Ex-Im bank - *from aid budgets,* as Official Development Assistance (ODA).

Conclusion

I want to recap this complex architecture of debt with an example for clarity: an ECA loans a private company in the Global South the funds to build a potentially destructive dam outside of the social and environmental regulatory confines of development banks. The ECA requires a guarantee from the government which will insure them against loss should the company default. If the company defaults, this debt is transferred from the private business to public, or sovereign debt. If the sovereign is at risk of defaulting on their total foreign debt servicing (of which this ECA debt is now a part) they must accept IMF scrutiny to attend the Paris Club for debt rescheduling negotiations – which is often done with ECAs from creditor countries involved. Debt rescheduling is always on the condition of IMF 'stand-by' structural adjustment programmes, which generally enforce trade liberalisation legislation and foreign exchange laws. In short, the IMF takes over the economic policy-making. The cancelled debt, which is often inflated through interest to over 90x the principal loan amount (as with Sudan), is then deducted from Official Development Aid budgets, and real-world financial transactions materialise to pay the creditors back out of funds that are supposedly earmarked for development projects.

A number of logics of logistical rationality play out in development, credit ratings and global architectures of indebtedness. The development and modernisation discourses that encourage and replicate the political and economic structures of Western modernity lead to heavy investment in extractive industries and logistical infrastructure to service them. These projects are often financed by either development institutions and banks, or, credit is given by ECAs. The price of the credit, the interest rates, and the later price of the debt is determined by a system of metrics that themselves retain legacies of colonialism, whilst purporting to be value free, objective representations and predictions of financial futures. This is the hallmark of logistical rationality. The metrics by which they do this serve a number of purposes. First, by benchmarking states against the modern, 'developed' nation state, they delineate the conditions states must adhere to in order to participate in the global economy. They determine which states count as such. Second, they render uncertainty and indeterminacy as calculable risk, represented in models that enfold complex qualitative judgements about individual nation states in the Global south in numerical form. This erases legacies of slavery, colonialism, imperialism, and repressive rule as contributing to the financial situations of debtor nations. Finally, they *valorise* that risk, rendering risk profitable to the creditors, and thus using debt as an extractive mechanism of control.

We can see a logistical reconstitution of coloniality in the project of economic taxonomy outlined in the section on CRAs – of categorisation along a hierarchy of difference – that belies the inequality of global geo-economic relationships of debt and credit; and secondly, in the concurrent project of prediction – in which predictions, based on the myriad metrics that purportedly represent the financial reality of a sovereign government, serve as disciplinary mechanisms and the means by which sovereigns can be downgraded. This affects their material conditions, their place in the global economic hierarchy, and as I have shown in the final section, opens them up to discipline and intervention from organisations such as the Paris Club and the IMF. This can be seen as a form of standardisation, in the replication of the conditions of Western modernity. We can see this aspect of standardisation too in the "nation-building" programmes of development based on the Western model of the nation state and in the ensnaring of nations in relations of indebtedness that ensure the continuation of unequal relations of power.

The final two chapters depart somewhat from the historical focus the first three have taken. Having excavated the emergence and becoming-infrastructural of logics of logistical rationality and the construction of the representational order of world-as-data, I look to its contemporary iterations in order to articulate its more current modes of operation and the forms of epistemic violence they afford. The next chapter unpacks standardisation as a central theme of logistical rationality. It critically examines contemporary logistical software and the curious logistical spatio-temporalities of modern-day data processing.

FOUR: CONTEMPORARY LOGISTICAL FORMATIONS: ENTERPRISE RESOURCE PLANNING AND THE COLONIALITY OF STANDARDISATION

Introduction

This chapter aims to bring forward the so far historical theorisation of logistical rationality into the contemporary moment of digital infrastructures, global supply chains and the intersections between them in which we all reside. It thus aims to demonstrate both the specificity and the continuity of this contemporary moment with logistical formations as they emerged in the context of processes of decolonisation. It will draw together the central themes developed so far in this thesis – where I have argued that modern logistics and its epistemological foundations are characterised by a logic of coloniality based on a positivistic, rationalising, and universalising framework that governs various forms of organisation. It will use the cases of international standards and Enterprise Information Systems (EIS) to explicate and reconcile those aspects of logistical rationality outlined so far; namely its basis in cybernetics and systems theory; its reliance on measurement, calculation and prediction; the corollary focus on the control or modulation of uncertainty; and various forms of extraction and translation. This chapter will also introduce questions surrounding the logistical organisation of space and time; specifically highlighting the production and compression of time and space as a spatio-temporal logic of logistical rationality. The cases of international standards and EIS uniquely demonstrate these logics, indicating both the multiplicities of global governance and the operation of the coloniality of power, and how at the same time they traverse and shape the world accordingly.

To continue developing this overall theorisation of logistical rationality as it manifests in modern supply chain capitalism, this chapter will focus on standardisation as a central operation of logistical organisation. It will situate its operations in the intersections of the digital, material and the infrastructural, and reveal the epistemological foundations and rationality of standardisation as rooted in coloniality. Here I will draw again on Mitchell's understanding of representation and the dualism of image and physical reality, to think through the ways in which standardisation maps onto and replicates in a different form the ongoing production of what we might call logistical-colonial-modernity. Complementing this understanding of standardisation as a means by which the world is rationalised and translated into logistical legibility, this section returns to Vázquez's notion of the violence of epistemic translation. Here I demonstrate the way in which processes of standardisation amount to both material and epistemic domination through the attempted, and apparently neutral translation of the world into quantifiable, legible and thus replicable representations.

Section one gives a brief history of standards and their growing import over the past few decades, before thinking about how we can understand standardisation as contributing to a physical and representational order that links the logistical production of time and space to the ongoing production of logistical colonial modernity. The second section looks at specific standards and EIS in order to demonstrate these logics as they operate out in the world. This leads me to a discussion of the various ways data is created and extracted in service of these logistical software systems in section three. In this I also look briefly at machine learning and predictive algorithms and the complex logistical spatio-temporalities they bring to the fore.

Section One: Standards

The importance of standardisation to modern logistics is clear in the oft-rehearsed arguments that its contemporary form was shaped by the phenomenon of containerization, where standardised shipping containers (originating in the US military) dramatically increased the speed of loading and unloading in docks and therefore the speed of global networks of circulation.[1] We can see it too in the standardisation and international convertibility of currency, in modern mass production and manufacture techniques, and in the ability to control the movements of capital and goods across the world with astonishing accuracy.

The aspects of logistical rationality so far outlined in this thesis also demonstrate this tendency toward standardisation. One can see such a tendency, for instance, in the project of the development of a standard, cybernetic 'language of languages' (chapter one); in the processes of modernisation that set 'the West' as a standard template for the 'development' of the 'underdeveloped' nations of the Global South (chapters two and three); and in the replication of the form of the nation state, regulations on trade and modes of governance in the debt traps of the Export Credit Agencies, the Paris Club and the IMF structural adjustment programs (chapter three). We see standardisation in the infrastructures on which processes of modernisation rely; in the material organisation of commodities and supply chains, and in the telecommunications and digital infrastructures upon and through which capital, debt, and information moves, works, and delimits.

I argue here that standardisation is one of the means by which the world is made amenable to logistical translation – in order for logistics to operate seamlessly across territorial, continental, or global circulatory systems of capital, it follows that as far as possible, the practices, techniques, legal definitions and technical specifications that make up these complex operations should interoperate seamlessly. Standardisation should be understood as another attempt at the production of certainty – or rather, of the *modulation* of risk. In standardisation one can see a

[1] Alexander Klose, *The Container Principle: How a Box Changes the Way We Think*, Infrastructures Series (Cambridge, Massachusetts: The MIT Press, 2015); Levinson, *How the Shipping Container Made the World Smaller and the World Economy Bigger*.

form of logistical translation that aims at the construction of a more certain future. In the production of both physical and digital infrastructures, standardisation aims at either reducing uncertainty, or *extracting value* from it, producing mechanisms of *control* over the complex processes of global logistical capitalism at multiple levels. On the one hand, this is visible in the fundamental uncertainty and heterogeneity that drives the global expansion of capital, and on the other, in the proliferation of Enterprise Information Systems that purport to provide the tools to manage uncertainty, predicting both machine failure and customer desires alike. The drive to standardisation does not aim to totally eradicate either difference or risk. Rather, it incorporates them into its models as a means to extract further value.

Emphasising the expansion of these processes of standardisation does not mean that they are complete or totalizing, or that they do not by default also build in heterogeneous relations of power, distributions of labour, or cultural forms. Standardisation may be understood as the means by which the world is *formatted* for logistical organisation – for the logistical organisation of capital, where heterogeneity produces profitable differentials. In this context, logistical standardisation does not aim to homogenise the world totally and completely. It converts its very heterogeneity into an extractable resource, in which difference can be measured, calculated, and manipulated to create value – in fact, one could go so far as to say that this difference is the resource from which value is drawn. As Mitchell argues, 'the production of modernity involves the staging of differences. But there are two registers of difference, one providing the modern with its characteristic indeterminacy and ambivalence, and the other with its enormous power of replication.'[2] As we have noted, this power of replication emerges out of the difference staged between representation and reality.

Specific to 'supply chain capitalism' as Anna Tsing terms it, the translations of difference, and the economic diversity that characterises global supply chains actually inspire a model of power and struggle, which is on the one hand profitable and subsumable to global capital, and on the other, leaves a space open for radical political action and resistance. Tsing delineates a shift in standards implementation, where 'twentieth century corporations had worked with nation-states to recruit, train, and discipline labour and raw material for commodity production' in supply or commodity chains during the twenty first century: 'such forms of rationalization have been increasingly dismissed as unnecessary "regulation", hampering capital. In supply chain capitalism, as long as the inventory passes standards, labor and environmental practices are catch-as-catch-can.'[3] Logistics is crucial in this turn toward technical standards.

The abundance of organisations that oversee efforts to standardise technical specifications for inventory is a relatively recent phenomenon, with standards organisations emerging in the early 20th century largely in response to difficulties with trading between companies – the Engineering

[2] Mitchell, 'The Stage of Modernity', 26.
[3] Tsing, 'Empire's Salvage Heart', 40.

Standards Committee was established in London in 1901 and takes the claim of the world's first national standards body. By 1931, this organisation became the British Standards Institution, which still operates today. It was in 1929 that the International Federation of the National Standardizing Associations (ISA) emerged, with the charge of enhancing international cooperation on technical standards. Following a period of suspension during the Second World War, the newly created United Nations Standards Coordinating Committee (UNSCC) proposed that the ISA reform as a global standard-setting body, creating the International Organization for Standardization (ISO) in 1947. The ISO, along with the International Electrotechnical Commission (IEC) and the International Telecommunication Union (ITU) together formed the World Standards Cooperation (WSC) in 2001, ensuring the interoperability and proliferation of international standards as 'an important instrument for global trade and economic development'.[4] It aimed at 'a harmonized, stable and globally recognized framework for the dissemination and use of technologies'.[5] According to the WSC website, international standards are vital for political and economic governance. By integrating standards into national regulations, 'governments help ensure that requirements for imports and exports are increasingly harmonized, therefore facilitating the movement of goods, services, and technologies from country to country'.[6]

Standards developed by the WSC – the ISO, ITU and the IEC – are recognised by the World Trade Organisation (WTO) as not conflicting with the 'Technical Barriers to Trade' (TBT) agreement. The TBT aims to promote international standardisation and the proliferation of standards themselves, whilst at the same time 'ensuring that such technical regulations, standards and conformity assessment procedures, which governments might use to describe the characteristics of products being traded, do not create unnecessary barriers to trade'.[7] While many international standards are presented as voluntary, there are a range of pressures on companies and governments to ensure compliance. Compliance can also determine access to trade, as with the case with the requirement of ISO 9000 compliance in order to engage in trade with the European Union. According to the WTO website,

> The difference between a standard and a technical regulation lies in compliance. While conformity with standards is voluntary, technical regulations are by nature mandatory.

[4] 'World Standards Cooperation – About', accessed 29 January 2020, https://www.worldstandardscooperation.org/about/.
[5] 'World Standards Cooperation – About'.
[6] 'World Standards Cooperation – Government', accessed 29 January 2020, https://www.worldstandardscooperation.org/international-standards/the-case-for-business/.
[7] WTO, 'Agreement on Technical Barriers to Trade', Pub. L. No. 1868 U.N.T.S. 120 (1995), https://www.wto.org/ENGLISH/docs_e/legal_e/17-tbt.pdf.

> They have different implications for international trade. If an imported product does not fulfil the requirements of a technical regulation, it will not be allowed to be put on sale.[8]

Elsewhere in the TBT agreement it states that WTO members (164 member and 23 observer governments) should use existing technical standards where 'relevant standards exist or their completion is imminent' as a basis for their technical regulations.[9] The TBT agreement therefore encourages reliance on ISO, ITU and IEC international standards for national regulations as a means to facilitate the smooth flow of global circulatory capital and international trade.

INTERNATIONAL STANDARDS ORGANISATION

The ISO – based in Geneva, Switzerland (like many such bodies) – boasts an intimate relationship with various supranational institutions such as the UN, NATO, OECD, WTO and the IMF to name just a few. It also operates in much the same way as these organisations – it has full members, signatories and associates, each of whom have differing degrees of input into and control over the structure and content of the standards. The ISO has been creating best practices since its inception, though they began publishing them as 'international standards' in 1971.[10] These standards reach across the globe and delimit the dimensions and operations of the world from the micro to the macro, from the technical to the more ephemeral realm of models, management and business processes. The vast majority of ISO standards are proprietary, and cost money to both purchase and implement for certification, compliance or conformity.

ISO standards range from determining the standard tread of a screw, to the width of a credit or ID card, right through to computer protocols such as SQL (which I examine in more detail later) and - possibly one of the most widely adopted standards – the ISO 9000 family of standards controlling 'quality assurance'.[11] This class of standards are the regulatory frameworks for the management of people (i.e., human resources), abstract concepts like 'quality', and environmental impact processes. While the former deal with specific technical requirements and are thus fairly rigid rules for the production and manufacture of goods, the latter are more like the cybernetic models we came across in chapter one – supposedly applicable to any kind of organisation regardless of what the organisation does.

STANDARDS, MODERNITY, TEMPORALITY

We can understand the power these emerging processes of standardisation through a reading of

[8] 'WTO | Technical Barriers to Trade - Technical Information', accessed 29 January 2020, https://www.wto.org/english/tratop_e/tbt_e/tbt_info_e.htm.
[9] WTO, Agreement on Technical Barriers to Trade.
[10] International Standards Organization, *Friendship Among Equals: Recollections from ISO's First Fifty Years* (Geneva, Switzerland: ISO, 1998).
[11] *ISO 9001 Quality Management Systems* (New York, NY: Springer Berlin Heidelberg, 2017), 900.

Mitchell's conception of modernity – this section will figure the international standard as a powerful representation that contributes to the fixing and cohering of the ongoing project of colonial modernity. An exposition of Mitchell's understanding of the spatialization of temporality in modernity will ground a more detailed discussion of the standards and processes of standardisation outlined in the first part of the chapter.

The production of the narrative of the "West", or rather, the "staging" of capitalist modernity, cannot be separated from its colonial history. As outlined in chapter one, Mitchell describes this in terms of the world exhibitions that were held across the Western world in the 19th century. The exhibitions acted as a representation, in the same manner that Said describes in *Orientalism*, of an exotic realm beyond the dreams of the West.[12] At the same time, this representation gives the illusion of a 'pure reality out there, untouched by the forms of displacement, intermediation and repetition that render the image merely an image'.[13] In this way, the representation separates the image or model from its reality: in the same breath denying the reality of the image, or model, and affirming the reality it constructs itself against as a fact. The real of the world then only exists through its representation – through the *staging* of the real. Once staged as the real it is then open to serialisation and replication.

In his piece, 'On the Stage of Modernity', Mitchell continues this project and summarises work done elsewhere in conceptualising modernity as a staging, rather than as a stage – the colonial modern is staged as a representation. Here, as elsewhere, he argues that the colonial modern creates the effect we understand as reality through *organising the world endlessly to represent it.* This is the staging of modernity, which is also then a staging of *difference* – the difference 'between what is staged and what is real, between representation and reality'.[14] Capitalist, colonial modernity can then be better understood in terms of the relationality between the so-called 'West' and the rest of the world, rather than as a unique, totalising and coherent program of 'Western' expansion and domination. Though this interpretation troubles classical histories of the West and its development, it nonetheless still leaves the assumption of a 'West' and its exterior. He demonstrates how the West is conceived of as the *product* of modernity, when in fact this understanding of staging shows that 'modernity is produced *as* the West.'[15]

In this, Mitchell shows us how we can understand modernity as a project contingent on the production of a singular and universal time – the unidirectional and universal history of the West. This situates the West and the rest of the world on an evolutionary continuum of development, with the West perpetually in the "now", and the non-West as perpetually in the *past*, or behind. We can read this in the standardising, normative forces at work in Rostow's modernisation theory

[12] Said, *Orientalism*.
[13] Mitchell, *Colonising Egypt*, 1988, xiii.
[14] Mitchell, 'The Stage of Modernity', 26.
[15] Timothy Mitchell, ed., *Questions of Modernity*, Contradictions of Modernity, v. 11 (Minneapolis: University of Minnesota Press, 2000), 15.

and the developmentalism explored in earlier chapters. The production of a singular and universal history is intimately linked with the territorial expansion and "civilising" mission of imperialism. The imposition of a global, standardised temporal regime should be recognised, Giordano Nanni argues, as a 'project to incorporate the globe within a matrix of hours, minutes and seconds' that represents 'one of the most significant manifestations of Europe's universalising will.'[16] The abstraction and mathematization of time according to the mechanical clock was central to its increasingly formal standardisation in the mid-nineteenth century.[17] A uniform sense of time became central to the 'circulation of information and commodities through the railway, telegraph and faster mail services', which themselves became emblematic of modernity and the logistics of empire.[18]

European global expansion in commerce, transport, communication, and colonial administration 'was paralleled by, and premised upon, control over the manner in which societies abroad related to time.'[19] All of these projects relied on temporal translation and 'the establishment of a specific language and consciousness of time' to bring about a sense of 'world-wide "order"'.[20] Part of the narrative of the "civilising mission" depended on the construction of non-Western populations as idle and inattentive to the passage of time; indeed, 'it was partly by *imagining* itself as a time-conscious civilisation in opposition to a time-less Other, that Western Europe staked its claim to universal definitions of time, regularity, order; hence also to definitions of knowledge, religion, science, etc.'[21] This universal definition of time was concretised in 1884 with the establishment of Greenwich Mean Time as the Prime Meridian of the world, by a delegation of 25 nations recognised as 'civilised'.[22] This was gradually imposed upon, and elsewhere accepted by, nation after nation until it became the global referent for timekeeping. A standardised conception of time based on abstract temporal units thus came to encircle the world. The standardisation and control over the measurement and observance of time is thus an intrinsic aspect of coloniality. This is here demonstrable as a factor in imaginaries of superiority, claims to truth, and the right to govern and "develop"; as well as in terms of synchronising the movement of capital, goods, information, and people with a view to greater control, efficiency and profit. In other words, the

[16] The disruption, erasure and replacement of indigenous and local ways of perceiving and marking the passage of time and the seasons was a fundamental technique in processes of colonisation, whether securing disciplined labour for farms, mines, or plantations, the legitimation of land dispossession, or advancing "primitive" peoples along a scale of development. Giordano Nanni, *The Colonisation of Time: Ritual, Routine and Resistance in the British Empire* (Manchester: Manchester University Press, 2012), 2.
[17] In the 15th century, imperial seafarers searched for exact spatio-temporal methods of calculating longitudinal positions at sea. Known as the science of horology, these methods were instrumental in the charting of oceans and colonisation of the "new world". Nanni, *The Colonisation of Time*.
[18] Nanni, 51.
[19] Nanni, 2.
[20] Nanni, 3.
[21] Nanni, 3.
[22] Nanni, 54.

production of a global temporal regime should also be recognised as consonant with, and contributary to, logistical rationality.

Mitchell draws on Walter Benjamin's notion of homogeneous empty time – as the kind of time measured by clocks and calendars, each unit equivalent, empty – as, in its modern experience, an inherently spatial phenomenon too. Homogeneous empty time 'rests on giving temporality a spatial expression' – the linked expression of the West as the centre of both time and space, wherein 'modernity can be characterized, among other ways, by a sense of presence or contemporaneity created by the spatialization of time'.[23] He writes further, and this is worth quoting at length, that the

> "now" of modernity, its culture of contemporaneity, the particular sense of simultaneity that is taken as modernity's experience, depends upon the representation of an homogeneous space. The inhabitants of this space, almost all of whom never meet one another, can be conceived of as living the same empty moment, as occupying the same time-space. This effect of simultaneity makes it possible to construct the idea of historical time: history is the story of a civilization, culture, or people whose diverse lives are imagined to share a singular epoch and to progress as a unit from one contemporaneous moment to the next. … To stage this homogeneous time-space, there can be no interruptions from the non-West. The non-West must play the role of the outside, the otherness that creates the boundary of the space of modernity[24]

The shared experience of time is inherently linked to the project of modernity, or rather, of the making of the West *as* the privileged site of modernity. It can only be experienced or constructed as a linear, universal history *because* it is so linked to the fictional space of the West, over and against its 'outside'; the non-West, the primitive, the underdeveloped, the colonies. Here, 'the discipline of historical time reorganizes discordant geographies into a universal modernity'; much in the same way, I argue, that logistics organises the world. [25] It is this sense of contemporaneity, the modern understanding of time as a 'unitary, punctual, contemporaneous present', that allows for the sedimentation of the models in and by which we live.[26] Mitchell reckons that it is this that allowed for the construction of the modern nation state – the circumscription of the nation by way of a delimited border and a unified, coherent national history, constituted at the same time by the fact of its borders as the external, the other.

[23] Mitchell, 'The Stage of Modernity', 15.
[24] Mitchell, 15–16.
[25] Mitchell, 8.
[26] Mitchell, 15.

Here, practices of map-making and census-taking figure the nation as a 'real and knowable totality', one that, following these practices and the statistical constitution of the state, can be endlessly replicated through the repetition of the practices that constitute it.[27] This is the world-as-picture, world-as-exhibition, and now *world-as-data* and its serialization. The constant repetition of these representations gather strength 'from the way one picture is echoed and confirmed by another, so that each image forms part of a world-encircling web of signification'.[28] It is the duality of this process, whereby the image, and the reality that is its referent are mutually sedimented – where the 'act of representation, constantly repeated, makes each of these referents – nation, people, economy – appear as objects that exist prior to any representation, as something given, material, fixed in its unique time and space…'.[29] What this allows is an acknowledgement of the dual sedimentation of space and time within a framework that justifies the privileging of the Euro-American mode of societal organisation and notion of "progress".

This understanding of the sedimentation of space and time is vital to the central argument of this chapter. Understanding the coloniality of the construction of a singular, homogenous spatio-temporality that centres the West, or rather, pulls everything non-West into its orbit, we see how this bears on practices of standardisation and logistical software as they operate across the globe according to a unitary temporal and spatial logic. If the production of 'homogeneous empty time' and 'homogeneous space' are co-constitutive, this chapter argues that the logistical production of space and time is intimately interwoven with the ongoing reproduction of colonial modernity. It situates the logistical drive to 'real-time' and prediction, or rather, the attempted translation and incorporation of the future, within the production of the narrative of 'the West', in order to show how this colonial temporal regime can be understood as co-constituting the temporality of logistics.

We see this same process at work in the operation of world-shaping international standards. The aim of a standard is to provide an image, or a blueprint for the ideal, replicable form of objects, procedures, and protocol. These standards are *models* that delineate efficiency. As always, they are portrayed as objective, value free, delineated by experts.[30] They render the world as logistical representations; models and maps for its circumscription into what we might then understand as logistical-colonial-modernity - much as map-making figures the world as a 'real and knowable' totality. The standard figures whatever object, procedure, or protocol as an inherently replicable, representative model that describes a fixed and objective reality. International standards thus represent the globe as a 'homogeneous space' through the configuration of a standardised frame of reference, and the ever-multiplying normative representations of the hard and soft infrastructures that make up the world. In a similar manner, the latter part of this chapter

[27] Mitchell, 18.
[28] Mitchell, 19.
[29] Mitchell, 19.
[30] Mitchell, *Rule of Experts*.

demonstrates how standards and logistical Enterprise Information Systems represent the ongoing production and representation of the 'homogenous empty time'. The production of a world-encircling, *world-making* web of standards as normative representations works also to produce certainty in uncertain futures.

In thinking through the way in which the narrative of modernity rests on the construction of a singular historical time, and the way in which this temporality is spatialized, it is necessary to remember the constitutive outside against which this narrative is assembled. This allows us to theorise how processes of standardisation work to incorporate the world within the realm of logistical legibility; to render the world-as-data. In other words, logistics translates what is perceived as messy, contradictory and illegible into a regime of calculability. Returning to Vázquez provides us here with a useful framework with which to think this logistical translation through. His notion of the 'epistemic territory of modernity', whilst maintaining an understanding that the history of hegemony is tied to the geographical "West", also recognises that its *field of operation* is not limited to a geographical space. In chapter one, we saw logistical translation in terms of modelling the world as complex information feedback systems. In chapter two, we saw how the lifeworlds of populations were translated into logistical models that erased nuance, complexity and possibilities for other forms of social organisation in attempts to mitigate social unrest and insurrection. In chapter three, the translation of complex political, social and economic life into a series of metrics served both the replication of models of debt and economy and the erasure of ways of organising societies otherwise. It is for these reasons we need to think about the subject of logistical rationality, and the processes of inclusion and exclusion operant within it. Who, and what, is erased when the world is translated into logistical legibility?

In the remainder of this chapter I expand Vázquez's notions translation and of the "epistemic territory of modernity" to conceive of the processes and protocols of standardisation and logistical software on these terms. To recall, translation is a process of incorporation and erasure that, for Vázquez, 'subdues the multiple, the discontinuous, difference, into the realm of presence', that enables the 'reduction of difference into sameness, of contingency into continuity'.[31] In what follows I complicate Vázquez's original position, arguing that 'the reduction of difference into sameness' does not mean its total destruction, nor the complete translation of heterogeneity in homogeneity. Rather, that the incorporation of that difference into logistically legible forms includes difference and uncertainty in a regime of calculability. By looking at the cases of both the ISO and the ERP software systems imbricated in the dissemination of standards throughout the operation of global business, we see the translation and incorporation of the world into logistical physical and epistemic territory. By these means, logistical standards are extended and encircle the world in a vast web of surveillant and regulatory governance. I begin with a brief exposition

[31] Vázquez, 'Translation as Erasure', 28.

of the cases of digital languages, technical specification, and the ISO 9000 as specific examples that show how ISO standards are geared toward homogenizing global space and time.

Section Two: World-making models

ISO STANDARDS

In an article by an ISO member entitled "Why intelligent supply chains will rule the world", 'e-logistics' is touted as the imminent arrival of an 'an adaptive, intelligent supply chain – built around standards'.[32] This article stresses the need for cooperation between the multiple standards bodies that govern the supply chain, and for the establishment of standards of electronic data sharing that allow 'disparate business applications and trading communities to exchange information along their supply chains using a common format'.[33] This allows the 'interfacing modes' data structures and formats' to accommodate each other, allowing equal access to partners and customs agencies.[34] The ISO/IEC 19845 specifies the 'OASIS Universal Business Language' or UBL, defining a generic XML interchange format for business documents and objects, that standardises the schemas used for the exchange of data across businesses.[35] Unlike most ISO standards, it is free, open, and customizable (to the extent that an enterprise can create company-specific documents). It is also recognized by the WTO under the TBT agreement. The UBL XML interchange format allows multiple businesses along a supply chain, using different practices, data models, and business software to send standardised information along the way. We can take the process of tracking a shipment as an example of this standardised schema. Requesting an order and following its status sends out a request to each party involved in its transfer. Those parties would respond to this request in a UBL, XML-schema document, which is aggregated and assembled into a report for the user who made the request.

In the case of technical regulations, there is a drive toward the extension of international standards set out by members of the WSC into national regulations for all 164 members of the WTO. The standard delimiting the specifications for credit or identification cards is an illustrative one.[36] ISO/IEC 7810:2019 is a standard that is near global in its implementation that certainly creates the impression of a homogeneous global space – connected to a vast physical and digital infrastructure, credit cards can be used all around the world. As a world-encircling phenomenon,

[32] Elizabeth Gasiorowski-Denis, 'Why Intelligent Supply Chains Will Rule the World', ISO, 11 September 2017, http://www.iso.org/cms/render/live/en/sites/isoorg/contents/news/2017/09/Ref2214.html.
[33] Gasiorowski-Denis.
[34] Gasiorowski-Denis.
[35] 'ISO/IEC 19845:2015 Information Technology - Universal Business Language Version 2.1 (UBLv2.1)', International Standard (International Standards Organisation, December 2015).
[36] 'ISO/IEC 7810:2019 Identification Cards - Physical Characteristics', International Standard (International Standards Organisation, December 2019).

the standard credit card flattens the global space, allowing for and fostering continuous connection to and circulation within global banking infrastructures and the movement of capital. Its universality and ubiquity represents global space as homogeneous, within reach, and *simultaneous* – wherever you are, whatever *time* you are in, so long as there is an ATM or a card reading machine, money can be spent or withdrawn. From these relatively tangible icons of standardisation, in the form of attempts to create a universal language for business and a universal money mover, we can proceed to the more immaterial but no less expansive ISO 9000 family.

ISO 9000

The ISO has recently broadened its scope from technical specifications to develop management standards in a broad spectrum of fields such as environment, health, education, data collection and going so far as government itself. In this context, the ISO acts as a form of private governance that asserts authority without public or political oversight or dialogue, where ISO standards and consultants influence government policy and planning.[37] The focus for this class of standard is to create a model of *processes*; how an organisation structures the processes it uses to determine the quality of its products, its assessments and risk analysis of environmental impact, and so on. With ISO 9000 – the "quality assurance" family of standards – compliance & certification for the standards are determined by an external evaluation of whether an organization has met the targets or addressed the objectives *that it has set for itself*.[38] It does so by elaborating eight principles – Customer focus; Leadership; Involvement of people; Process approach; System approach to management; Continual improvement; Factual approach to decision making; and Mutually beneficial supplier relationships.

Here we can begin to sketch out the ways in which the empty model of the ISO 9000, and the procedural protocol it defines, reconstructs and redefines the world as a rationalisable, calculable, homogenous space. That this "process standard" is deemed applicable to almost any enterprise, of any size, from health care organisations, to universities, to multinational corporations, demonstrates the implied fungibility of the "thing" to be "quality assured". Difference here is subsumed into a model that proclaims universal applicability and unending replicability through the emptiness of the model itself – as noted earlier, the ISO 9000 delineates and represents the *form and structure* of the processes, but not the processes themselves. For Mitchell, as it seems for the ISO, 'it is not a particular representation of space that characterizes the production of the modern, but the organization of reality as a space of representation'.[39] To

[37] Easterling, *Extrastatecraft*, 134.
[38] 'Quality Management Principles' (International Standards Organisation, 2015), https://www.iso.org/files/live/sites/isoorg/files/store/en/PUB100080.pdf; *ISO 9001 Quality Management Systems*.
[39] Mitchell, 'The Stage of Modernity', 27.

demonstrate this ongoing organization of reality through representative models and modelling, I will now outline Enterprise Information Systems (EIS) software and the predictive analytics that drive logistical capital.

EIS AND ANALYTICS

Here I look to some of the software suites, analytics and algorithmic processes that govern many modern organisations and supply chains. In order to render the logistical drive towards standardisation clearer, I focus on EIS systems, translytical databases and predictive analytics. In shifting my attention to the analysis of these logistical systems, I complicate the account of colonial-modernity and the co-construction and representation of homogeneous time and space that Mitchell provides. The *representation* of homogeneous time and space is central to logistical capitalism, whose continued running relies crucially on the speed and scale on which its operations unfold. As a way of showing this intimate relationship, this section examines the compression, or attempted annihilation of time and space in logistical organisation, through looking closely at the notions of "real-time", prediction, and speed that are deemed to underpin "supply chain capitalism".[40] Viewed from this perspective, Enterprise Information Systems can be understood as the construction of a virtual, abstract 'homogeneous space' for the ordering of things; in other words, the ordering of the territory of the 'real'. In the final part of this chapter, I shall elaborate on how aspects of Enterprise Information Systems operate at the algorithmic level. I argue that these systems attempt to map organisations, both internally and in relation to each other, and in accordance with the temporal logic of colonial modernity tied to efficiency, profitability, development, and rationalisation.

Enterprise Resource Planning software, or ERP, is a class of software that aims to rationalise, standardise and automate business processes along supply chains. It is one type of the broader class of Enterprise Information Systems or EIS, which is understood as encompassing the various different classes of business intelligence software; including Supply Chain Management systems (SCM), Customer Relationship Management (CRM) and Knowledge Management systems (KM). From manufacturing and production to finance and customer service, the central aim of ERP is to create a streamlined, efficient and more productive organisation through centralising information flows across all aspects of the organisation, integrating all datasets, business processes and functions and so on.[41] This is essentially the contemporary, advanced and algorithmic form of Forrester's cybernetic industrial dynamics we saw in chapter one.

[40] David Harvey, *The Condition of Postmodernity: An Enquiry into the Origins of Cultural Change* (Oxford [England] ; Cambridge, Mass., USA: Blackwell, 1989); Paul Virilio, *Speed and Politics*, 2006 ed., Semiotext(e) Foreign Agents Series (Los Angeles, CA: Semiotext(e), 2006).

[41] For example, the APICS supply chain management dictionary defines ERP as a 'framework for organizing, defining, and standardizing the business processes necessary to effectively plan and control an

EIS grew out of the aims of Physical Distribution Management and Industrial Dynamics in the 1960s and 1970s, where Manufacturing Resource Planning (MRP) systems and Production and Inventory Control Systems (PICS) were early versions of computerised scheduling and planning methods for industrial production.[42] These early systems were big, expensive, and required a huge amount of technical support to run. The development of faster computing and higher capacity random access storage spurred the continuous development of more inclusive and totalising software systems. By 1972, SAP (*Systemanalyse und Programmentwicklung*), now one of the largest ERP providers, was founded. A core aim of SAP was to produce standardized software for the integration of business solutions. Oracle, another major EIS software firm today was established in 1977 and introduced the first SQL (Structured Query Language) relational database management system in 1979. In its capacity as a specific coding language, SQL allowed for complex requests to be asked of structured data where there are multiple relations between different aspects, entities or variables within the database – in short, it allowed for the manipulation of the structure of, as well as the data contained in, a database. Although SQL later became a standard of the American National Standards Institute (ANSI) in 1986, and of the ISO in 1987, this did not automatically ensure compatibility between different vendors nor did necessarily follow standards themselves.[43]

EIS software programs and their predecessors emerged before the age of the World Wide Web. Early forms were siloed in each specific organisation – software was designed for a particular business with heavy customization and with little care about interoperability between organisations or along supply chains. This, however, is changing rapidly, with the proliferation of standards that aim to increase interoperability, from the modelling of enterprises, to the software and coding languages used, to the physical infrastructure that enable the circulation of capital as we have seen above.

Contemporary EIS systems are usually modular in nature, meaning that an organisation can purchase the basic software 'out of the box', and either add other standard modules or customise existing ones for different functions and aspects of different organisations.[44] EIS are touted as enhancing efficiency, productivity and profitability across almost all types of businesses; the fundamental premise, much like in the ISO 9000, being that the model of EIS systems is purportedly applicable and tailorable to any kind of content or business. Where one business might only need some aspects of the software, for example a finance, accounting, human

organization and how it can use its internal knowledge to seek external advantage' Blackstone Jr., J.H., Cox, J.F., 2005. APICS Dictionary, 11th ed. APICS: The Association for Operations Management. (p38)

[42] F. Robert Jacobs and F.C. 'Ted' Weston, 'Enterprise Resource Planning (ERP)-A Brief History', *Journal of Operations Management* 25, no. 2 (March 2007): 357–63.

[43] 'ISO 9075:1987: Information Technology - Database Languages - SQL - Part 1: Framework (SQL/Framework)', International Standard (International Standards Organisation, 6 January 1987).

[44] David Romero and François Vernadat, 'Enterprise Information Systems State of the Art: Past, Present and Future Trends', *Computers in Industry* 79 (June 2016): 3–13.

resources, and inventory module, a multinational dealing with the entirety of the production, manufacture and distribution processes across supply chains would require a number of others.[45] The modules are designed as "plug ins" that add on to the standard or basic software package, to add different functionalities and tiers of management. On the internal level, EIS systems serve to standardise the internal processes of a business or organisation, through the centralising of datasets, information flows, and the standardisation of coding languages and report generation. The modules share data with one another – for example, inventory, human resources and purchasing will all share data with one another in order to create a single database through which the business manages all these processes more efficiently. An update in inventory, sales, or returns will affect accounting, finance, and so on.

EIS systems are thus designed to capture (*extract*) data and use it to optimize and calibrate the workings of an organisation – to rationalise and incorporate all the messy, "human" elements and render them legible and productive. Dillard et al propose that ERP systems should be read as the physical manifestation of instrumental rationality as the 'enabling and constraining logic of modernity'.[46] They argue that these systems 'inherently embody the tenets of administrative evil', as they are implemented on the basis of appeals to instrumental rationality, technological determinism and for the demands of capital regardless of the purpose of the organisation.[47] For them, ERP systems obfuscate human choice and morality via the prioritisation of instrumentally rationalised and legitimated protocol and administrative hierarchies.

ERP, or more broadly, EIS systems constitute the *attempted* mapping of a business or organisation, and the translation of all the processes it conducts and all the interactions it has with the world, for the benefit of increased efficiency, productivity and profit. They create a real-time, cybernetic-cartographic representation of an organisation – which could be a business, a hospital or health-care system, a university, or a governmental organisation (again, much like the empty model of the ISO 9000). EIS systems model and govern, then, to some extent, the internal logic of an organisation, and multiple organisations that operate as part of an enterprise along a supply chain. Such processes translate different structures and organisations into logistical legibility, into the world-as-data, and hence into a regime of representation and replicability. According to the EIS narrative, the software is deemed to be flexible enough that through streamlining and increased informatics management, the implementation of these expensive

[45] Massive MNC's often build their own software as the scale and complexity of their operations require highly customised software. Amazon, for example, sell their own range of ERP products allowing businesses to tap into their already highly developed logistical infrastructure, in the use of databases, cloud services and predictive software or their physical logistical distribution networks. 'AWS Smart Business - ERP', Amazon Web Services, Inc., accessed 4 March 2020, https://aws.amazon.com/campaigns/smart-business/ERP/.

[46] Jesse F. Dillard, Linda Ruchala, and Kristi Yuthas, 'Enterprise Resource Planning Systems: A Physical Manifestation of Administrative Evil', *International Journal of Accounting Information Systems* 6, no. 2 (June 2005): 108.

[47] Dillard, Ruchala, and Yuthas, 107.

systems will ensure a return on the initial investment (although it often does not).[48] Like so many of the models, maps, and representations of the first three chapters, EIS attempt to delineate and simplify everything, to render all points legible and cross-functional, synced together in perfect feedback. These systems are supposed to enable the centralisation of information flows and power, into diagrammatic maps that update second by second, or rather micro-second by micro-second, affording the capture and extraction of incredible amounts of data on all aspects – human or non-human. This is automatically fed back into the system through machine learning algorithms that continually analyse, optimise, and refine.[49]

The implementation of EIS, however, is rarely completely successful and many organisations come across difficulties when rendering qualitative or complex, messy real-life problems into perfectly working code and software systems. Implementation processes tend to go over time and budget, and even when fully implemented, usually contain a number of "work-arounds" – subversions of the "out of the box" code that use the model in non-prescribed ways.[50] These work-arounds are generally the result of the actual users of the systems – where the way of doing something prescribed by the software is not fit for the purposes of the members of staff using them. They often circumvent, deviate and reconfigure their usage of the software. This has consequences for the standardizing mission of the software and for compliance to the standards that they are supposed to uphold. As a result, despite in-built promises of the ease of compliance with ISO standards such as ISO 9000/9001, EIS software can be used "badly", and can end up fostering practices that go against the standards the company might be certified for and by the implementation of the software. How internal standardisation affects the external is a question of the interoperability of the software; the kinds of standards and best practices that are built into it; and the increasing use of the software across different sized businesses and in governments across the world.[51]

EIS systems extract data from the workings of the organisation in order to provide analytics for the streamlining and optimization of business processes and management along the supply chain.

---

[48] Classic ERP programmes can cost anywhere between £3m and £100m to implement, requiring years of consultations, consultants and tech support. This meant that until recently only medium to large organisations could undertake ERP implementation; however, cloud-based ERP services are becoming more popular and these are more affordable/available/less cumbersome for smaller businesses.

[49] Zhaohao Sun, Francisca Pambel, and Fangwei Wang, 'Incorporating Big Data Analytics into Enterprise Information Systems', in *Information and Communication Technology*, ed. Ismail Khalil et al., vol. 9357 (Cham: Springer International Publishing, 2015), 300–309, http://link.springer.com/10.1007/978-3-319-24315-3_31.

[50] Rajesri Govindaraju, 'Enterprise Systems Implementation Framework: An Organisational Perspective', *Procedia - Social and Behavioral Sciences* 65 (December 2012): 473–78.

[51] The format that internal standardisation takes also depends on the increasing use of the Universal Business Language (UBL) outlined above, and its interoperability with the major EIS vendors. In fact, it was with intellectual property technical support from CommerceOne and SAP, and work done by the US government that got the initial UBL scheme off the ground. Jon Bosak, 'UBL Is an ISO International Standard, so Now What?', *Tradeshift Blog* (blog), accessed 29 January 2020, https://hub.tradeshift.com/tradeshift-blog/ubl-is-an-iso-international-standard-so-now-what.

They constantly modulate performance through the extraction and calculation of ambient data, generated through the daily workings of the organisation and between different aspects of the business. The incredibly complex nature of supply chains and global, circulatory capitalism at large brings a great deal of uncertainty – the possibility of machine, transport, and infrastructural failure is intrinsic to the organisation of so many moving parts. A central role of EIS is then to organise the algorithmic, 'real-time' tracking of machines and the translation of this data into predictions of potential failures. Stoppages in the speed-driven flow of logistical circulation can cost millions in lost revenue, so planning for unpredictability is paramount. Turning the certain uncertainty that processes will fail into calculable risks and workable predictions means that interventions before an event happens ensure the continued flow of goods, services, and profits. Again, this is a central aspect of logistical rationality – the future-oriented control and valorisation of uncertainty, via the extraction and translation of information about the world into data. The world imagined by these machines as a cybernetic system of flows to be optimised is a world-making representation of the world-as-data; calibrating informatics determine optimising actions, which arrange infrastructures, supply lines and channel workers.

Since 2015 there has been a trend toward what EIS software services are calling "translytical" databases – defined as a database that 'can ingest and analyse data *in-transaction* and enable real-time, *in-event analytics* and decisioning'.[52] What these databases purport to do is support 'transactional, operational and analytical workloads in a single database'.[53] Before, each of these sets of operations would take place in different 'stacks' – the aim in translytical software is to collapse these stacks into a single system that stores data "in-memory" rather than "on-disk", increasing the speed at which these processes can occur.[54] There, databases store and process the streams of data being generated in "real-time". If we think about the myriad of processes that encompass an organisation that sells products, from purchasing, to inventory, to distribution, online shopping and advertising, each of these activities generate masses of data that can be used to feed into machine learning algorithms for both discrete and holistic optimisation of their processes. In a translytical database, the different "silos" of data are combined for the integration of potentially relevant datasets and "streaming data"; the continuous flow of data as it is generated through interactions with various technologies and devices.

More and more EIS providers are using Artificial Intelligence (AI) and Machine Learning (ML) algorithms to conduct analytics for the measurement, prediction and control of business processes. Real-time analytics are fast becoming industry standard. Managers can observe manufacture, production, inventory, marketing, accounting, distribution and other processes as they happen, for the supposed continual optimisation of every interrelating aspect of the

[52] Madhup Mishra, 'Translytical Has Become Synonymous with Real-Time', InfoWorld, 6 March 2018, https://www.infoworld.com/article/3261028/translytical-has-become-synonymous-with-real-time.html.
[53] Mishra.
[54] Mishra.

business. This principle of "continual improvement" is also, if we recall, a core tenet of the ISO 9000 family (and logistics more broadly speaking).[55] The ability to see all processes in 'real-time' has the dual effect of time-space compression: processes that may be happening at vast distances in the case of global or multinational companies are able to be observed and manipulated at once from a completely different point in the supply chain. In effect, it is the attempted annihilation space through time characterized first by Karl Marx, later by David Harvey and then by Paul Virilio, as a defining characteristic of capitalism, empire and postmodernity respectively.[56] Or rather, it is the impossible dream of logistics to annihilate space *and* time; in the attempted conquest of space and the reduction of time to the point of the present – 'real time'. More than this, in the incorporation of ever-increasing consumer data analytics, logistics dreams of predicting and satiating desires instantaneously.

Given the centrality of these analytics and big data to logistical software, it is useful now to delve into the actual workings of the algorithmic processes that these software suites and database architectures use to manage logistical operations in the contemporary supply chain. Standardisation at the level of data translates the world into firstly "raw data", and subsequently into "features" or "datapoints", to form predictions that then reach back into the world in the form of automated decisions or actions. In the next chapter, we will see how these automated decisions and actions come to bear on human behaviour – in short, we will focus more specifically on the *subject* of representation in logistical rationality, or put differently, on the subject of logistics.

Section Three: Extraction and Prediction

Translytical databases

> offer the ability to support many use-cases, including real-time insights, predictive analytics, streaming analytics, real-time data access, and extreme transactional processing. Storing and processing customer data in a single integrated translytical platform enables businesses to upsell and cross-sell new products based on customer likes, dislikes, buying patterns, friend circles, and past orders.[57]

The trend toward the further centralisation of process and data management echoes the tendency to shrink and annihilate time and space – where the "distance" between databases, analytics and transactions is eliminated. The extraction and use of "hypergranular analytics" from social media

[55] Cowen, *The Deadly Life of Logistics*; Neilson, 'Five Theses on Understanding Logistics as Power'.
[56] Karl Marx, *Grundrisse: Foundations of the Critique of Political Economy* (London: Penguin, 1857); Harvey, *The Condition of Postmodernity*; Paul Virilio, *Speed and Politics*, 2006 ed., Semiotext(e) Foreign Agents Series (Los Angeles, CA: Semiotext(e), 2006).
[57] Noel Yuhanna and Mike Gualtieri, 'Emerging Technology: Translytical Databases Deliver Analytics At The Speed Of Transactions', 2015, 6.

and importantly, mobile devices relies on decreasing the distance, both physical and metaphorical, between the company and the customer. The Forrester report explains that translytical software allows you to tap into 'mobile connectivity via smartphones and tablets' which 'collects even more data, such as geolocation, that you can use to learn how your customers behave throughout their days. An integrated view of these sources can give you unprecedented levels of detail about your customers'.[58]

The extraction of this mobile data is often actually done by a host of different companies. A cursory glance at the different applications and analytics services that place "cookies" and other tracking technologies on your devices reveals that on any one website there may be hundreds of companies collecting data on how you use it.[59] The fact that the majority of mobile devices now have sensors works towards adding to this wealth of data. For example, one Google program/script (present on any android operating system) that can be added to any mobile application is 'Activity Recognition API', which analyses data streaming from the sensors on your phone to identify any activities you are engaged in.[60] This could be a mileage app, tracking the distance of a journey, or a fitness app tracing the steps you have made. This data is analysed alongside other ways you use your phone – for instance, what website or app you usually open after the device has been resting on a table for a while – produces a clearer narrative of what a person does in their daily life.

Data about you is thus constantly extracted and cross-referenced with a plethora of other data markers and across devices: frequent IP addresses; other websites or apps the devices have used; geolocation through signal towers; and Bluetooth signals picked up by beacons in retail shops and public and private spaces.[61] Beacons connect with smartphone devices in the vicinity and correlate offline movements with online search data – matching "real world" behaviour and the location of a user with online activities. This is an example of the attempted translation of *more* of the lifeworld and the lived everyday that is ostensibly *offline* into machine readable data. In addition, alongside the Google Activity Recognition API, data can be gathered on how you travelled to the vicinity of the beacon. The list of devices and applications that gather, store, share and correlate data on the minutiae of the lived everyday is seemingly boundless. The distance

[58] Yuhanna and Gualtieri, 2.
[59] See Ghostery, a tracker protection suite of applications. The software renders trackers operating on any given website visible and allows you to intercept them. J. Signanini and F. Shnir, *Ghostery* (Cliqz GmbH, 2014), https://www.ghostery.com/.
[60] Google, 'Activity Recognition API', *Google Developers* (blog), accessed 5 March 2020, https://developers.google.com/location-context/activity-recognition.
[61] Nic Newman, 'Apple IBeacon Technology Briefing', *Journal of Direct, Data and Digital Marketing Practice* 15 (2014): 222–25; Allen LU et al., System and Method for In-store Tracking (Pittsburgh), accessed 30 January 2020, https://patentimages.storage.googleapis.com/7a/bf/b8/97f0eb8162c1a5/US20150278829A1.pdf; Iskander Sanchez-Rola et al., 'The Web Is Watching You: A Comprehensive Review of Web-Tracking Techniques and Countermeasures', *Logic Journal of IGPL* 25, no. 1 (February 2017): 18–29.

between the person, what they do, and the extraction of the data consequently generated is collapsed to the point that it is understood as "real-time", and often centred directly on the body.

The very way you interact with a website also generates data. This is extracted in many ways – one being via "web logs". The web log is essentially the interface of the website - which can appear in different ways to different people. In A/B testing, one person might see a 'shop now' button, and other a 'buy now' button.[62] This is one of the ways a company and their third-party analytics providers experiment on their webpage users – data will be collected and analytics used to determine the button with the higher amount of "engagement" or "follow through". Web logs can also gauge where your cursor is on the page, how long it hovers there, your scrolling habits, how long you spend on the page, or view a particular form of media (like a video), amongst other things. Combining these analytics with geographical or spatial data, such as *where* your device is when you view the webpage, or in the virtual space, which website address you were visiting before you arrived at the one you are on currently, provides even more data to be analysed and a more detailed picture of your activities.[63] The kinds of data that are pooled are then the historical data on previous transactions and usage, streaming data coming in from webpages, sensors and the 'internet of things', and so on, in order that future behaviour might be predicted. The next chapter shows how this surveillance not only attempts to predict this behaviour, but actively shapes it. As highlighted in chapter two, contemporary drone operations work on similar data analytics – the idea behind these technologies, such as Activity Based Intelligence and 'pattern of life' analysis, is that by recording the movements of a person or group of people it is possible to apply surveillance trans-temporally. The same happens in online advertising: what is under surveillance is simultaneously the subjects past (by storing data of their movements, actions and transactions), their present (by recording their current movements) and finally, their future – since by producing a pattern of life, data recording is aimed toward *prediction*.

MACHINE LEARNING

In a machine learning (ML) algorithm, of the sort that streaming or predictive analytics in an EIS or translytical system would use, these past and present data are continuously extracted and combined to help an algorithm learn, make predictions, and even automate actions or decisions based on those predictions. ML algorithms are, in effect, more empty models. Most require that real-world information be translated into numerical data. This could be text, image, sound, video; or "ambient" or meta data of the kind outlined above. This data must be then be standardised. Each word, pixel or soundwave is translated into numerical values. It is at this point that so-called

[62] Dan Siroker and Pete Koomen, *A / B Testing: The Most Powerful Way to Turn Clicks into Customers* (New Jersey: John Wiley & Sons Inc, n.d.).

[63] For a recent and comprehensive review of the state of Online Behavioural Advertising and the broader scope of the literature around it, see: Kaan Varnali, 'Online Behavioral Advertising: An Integrative Review', *Journal of Marketing Communications*, 17 June 2019, 1–22.

"features" are extracted – features being a measurable value or characteristic that the algorithm will use to complete its task and find meaningful patterns in.[64] A feature might be something like height, weight, colour, grammar, or shape, if these values are pertinent to the predictions needed. The selection of features is expected to contain specifically relevant information from the "raw data" – this is key to speeding up processes so the algorithm need not trawl through all the data available.[65] These features will be updated as the algorithm works – that is, if the ML algorithm determines that a particular feature is useful to the task at hand, it will bring in more data from the bank that links to said feature.

An example could be an ML algorithm using the Bag of Words model, fed a dataset of millions of sentences so that it learns how words relate to one another and to select features for analysis.[66] The program will have only a vocabulary of known words and a measure of their presence - no prior knowledge of the order or structure of the words is used. The algorithm then 'quantizes' and renders the words in relation to one another – so each word becomes a datapoint in the abstract high dimensional space, and each datapoint might have two hundred or more dimensions.[67] The algorithm clusters words together based on how the numerical values of the words relate to one another, finding patterns in the data of the sentences and arranging the words accordingly. The ML algorithms, then, are organising these data in what is known as the "feature space". In ML, this feature space is widely understood as 'high-dimensional space' – where each datapoint can contain hundreds of dimensions (and where each datapoint is made up of a set of numbers from the translation of the dataset).[68] A feature space is essentially the axis within which data are sorted according to the criteria inputted into the algorithm. Datapoints are put into geometrical relation to one another in abstract spatial and temporal terms, and are assembled according to their 'shortest path'.[69]

If the algorithm is tasked with making predictions, the data are then reworked into a chronological linear time line to make predictions and assemble meaningful patterns based on the 'between-ness', as Aradau and Blanke put it, or rather, the *relationality* between different datapoints and their connections.[70] In effect, chronological time is rendered artificially in this

[64] Ethem Alpaydin, *Introduction to Machine Learning*, 3rd ed. (Cambridge: MIT Press, 2014).
[65] We should consider here whether data is ever "raw". All data is subject to translation and processing in its manufacture. The use of the term 'raw' can be seen as a naturalisation of data as a resource to be mined and exploited; an impartial, pristine and importantly, *representative of reality*.
[66] Yin Zhang, Rong Jin, and Zhi-Hua Zhou, 'Understanding Bag-of-Words Model: A Statistical Framework', *International Journal of Machine Learning and Cybernetics* 1, no. 1–4 (December 2010): 43–52.
[67] Prateek Joshi and Alberto Artasanchez, *Artificial Intelligence with Python: Your Complete Guide to Building Intelligent Apps Using Python*, 2nd ed. (Birmingham: Packt, 2020).
[68] Michel Verleysen and Damien François, 'The Curse of Dimensionality in Data Mining and Time Series Prediction', in *Computational Intelligence and Bioinspired Systems*, ed. Joan Cabestany, Alberto Prieto, and Francisco Sandoval, vol. 3512 (Berlin, Heidelberg: Springer Berlin Heidelberg, 2005), 758–70.
[69] Claudia Aradau and Tobias Blanke, 'Politics of Prediction: Security and the Time/Space of Governmentality in the Age of Big Data', *European Journal of Social Theory* 20, no. 3 (August 2017): 8, https://doi.org/10.1177/1368431016667623.
[70] Aradau and Blanke, 'Politics of Prediction'.

abstract feature space, where past, present and future are all organised according to the measurement of this relationality, and according to whatever is mapped onto the geometry of the feature space – or in other words, the specific questions being asked by the algorithm. This 'between-ness' relates to the multi-directional and multi-temporal connections, where the high-dimensional feature space captures the 'accidental or nonchronological relations' that can be 'better predictors of the future'.[71] Put differently, the relations between past, present and future become muddied in the algorithmic space, in order that they then may be woven back together in a particular, more certain image of the future. In one sense, then, this calculation of between-ness *produces time as a relation* between datapoints, and in another, *linear time is reassembled* in the abstract feature space to create the conditions for near-real-time decision-making, as is the case with the translytical software outlined above.[72]

So, what is really happening, when we think about the logistical imperative to 'real-time' analytics, is that logistics requires not only the shrinking of time and space implied in the speed of supply chains and the movement of goods, but, in their algorithmic governance, the actual *collapsing* of the categories themselves. Temporal and spatial relations in the abstract digital feature space of the algorithm are disassembled and reassembled to render representations and predictions about the future. What we see here then is the way in which contemporary logistics produces and organises time and space in its own image. Logistics legitimises itself as a mode of organisation and a governing, normative rationality through promises on the future – ROI (return on investment), development, urbanisation, smoother, faster, and more profitable trade. In so doing, it fortifies its own legitimacy – producing and utilising complexity and uncertainty in supply chains and its corollary risk management industry, consumer behaviour and advertising services, protocols for standardisation and for control, prediction and surveillance. The production of logistical temporalities thus reinforces increasingly pervasive structures of surveillance.

Logistics then represents a doubling of time. This is evident first in the overarching temporality of colonial modernity, of modernisation, progress and Mitchell's contemporaneous present that logistics represents and seeks to draw the world into. Second, in the simultaneous collapsing of time and space that is a signature of contemporary logistics. Considering that the impossible dream of logistics is to collapse time and space to allow for the instantaneous, and even predictive, satisfaction of desires in global circulatory capitalism, how does this dream map onto the fixing and cohering of historical time and space we find in Mitchell? On the one hand, the overarching imperial temporality that represents the world as a homogenous space, operating in homogeneous time, makes the world amenable to calculative organisation and processes of

[71] Wendy Hui Kyong Chun, *Updating to Remain the Same: Habitual New Media* (Cambridge, MA: The MIT Press, 2016), 56.

[72] Aradau and Blanke here are concerned specifically with prediction in 'governmental apparatuses of discipline, biopower and big data'. They interrogate what discipline and surveillance means in the algorithmic space of predictive policing and anticipatory governance. It is sadly beyond the scope of this chapter however makes a clear avenue for future inquiry. Aradau and Blanke, 'Politics of Prediction', 1.

standardisation, and on the other, algorithmic understandings of time and space collapse those categories and allow for the extraction and translation of intimate, incoherent and dispersed forms of knowledge and information to be corralled into its overarching framework.

Conclusion

In thinking through Mitchell's insistence on the ontological separation of the image and physical reality as the metaphysics of colonial-modernity, what logistics management software (or EIS) does then is constitute and fix the world as a series of supply chain networks; as replicable and replicated spaces, represented and managed in the virtual space of EIS software as in the world. Imbricated with the standards of the ISO, EIS thus offer a standardised model that promises increasing interoperability and a particular form of homogeneity across supply chains. Regardless of the type of organisation, regardless of the heterogeneity in the type of business it does, product it moves, or people it manages, EIS delineates the *form and structure* so that it is replicable in each case. It is this replicability, their mutual affirmation in their seemingly boundless applicability, that helps to produce logistics as a world-encircling phenomenon. It renders more and more of the world legible to logistical organisation in which its resources are cast as calculable, optimisable, and extractable. In casting these types of software as mere representations, diagrams, or models of the world, the 'reality' they 'represent' is cast in this calculative light – these models map the world-as-data and in doing so, render it so, opening it up to logistical legibility and management.

The inherent heterogeneity and contigency of the world is monetised; transformed into calculable risk in the ISO 9000 risk-management formulation of quality assurance, and translated into numerical values and run through algorithms to extract and cohere images of the future. The world is thus represented as and (incompletely) transformed into a logistically homogeniseable space, where supranational organisations and global trade relies more and more on the adoption of standards and best practices for the purposes of logistical connectivity, and for the removal of barriers to the smooth flow of circulatory capital. Put differently, or in Vazquez's terms, standardisation and logistical software attempt to incorporate the world into both the epistemic and material territory of logistics – to translate the world into a regime of calculability and ordering that draws past, present and future together into a single, contemporaneous 'real-time' homogeneous space of global capitalism. This chapter has focused on the circulatory system of goods and data in respect to global supply chains, and how processes of standardisation are based on the same ontological distinctions that characterize the foundations of colonial-modernity. In the next chapter, I will demonstrate the specificities of the data-driven government of populations in relation to companies like Cambridge Analytica.

FIVE: BEYOND SURVEILLANCE CAPITALISM: BEHAVIOUR, INFLUENCE, AND INTERVENTION

> Epistemic violence, that is, violence exerted against or through knowledge, is probably one of the key elements in any process of domination. It is not only through the construction of exploitative economic links or the control of the politico-military apparatuses that domination is accomplished, but also and, I would argue, most importantly through the construction of epistemic frameworks that legitimise and enshrine those practices of domination.[1]

> Where did logistics get this ambition to connect bodies, objects, affects, information, without subjects, without the formality of subjects, as if it could reign sovereign over the informal, the concrete and generative indeterminacy of material life?[2]

Introduction

This thesis has examined several related aspects of logistics as rationality, here understood as an organising principle or order of rationality. These include rationalisation and regimes of measurement and calculation; cybernetics and the control of uncertainty; the extraction & translation of data; surveillance and counterinsurgency; and the legacies of colonialism and imperialism that underpin them. As key nodes of current forms of the coloniality of power, they take on new significance in what many understand as the "age of Big Data" and inform a new digital regime of knowledge production.[3] This is an epistemological shift in which data-processing has become the prevalent mode of the production of knowledge and is based on three related assumptions. First, that 'data reflects reality'; second, that 'data analysis generates the most valuable and accurate knowledge', and third, that the 'results of data processing can be used

[1] Enrique Galván-Álvarez, 'Epistemic Violence and Retaliation: The Issue of Knowledges in Mother India', *American Studies.*, 2010, 12.
[2] Harney and Moten, *The Undercommons*, 92.
[3] Franklin, *Control: Digitality as Cultural Logic*; Ricaurte, 'Data Epistemologies, The Coloniality of Power, and Resistance'; Louise Amoore, *Algorithmic Life: Calculative Devices in the Age of Big Data*, 1st ed. (Abingdon, Oxon ; New York, NY : Routledge is an imprint of the: Routledge, 2015); Martin Berner, Enrico Graupner, and Alexander Maedche, 'The Information Panopticon in the Big Data Era', *Journal of Organization Design* 3, no. 1 (10 April 2014): 14; Yongxi Chen and Anne S. Y. Cheung, 'The Transparent Self Under Big Data Profiling: Privacy and Chinese Legislation on the Social Credit System', *SSRN Electronic Journal*, 2017; Ezekiel Dixon-Román, 'Toward a Hauntology on Data: On the Sociopolitical Forces of Data Assemblages', *Research in Education* 98, no. 1 (August 2017): 44–58.

to make better decisions about the world'.[4] I show that these three assumptions can be better understood in relation to the coloniality inherent to the project of logistical rationality, which I have illustrated through an adaptation of Mitchell's regime of representation and replication. As I have argued, this regime brings about a representation of the world-as-data. This final chapter ties together the various strands of logistical rationality under this ostensibly "new regime" of knowledge production, by investigating the network of actors, theoretical justifications, infrastructures, techniques, technologies and logics that made possible the events surrounding Cambridge Analytica, which recently became the object of public outcry. This thesis may then be understood as a historicised and philosophical analysis of this particular moment's constellation of state-corporate-military digital surveillance.

I understand these logics as part of a broader coloniality of power in logistical rationality, and follow decolonial thinkers in order to interrogate the ways in which these logics manifest 'the violent imposition of ways of being, thinking, and feeling that leads to the expulsion of human beings from the social order, denies the existence of alternative worlds and epistemologies, and threatens life on Earth', as Ricaurte writes.[5] We must then interrogate the epistemic violence that undergirds contemporary digital-logistical formations – for example, in the case of Cambridge Analytica and its associated networks – as a key infrastructural element in current processes of domination. To demonstrate the historical connections between the forms of logistical rationality explored in previous chapters and its current form in Big Data, this chapter proceeds as follows.

The first section will outline Zuboff's notion of 'Surveillance Capitalism' and her understanding of the mechanisms of extraction, prediction and behavioural modification that underpin this regime.[6] Elaborating on Zuboff's model, I show how the extraction, translation, modelling, and prediction of the behaviour of populations works toward the end of administering it. In line with Zuboff, I will show that the surest way to predict behaviour is to control it. I go beyond this, however, to argue that while recent developments in the capacity to harvest ever finer granularities of behavioural data represent a new level of intensity (and which reached a public climax in the Cambridge Analytica scandal), the fundamental logics that underpin these techniques have been in place for longer than Zuboff allows in her narrative. I have shown throughout this thesis that these logics are in fact a continuation and recalibration of colonial and imperial practices of mapping, extraction and translation, and the paternalistic governance of subjects always already deemed 'irrational' and hence incapable of governing themselves.

The second section will begin with a brief exposition of the Cambridge Analyica controversy, showing that it can be better understood through an exposition of Behavioural Economics (BE), libertarian paternalism and the 'new neuros' outlined by Jessica Pykett as a legitimating

[4] Ricaurte, 'Data Epistemologies, The Coloniality of Power, and Resistance', 350.
[5] Ricaurte, 351.
[6] Zuboff, *The Age of Surveillance Capitalism*.

theoretical framework for the control of, or interventions in, the behaviour of target groups.[7] I point to the cybernetic roots and conceptions of control in the foundations of BE, and highlight the importance of the turn toward affect as a means of accessing and, importantly, *controlling* decision-making processes in conditions of uncertainty. I show how in forms of experimental governance, this amounts to a reworking of colonialist tropes of "people without rationality" as a basis for intervention. This allows us to open up a critique of Zuboff to argue further that any examination of current modes of surveillance must incorporate an analysis of the epistemic violence inherent to it and, further, the imbrications of military, state and corporate power and the violent histories that precede it.

The third section returns to Cambridge Analytica (CA) to show the trajectory of behavioural economic theory through the conceptual, agentic, political and material network of companies and stakeholders that extend beyond CA and its parent company, Strategic Communication Laboratories (SCL). I take the case of CA and SCL not as an isolated event but as a gateway to this analysis of the broader structural framework within which the operations of this company (and their effects) unfold and are made possible. By situating the workings of CA in this underlying framework of logistical rationality, I suggest that we can bring to the fore the ways in which the latter has become infrastructural to contemporary politics. I trace the links between these organisations and their flagship methodology of 'Target Audience Analysis' to not only highlight the transposability of the techniques of surveillance and manipulation they deploy, but also to articulate some of the differential effects of the becoming-infrastructural of logistical logics to politics, and the epistemic violence that underpins them. Necessarily going beyond Zuboff's analysis, and in agreement with Ricaurte, who maintains that 'studies of data and digital colonialism should take into account the process of colonization that reproduces injustice within and across countries', I highlight the epistemic violence of the digital translation of the intimate emotional, political and social lifeworlds of populations, and how these serve to entrench inequalities and concentrate power in the hands of a handful of companies and the state, broadly speaking.[8]

[7] Jessica Pykett, 'Neurocapitalism and the New Neuros: Using Neuroeconomics, Behavioural Economics and Picoeconomics for Public Policy', *Journal of Economic Geography* 13, no. 5 (September 2013): 845–69.

[8] This thesis is not involved in an argument contesting the status of humanness directly – but is addressing processes related to its construction. By this I mean that I am interested in the way that populations are constructed as intervenable upon, which is also to say the way in which subjectivity is produced and shaped by logistical rationality.

Section One: Surveillance Capitalism

For Zuboff, the global contemporary moment is characterised by 'Surveillance Capitalism', deemed a novel, rogue form of capitalism which rests on

> capitalism's idiosyncratic economic imperatives defined by extraction and prediction, its unique approach to economies of scale and scope in raw-material supply, its necessary construction and elaboration of means of behavioural modification that incorporate its machine-intelligence-based "means of production" in a more complex system of action, and the ways in which the requirements of behavioural modification orient all operations towards totalities of information and control. [9]

She argues that human experience has been declared, firstly and multilaterally by large tech companies and subsequently by state agencies and militaries, as a "fictional commodity", to be expropriated from human beings. Here, 'human experience is subjugated to surveillance capitalism's market mechanisms and reborn as "behavior"', from which we are now 'exiled' by means of obfuscation and denial of access.[10] We have become human natural resources – our limitless consciousness and experience steadily being mediated, extracted and rendered through and for digital formats that themselves steadily develop to further envelop the farthest reaches of our lifeworlds. She formulates this issue of translation as *rendition,* in what she understands as the *rendering* of human experience as behavioural data. For Zuboff, the verb *to render* describes the two essential aspects of the ways in which "raw" human experience is transformed – firstly, it 'describes a process in which something is formed out of something else that is originally given'; and secondly, it also describes how the thing that is given is itself transformed in the process – 'it *sur-renders*'.[11] Further, and as I argue, under this regime, what cannot be computed, rendered or translated is seen as an absolute threat to certainty – it is dark, in the same way as logistics in the 1950s was the 'last dark continent'.[12] It is 'dark data' – the unstructured enemy of predictive power; out of control, and unobservable. All must be illuminated in order to be controllable.

According to Zuboff, this novel surveillance capitalism has proceeded by 'way of aggressive declaration', entrenching its success by imposing a new reality – one in which the 'detritus' of human activity, the "digital breadcrumbs" we leave behind on our travels through the internet and through the (increasingly hard or near impossible to separate) physical world are harvested with intent. [13] This is made possible through the 'always on instrumentation, datafication,

[9] Zuboff, *The Age of Surveillance Capitalism*, 10.
[10] Zuboff, 100.
[11] Zuboff, 234. I would also like to trouble here the figuring of 'human experience' as a *raw resource,* 'originally given'.
[12] Peter F. Drucker, 'The Economy's Dark Continent', *Fortune* 48 (1962): 103, 265–70.
[13] Zuboff, *The Age of Surveillance Capitalism*, 179.

connection, communication and computation of all things, animate and inanimate, and all processes – natural, human, physiological, chemical, machine, administrative, vehicular, financial.'[14] Her research with software engineers demonstrates with lucidity the ways in which real world activity is 'continuously rendered from phones, cars, streets, homes, shops, bodies, trees, buildings, airports and cities back to the digital realm' before it is reworked into predictive technologies. She terms this the 'prediction imperative', a central theme in my own understanding of logistical rationality. The prediction imperative marks a shift toward both economies of scope and economies of action, which I will discuss in turn.

Economies of scope define a new set of aims – in order for predictive products to more reliably make predictions of behaviour, the behavioural data must be both *vast* and *varied*. This variation may be understood to take two forms. Firstly, variation comes in the *extension* of extractive operations from the online, virtual world into the 'real' world through sensors, the internet of things, and the connectivity of our mobile devices, and so on. Secondly, scope implies an extension in *depth*. Zuboff writes that

> [t]he idea here is that highly predictive, and therefore highly lucrative, behavioral surplus would be plumbed from the intimate patterns of the self. These supply operations are aimed at your personality, moods, and emotions, your lies and vulnerabilities. Every level of intimacy would have to be automatically captured and flattened into a tidal flow of data points for the factory conveyor belts that proceed toward manufactured certainty.[15]

As we will see in the following sections, this turn toward affect, emotion and the "irrational" parts of the "human experience" is a key feature in behavioural economics, neuroeconomics and neuromarketing, as well as the more sinister "behaviour change", "influence operations" and PSYOPS techniques, theories and methodologies. What they represent here however, is the shift toward what Zuboff terms economies of *action* – it is not enough to predict the future, but to directly *intervene in it*. By this, Zuboff means active processes that attempt to shape future behaviour by way of analysing past behaviour and shaping future decision-making.

As argued throughout this thesis, extraction and prediction are closely interlinked processes that work to secure the means and grounds for various kinds of intervention in the behaviour of populations. Concomitantly these processes rely on *translation*; the rendering legible of social phenomena, behaviour, practices, ways of knowing and so on into calculable, and now machine-readable forms. Zuboff also understands extraction and prediction to be closely connected

[14] Zuboff, 202.
[15] Zuboff, 201.

principles, arguing that the latter, as the 'predictive imperative' is actually the first phase of a much more ambitious project. She posits that under the surveillant capitalist assemblage,

> economies of action mean that real-world machine architectures must be able to know as well as to do. Extraction is not enough; now it must be twinned with execution. The extraction architecture is combined with a new execution architecture through which hidden economic objectives are imposed upon the vast and varied field of behaviour.[16]

It is the twinned extraction and execution architecture that she understands as the foundation – or condition of possibility – for the 'means of behavioural modification'.[17] Just as scale became necessary but insufficient in the pursuit of higher quality behavioural predictions, scope would also eventually become insufficient to sustain competitive advantage over other companies in behavioural futures markets. The next logical step and the surest way to predict behaviour is, then, to intervene and shape it at the source. Though a powerful and succinct figuration, this, as I have shown in previous chapters, is not a novel logic. The twinning of extraction and execution as Zuboff renders it here has a longer history – first, in colonial experimental governance and classification, and second (with its bases in the former), in the forms of social and cultural knowledge extraction in social science as counterinsurgency in the Cold War period.

For Zuboff, the aim of this twinned extraction and execution architecture is not to produce uniform, conformist or obedient behavioural norms, but rather to 'produce behaviour that reliably, definitely, and certainly leads to desired commercial results.'[18] The desired 'guaranteed outcomes' of surveillance capitalism – and, further, that which the surveillance capitalists ultimately want to 'author' – is *us*, producing diverse yet completely predictable behaviour and making possible, as she terms it, 'the deletion of uncertainty'. [19] In her account, the attempt to delete uncertainty amounts to an absolutely novel threat to the liberal order. In an interview article about her book, she argues:

> We've entered virgin territory here. The assault on behavioural data is so sweeping that it can no longer be circumscribed by the concept of privacy and its contests. This is a different kind of challenge now, one that threatens the existential and political canon of the modern liberal order defined by principles of self-determination that have been centuries, even millennia in the making. I am thinking of matters that include, but are not limited to, the sanctity of the individual and the ideals of social equality; the development of identity, autonomy and moral reasoning; the integrity of contract, the freedom that

[16] Zuboff, 203.
[17] Zuboff, 203.
[18] Zuboff, 203.
[19] Zuboff, 337, 336.

> accrues to the making and fulfilling of promises; norms and rules of collective agreement; the functions of market democracy; the political integrity of societies; and the future of democratic sovereignty.[20]

While I share Zuboff's concern about the pervasiveness and dangers of surveillance capitalism, I wish to problematise the basis on which she expresses this concern, highlighting a number of issues she neglects in her critique.

First, Zuboff repeatedly deploys imperial language and imagery – she writes of those living under surveillance capitalism as 'the native peoples now whose tacit claims to self-determination have vanished from the maps of our own experience', or of 'our' experience reformulated as '[a] new continent of behavioral surplus'.[21] Despite using these metaphors there is little discussion of the ways in which this complex apparatus of behavioural modification might hold, extend and reflect legacies of imperialism and colonialism. She does recount Harley's assessment that '[m]aps created empire', through the 'pacification, civilization and exploitation' of the territories imagined and hence constituted (at least in part) through practices of map-making and cartography. In this, she writes, the 'cartographer is the instrument of power as the author of … order, reducing reality to only two conditions: the map and oblivion. The cartographer's truth crystallizes the message that Google and all surveillance capitalists must impress upon all humans: if you are not on our map, you do not exist.'[22] The problem here is not only that Zuboff glosses over the history of colonial settlement and extraction through the uncritical use of this language, but that she is also committing the fallacy of imagining that all human beings are hit equally hard by surveillance capitalism's blows – as if we are all rendered equally vulnerable by it.

This represents a profound and double-edged exclusion of those ways of being and thinking in the world that are non-translatable, or that exist outside of the reach of what many too easily understand as digital ubiquity.[23] Where Zuboff remains partial, Tadiar, Ricaurte, and Couldry & Mejias all speak to the differential effects of, access to and possibilities of inclusion in the digital. Ricaurte asks 'what are the implications of data colonization for societies and individuals located on the economic margins? How do the underlying power relations affect populations that exist outside this knowledge order?'[24] Two things come to mind in beginning to answer these questions. The first might look something like the data-driven, behavioural economic approach to the imposition of regimes of austerity and benefits sanctions on welfare recipients in the UK –

[20] Shoshana Zuboff, 'Google as a Fortune Teller: The Secrets of Surveillance Capitalism', *FAZ.NET*, 5 March 2016, https://www.faz.net/1.4103616.
[21] Zuboff, *The Age of Surveillance Capitalism*, 100, 128–29.
[22] Zuboff, 155; John B. Harley, *The New Nature of Maps: Essays in the History of Cartography*, ed. Paul Laxton (Baltimore: Johns Hopkins University Press, 2001), 58–59.
[23] For a critique of the problem of digital ubiquity and the notion of capitalist realism see: Emma Harrison, 'Activism, Refusal, Expertise: Responses to Digital Ubiquity' (unpublished PhD thesis, University of Sussex, submitted 2020).
[24] Ricaurte, 'Data Epistemologies, The Coloniality of Power, and Resistance', 351.

which we will come to in the second section. The second should be considered alongside Facebook's move to attempt to corner "developing" nations' internet access through their 'FreeBasics' programme.[25] This programme provides free access to a limited version of the internet, curated by Facebook, and ensures Facebook's access to the data generated through its use. The programme has been widely criticized for its disproportionate number of Western-owned, English language sites (wherever the application is run) and as a cynical ploy to expand the reach of Facebook to connect unconnected people to its data-extractive network. One way to look at this might be that if you are not connected, if you do not have a digital paper-trail or footprint, you do not exist on the registers of capital, or to 'modernity' at large. There is a tension here. This lies between the idea of the absence of a digital footprint as a form of resistance, and the erasure of people through that same absence. The effects of refusal and exclusion are differentially adverse, but adverse nonetheless.

Second and related, in criticising surveillance capitalism, Zuboff nonetheless harbours, and relies on, an overly romanticised picture of liberal democracy. For her, surveillance capitalism is threatening only if and insofar as it threatens the values of liberal democracy. These values are not problematic in themselves; on the contrary they are precisely what needs to be protected. In so arguing, Zuboff assumes that surveillance capitalism and liberal democracy are directly opposed forces. She erases the entire history of the two working in tandem to ensure colonial domination.[26] Fundamental to this picture of liberal democracy is a determined cloaking of its foundations and the continued and structural inequality that allows that *some* have *limited* access to self-determination, individual sovereignty, the political integrity of societies, and the rest of the examples she lists here as being essential or existential to its functioning. That these rights and privileges have only been available to some, and always at the expense of Others, is of no import in a model of surveillance capitalism that makes scarce attempt to contend with the differential effects of its operations across the globe; including in the *value* for the user. At stake here is not simply a matter of an assault on behavioural data as such, nor is it simply a threat to the modern liberal order. The way in which she understands this liberal order as a realm somehow distinct from and outside of the logics she describes is itself a problem.

Zuboff's account has been instrumental in developing a lucid model of a complex and notoriously slippery set of mechanisms concerning the translation and extraction of something like human

[25] For more in-depth expositions and critiques of the FreeBasics programme, see: Rijurekha Sen et al., 'Inside the Walled Garden: Deconstructing Facebook's Free Basics Program', *ACM SIGCOMM Computer Communication Review* 47, no. 5 (25 October 2017): 12–24; Genevieve Gebhart, 'Zero-Rating in Emerging Mobile Markets: Free Basics and Wikipedia Zero in Ghana', in *Proceedings of the Eighth International Conference on Information and Communication Technologies and Development - ICTD '16* (the Eighth International Conference, Ann Arbor, MI, USA: ACM Press, 2016), 1–9; 'Free Basics in Real Life: Six Case Studies on Facebook's Internet "On Ramp" Initiative from Africa, Asia and Latin America' (Advox Global Voices, 27 July 2017).

[26] Again, for critiques that demonstrate the impossibility of capitalist 'modernity' without 'coloniality' see Quijano, 'Coloniality and Modernity/Rationality'; Mignolo, *The Darker Side of Western Modernity: Global Futures, Decolonial Options*.

experience, its reappropriation for the machinations of prediction and, ultimately, behavioural modification. However, she relies on an old political model – one that assumes that there is a functioning and distinct thing such as 'democracy'. Liberal democratic rights do not lie outside of the problems she highlights. The problem instead lies in the wholesale replacement of politics by logistical rationalities – not simply a corruption of the former but an attempt at its complete and total eradication. As I contend throughout this thesis, logistical rationalities have come to be infrastructural to the realm of politics – quantification, measurement, prediction and control have come to be central tools and modes of the organisation of governance itself. What this means is that the spread of logistical rationality as an organising principle requires a rethinking of the fundamental categories of politics. Zuboff's framework, whilst offering an extremely useful analysis of the mechanics of extraction, prediction and intervention, is not equipped to situate this stage of capitalism in its broader genealogy. One of the most pressing issues here is that it erases the coloniality of power from its operations. In the remainder of this chapter, I study some of the networks, knowledges and formations of power that, broadly speaking, fit under the umbrella of 'surveillance capitalism' but that may be shown to contain traces of the broader histories I have mapped throughout this thesis.

The next section will look to Cambridge Analytica and the current, much broader pivot toward behavioural economics that I argue underpins its ontology. I see this as an example of the ways in which we need to go beyond an analysis of liberal capitalism that leaves its fundamental assumptions intact, and as a powerful example that warrants a longer history of extraction and social modelling for behavioural modification.

Section Two: Cambridge Analytica & Behavioural Economics: Ontologies of manipulation

CAMBRIDGE ANALYTICA

In 2018, an international scandal broke out surrounding the now infamous Cambridge Analytica (CA), resulting in moral outrage concerning data privacy, "dark" advertising and propaganda, and the resultant fear of the manipulation of voters in both the US general election and in the European referendum held in Britain. Following an exposé by Channel 4 News showing CEO Alexander Nix and managing director Mark Turnbull proclaiming CA's involvement and success in manipulating numerous political campaigns, largely across the Global South, the company and its parent organisation, Strategic Communication Laboratory, came under fire.[27] The situation

[27] 'Data, Democracy and Dirty Tricks', 7 Part Series (United Kingdom: Channel Four, 19 March 2018), https://www.channel4.com/news/data-democracy-and-dirty-tricks-cambridge-analytica-uncovered-investigation-expose.

became more controversial following whistleblower Christopher Wylie's statements. He admitted that 'We exploited Facebook to harvest millions of people's profiles. And built models to exploit what we knew about them and target their inner demons. That was the basis the entire company was built on.' [28] Wylie's statements proffered a clear admission that political manipulation based on psychological modelling functioned as the cornerstone for CA and its operations. CA had obtained the data of tens of millions of Facebook users without their consent through a personality quiz, leveraging the data to map personalities and create psychographic profiles in order to match political advertisements with those who would most likely be affected by them.[29] As the scandal unfolded, a web of ties to Russian information operations, Trump campaign associates, and Conservative Party members and supporters was uncovered.[30] This information, coupled with the steady drip of earlier statements made by the researchers and central actors in the company that claimed the scope, accuracy and resultant ease of manipulation the psychometric profiles afforded, led to widespread public outcry, and the eventual dissolution of Cambridge Analytica (only for it to be reborn under the name *Emerdata*).[31]

The scandal inaugurated a new public conversation, which rivalled the revelations of Edward Snowden in its ferocity and anger, about the extent to which our online lives are monitored and manipulated. However, where the Snowden exposure alerted the public to the US's national security tactics of capturing massive amounts of private communications meta-data, the Cambridge Analytica scandal pointed to something apparently much more disconcerting – a

[28] Cited in: Carole Cadwalladr and Emma Graham-Harrison, 'Revealed: 50 Million Facebook Profiles Harvested for Cambridge Analytica in Major Data Breach', *The Guardian*, 17 March 2018, sec. News, https://www.theguardian.com/news/2018/mar/17/cambridge-analytica-facebook-influence-us-election.

[29] Michal Kosinksi, Deputy Director of the University of Cambridge Psychometrics Centre worked on similar methodologies to the ones ultimately used by his colleague, Alexander Kogan, for Cambridge Analytica. See the following to studies for more information on psychographic modelling: S. C. Matz et al., 'Psychological Targeting as an Effective Approach to Digital Mass Persuasion', *Proceedings of the National Academy of Sciences* 114, no. 48 (28 November 2017): 12714–19; Gregory Park et al., 'Automatic Personality Assessment through Social Media Language.', *Journal of Personality and Social Psychology* 108, no. 6 (June 2015): 934–52.

[30] There are a number of articles attempting to map the shadowy network of stakeholders in CA's parent company, SCL Group. It appears that this network of funders, supporters and stakeholders consists of predominantly right-wing groups and individuals, with ties to Russia; the Trump administration, the Conservative party and their backers; and it now emerges, large energy companies and their corollary climate science denial think tanks and lobbyists. See Cadwalladr and Graham-Harrison, 'Revealed'; Carole Cadwalladr and Mark Townsend, 'Revealed: The Ties That Bind Vote Leave's Data Firm to Controversial Cambridge Analytica', *The Guardian*, 24 March 2018, sec. UK news, https://www.theguardian.com/uk-news/2018/mar/24/aggregateiq-data-firm-link-raises-leave-group-questions; Matt Hope, 'Web of Power: Cambridge Analytica and the Climate Science Denial Network Lobbying for Brexit and Trump', DeSmog UK, 21 March 2018, https://www.desmog.co.uk/2018/03/21/web-power-how-cambridge-analytica-sits-heart-brexit-trump-and-climate-science-denial.

[31] This of course follows a longstanding tradition of shapeshifting in companies that have faced massive controversy – see Erik Princes' Blackwater (1997), aka XE Services (2009), aka Academi (2011) following a succession of controversies including an unprovoked massacre in Iraq. Erik Prince became the chair of Emerdata after Cambridge Analytica was dissolved. See: Peter W. Singer, 'The Dark Truth about Blackwater', *Brookings*, 2 October 2007, https://www.brookings.edu/articles/the-dark-truth-about-blackwater/; 'Disinformation and "Fake News": Interim Report - Digital, Culture, Media and Sport Committee - House of Commons', Interim Report (United Kingdom: United Kingdom Parliament, 29 July 2018), https://publications.parliament.uk/pa/cm201719/cmselect/cmcumeds/363/36306.htm.

private company collecting, collating, and, importantly, *producing* intimate personal information from data self-published online, for the explicit purpose of manipulating the behaviour of target populations. A long-harboured anxiety regarding the amount of information we share, and what that information could be used for, erupted in the public imaginary. This unease was attached to CA's claims and reports about the uses of our online activity and the technologies that purport to infer magnitudes more information about individuals based on seemingly innocuous data. Newspaper articles on the scandal and earlier academic papers underscored CA's self-proclaimed abilities to accurately predict intimate, non-disclosed information based on Facebook photos, friendship networks, or as few as 10 'likes'.[32] On the one hand, the outrage that followed the revelations signalled that to many, this was something unexpected, novel, and unprecedented. On the other, a sense of inevitability, encapsulated by intonations of "what did you expect?" and "this is what you get for giving Facebook your data", plagued the countless news stories and op ed pieces that proliferated in the following weeks.[33]

For the wider public, the questions raised by the Cambridge Analytica scandal largely revolved around corruption: did it actually change the outcome of the 2016 US election or have a decisive effect on the outcome of the European referendum in Britain? While these questions problematise the immediate political concerns about the workings of Cambridge Analytica, the analytical focus of this chapter lies elsewhere. I am concerned not so much with the political implications of Cambridge Analytica, however important these may be, but rather with the *methods* and hence fundamental assumptions on which it rests. My contention is that Cambridge Analytica is not only just one company in a much broader network, but this network is one network in a much broader movement. My broader aim, then, is to uncover the techniques and methods that underpin not only CA and other companies of similar functioning and operations, but to show that the logics that underpin them are the various permutations of the logistical logics we have encountered throughout this thesis. CA, in short, will function as a lens through which we can study the reach and nature of logistical rationality in an age of "Big Data".

What we are concerned with here is ultimately the *pattern* of attempts to direct, modulate or control behaviour through not only its prediction but, increasingly, its manipulation underneath the registers of consciousness. As I have shown, this technique is not altogether new – even

[32] Carole Cadwalladr and Emma Graham-Harrison, 'How Cambridge Analytica Turned Facebook "Likes" into a Lucrative Political Tool', *The Guardian*, 17 March 2018, sec. Technology, https://www.theguardian.com/technology/2018/mar/17/facebook-cambridge-analytica-kogan-data-algorithm; M. Kosinski, D. Stillwell, and T. Graepel, 'Private Traits and Attributes Are Predictable from Digital Records of Human Behavior', *Proceedings of the National Academy of Sciences* 110, no. 15 (9 April 2013): 5802–5.

[33] Nelie Bowles, 'After Cambridge Analytica, Privacy Experts Get to Say "I Told You So"', *The New York Times*, 13 April 2018, International Edition edition, sec. Technology, https://www.nytimes.com/2018/04/12/technology/privacy-researchers-facebook.html; Laura Bright and Kristen Sussman, 'Consumers Need to Be More Aware of What They Are Giving Facebook', *UT News*, 19 November 2019, Online edition, https://news.utexas.edu/2019/11/19/consumers-need-to-be-more-aware-of-what-they-are-giving-facebook/.

though, as Zuboff argues, the scope, scale, breadth and depth of the extractive processes as facilitated by new scientific, neurological, digital and algorithmic technologies expands its implications in countless untold ways.[34] The orientation of this organisation lies in increasingly granular control – in particular, the control of uncertainty, or the attempted control of the future through the increasingly detailed mapping of the present. As I show in the preceding chapter in relation to logistical supply chain software and standardization, this mapping is a form of translation – a violent process of translation and incorporation into what Vazquez terms the 'epistemic territory of modernity', and, I would venture, as *logistical legibility*. This process of epistemic – and indeed material – translation leads, necessarily, to myriad forms of erasure – the erasure of all that is not amenable to translation from the representational order. In rendering the material and social world legible in these terms, all that cannot be translated is erased, rendered invisible and superfluous to the exigencies of logistical organisation.

To unpack the above as it relates to and structures the operations of companies such as Cambridge Analytica and the like, we need to look at the ontological basis upon which they operate. I argue here that these operations are anchored in Behavioural Economics (BE) as an epistemic and discursive regime. Investigating this field of knowledge and the logistical principles upon which it is built, we can get a better grasp of the forms of reasoning that drove CA and its attendant companies. Cambridge Analytica aimed to access, map and manipulate the heuristic biases and cognitive processes of its target audiences. The methodologies it deployed to do so have their conceptual and theoretical bases in BE. Further, individuals who worked with CA's parent company, Strategic Communication Laboratory (SCL), in developing their methodologies are also key theorists in military applications of the central tenets of BE and Neuroeconomics (NE). In what follows, I outline the emergent field of BE as exemplary of the becoming-infrastructural of logistical rationality to political practice, by looking at the central assumptions of BE and some of its recent applications in policy construction. I do so to tie together a number of seemingly disparate but central themes. First, to show the genealogical position of BE as squarely rooted in the history of logistical rationality so far outlined. Second, to show that its foundational epistemic violence allows for or fosters inequality and domination in its applications from welfare policies right through to CA's political operations and its related military applications. Ultimately, we must pay attention to BE in order to demonstrate the continuities between the development of logistical rationality and the management of populations in ostensibly liberal democracies and in the theatre of war alike.

[34] There is of course a long history of propaganda and psychological to be contended with that warrants further and related genealogical work beyond the scope of this thesis. See, for example: Edward L. Bernays, *Propaganda* (New York: IG Publishing, 1928). Phillip Taylor M., *Munitions of the Mind: A History of Propaganda from the Ancient World to the Present Day*, 3rd ed. (Manchester: Manchester University Press, 2003); Garth Joweth S. and Victoria O'donnel, *Propaganda and Persuasion*, 7th ed. (California: SAGE Publications, 2018).

BEHAVIOURAL ECONOMICS

Recent years have seen an incredibly widespread uptake of a new set of behavioural economic theories designed to increase the explanatory power of economics by incorporating psychological and neuroscientific knowledges. The application of these theories often takes the form of experimental interventions in the behaviour of populations.[35] These developments have become conventional in contemporary accounts of economic (and otherwise) individual & social behaviour and human decision-making processes. As Pykett notes, these trends brought a shift in economic theory 'insofar as [they marginalize] alternative ways of knowing economic worlds and [produce] new conceptions of the post-rational human subject'.[36] In terms of influence and reach, behavioural economics in policy-making (in the US, France and the UK, at least) has been well documented.[37] In what follows, I outline the ways in which these same theories – and the fundamental assumptions about human rationality they rely on – are propagated and dispersed across governmental, commercial and militaristic realms in projects aimed at the manipulation and behavioural modification of the public. Cambridge Analytica and its broader networks are emblematic of this, as I go on to show.

These concerns are indeed central to the translation of behaviour into logistical legibility and the resultant administration of life. BE and NE both seek to translate and rationalise peoples' behaviour and they do so in two moves – firstly through the incorporation, measurement and theorisation of rationality, biases and heuristics, and the psychological and neuronal structures argued underpin them; and secondly, through the resultant legitimation of paternalistic intervention in order to rationalise behaviour in line with this standard of rationality. In ostensibly departing from the standard neoclassical economic account of human rationality as *homo economicus,* BE espouses an understanding of the human as fundamentally and systematically *irrational*.

The problematization of human rationality in Herbert Simon's 1955 work on bounded rationality is often cited as a precursor to modern behavioural economics. Simon was a cyberneticist and engaged with these ideas whilst working at the Cowles Commission. As a RAND consultant from 1951 until 1976, he worked with Allen Newell in the burgeoning field of Artificial Intelligence

[35] L Haynes et al., 'Test, Learn, Adapt: Developing Public Policy with Randomized Controlled Trials.', Policy Paper (London: Cabinet Office Behavioural Insights Team, 14 June 2012), https://www.gov.uk/government/publications/test-learn-adapt-developing-public-policy-with-randomised-controlled-trials; A Oliver, *Behavioural Public Policy* (Cambridge: Cambridge University Press, 2013).

[36] Pykett, 'Neurocapitalism and the New Neuros', 845.

[37] Thaler and Sunstein, the authors of the highly influential book *Nudge,* are of particular note in terms of citations and influence in governmental policy reports and programmes. They are widely credited with the popularisation of Nudge Theory. Thaler was instrumental in the creation of the UK's Behavioural Insights team, and has been appointed as a UK Cabinet Office strategic advisor. See: Richard H. Thaler and Cass R. Sunstein, *Nudge: Improving Decisions about Health, Wealth and Happiness* (Yale: Yale University Press, 2008).

(AI).[38] They conceived of human intelligence as fundamentally translatable in terms of formal logical rules, simulating human-information processing on a digital computer at RAND's Systems Research Laboratory. Simon went on to focus his work in AI on the practical goals of the military – and in simulating the mind as a cybernetic, closed system subject to technical manipulation. Esther-Mirjam Sent writes that this conception 'enabled the military to integrate humans into their control and command systems', just as Norbert Wiener conceptualised in his studies of aircraft gunnery control.[39] Of central importance to Simon was how the scientific method could be used to solve problems of social research and, specifically, the problem of 'the process of choice which leads to action.'[40] Simon's concept of 'bounded rationality' sought to show that people make best-fit decisions in cases where access to information is limited or imperfect – a process he termed 'satisficing'.[41] This theory was extended by Tversky and Kahneman in 1982, through identifying the importance of heuristic and subjective rules and biases applied to decision-making under uncertainty, in opposition to the more probabilistic or computational models assumed by neoclassical economists.[42] Their incorporation of psychological data and economic theory revealed more of the particular and recurring ways in which people make *economically irrational* choices, advancing Simon's work and arguing that this irrationality, far from being anomalous, is a systematic and fundamental part of human decision-making processes.

Though early BE sought to move away from the neoclassical idea of "perfect information", the narrower *operational* definition of rationality in empirical testing in BE is consonant with von Neumann and Morgenstern's game theoretic notion – namely that a rational choice is the one which maximises expected utility.[43] In this, agents are assumed to have perfect information and the capacity to act rationally on the basis of this information. Again, what this language suggests is that there is an abstract, universal standard of rationality – economic rationality – that most, if not all, individuals fail to meet. It is thus clear that despite the disciplines' attempt to move beyond an standard economic model of *homo economicus*, the behavioural economic model ends up reifying and further sedimenting an understanding of economic rationality as external to and, in some sense, over and above "the human". In this context, *homo economicus* is understood as a

[38] Simon also played a significant role in the creation of the Economic Cooperation Administration in 1948, and subsequently in the development of the Marshall Plan. See: Herbert A. Simon, 'Herbert Simon Biographical', in *Nobel Lectures, Economics 1969-1980*, ed. Assar Lindbeck (Singapore: World Scientific Publishing Co., 1978), https://www.nobelprize.org/prizes/economic-sciences/1978/simon/biographical/.
[39] Esther-Mirjam Sent, 'Herbert A. Simon as a Cyborg Scientist', *Perspectives on Science* 8, no. 4 (December 2000): 381.
[40] Herbert A. Simon, *Administrative Behavior: A Study of Decision-Making Processes in Administrative Organisations* (New York: The Free Press, 1947), 1.
[41] Simon, *Administrative Behavior: A Study of Decision-Making Processes in Administrative Organisations*.
[42] Daniel Kahneman, Amos Tversky, and Stewart Paul Slovic, eds., *Judgement under Uncertainty: Heuristics and Biases* (Cambridge: Cambridge University Press, 1982); Daniel Kahneman and Amos Tversky, 'The Psychology of Preferences', *Scientific American* 246, no. 1 (1982): 160–73; Pykett, 'Neurocapitalism and the New Neuros'; Mark Whitehead et al., *Neuroliberalism: Behavioural Government in the Twenty-First Century* (London: Routledge, 2017).
[43] Amadae, *Rationalizing Capitalist Democracy*.

higher form, universal and devised by 'Western' economists and from the standpoint of no standpoint, for all humans to aspire to.

What are the implications of this conception of (ir)rationality, particularly for ideas surrounding the 'nudging' of behaviour? For BE, the promise of a move *away* from the neoclassical model of the maximally rational economic agent turns on its head. Against what standard, which model, is the "systematically irrational" human held? If biases, emotions and heuristics are systematically employed in human decision-making and are a fundamental part of the process, where does the understanding of "rationality" come from, and how does it hold legitimacy as an ideal? What, then, does BE prescribe for us? If people are systematically 'predictably irrational' (as the title of one best-selling book proclaims) and rely to a *measurable* extent on unconscious, flawed thought processes to make decisions, then there is a justification for intervention in these processes in the name of economic rationality.[44] The longer history of classifying entire populations as irrational harks back to the irrational "savage mind" and the civilising missions of formal imperialism and colonialism that were legitimated as a result. Proponents of BE and related doctrines of "nudge" and "libertarian paternalism" aim to remedy this systematic irrationality by shaping those choice architectures with our systematic irrationalities in mind, and to the stated end of helping people to become "more rational" and make better choices for themselves. However, that these same insights can and are used for the opposite effect, particularly in marketing, persuasion, and influence operations.

It is worth returning briefly to underscore that this is the fundamental assumption of Cambridge Analytica's microtargeting operations. The premise that people may be "nudged" towards a "better choice" (or, rather, the choice desired by a stakeholder in a political campaign) is based on the notion that our systematic psychological biases and irrationalities, *if mapped with enough granularity*, can be exploited to shape decision-making. To recall the examples advanced in chapter two, the attempted mapping of communities and even entire nations with a view to shaping collective behaviour is not new. What is novel here is the sheer scale and apparent depth of the data available to create the requisite models. There is quite clearly an increased volume and intimacy of data self-published online via social media and, as we saw in the last chapter, data produced simply by virtue of interacting with websites. What is especially pertinent here is the focus on, or scope for, the algorithmic mining of ostensibly subconscious thought patterns. This broadening of complexity is at once inherently more individual – where microtargeting attempts to home in on the decision-making processes of psychologically similar individuals, this is only made possible through the relationality of the datapoints for analysis. As I argued in the last chapter, it is only through this relationality that the data is meaningful in any way – patterns can only be discerned within a large enough dataset. People can only be mappable and hence controllable in relation to one another.

[44] Dan Ariely, *Predictably Irrational: The Hidden Forces That Shape Our Decisions* (Canada: Harper Collins, 2008).

Where CA and its attendant networks make few pretences toward the moral, cultural or political value of decisions they attempt to influence, behavioural economics does. It couches the way it exposes and espouses the modification of behaviour via targeting of the conscious and subconscious mind in terms of political value; in terms of helping people to optimise their decision-making for a healthier, more rational, more productive life. Libertarian paternalism, the political ideology and framework derived from BE tenets aims to make it easier for people to make more rational choices whilst purportedly not delimiting the choices made available.[45] There are a number of obvious concerns with libertarian paternalism. The most immediate charge is that the concept is irrevocably oxymoronic.[46] Is it possible to have a form of paternalism that continually intervenes on populations while insisting on the primacy of individual liberty and the right to self-government? As Conly contends,

> First, libertarian Paternalism is manipulative. That is, it does not suggest that we engage in free and open discussion in order to rationally persuade you to change your ways. Sunstein and Thaler are not opposed to free and open discussion, but they don't think engaging you in rational argument is enough to get you to choose efficiently, because of the cognitive deficits they have described. The point of the nudge is to push you in ways that bypass your reasoning. That is, they use your cognitive biases, like the tendency to go with the default option, to bring about good effects. There is a sense in which they fail to respect people's decision-making ability.[47]

At its base, this iteration of paternalism rests on the ostensibly "scientific" principle that agents are *impaired* in their cognitive and affective capacities, and therefore must be intervened upon. As such, Conly, in her controversial title *Against Autonomy,* goes further than Thaler & Sunstein, contending that 'the existence of cognitive deficits does suggest a need for different sorts of legislation … coercive paternalism, for laws that force people to do what is good for them'.[48]

IRRATIONALITY AND INTERVENTION

The turn to biological and psychological figurations of human irrationality garners a particular, scientific certainty to the framing of the human as fundamentally irrational and flawed. It allows for a neuro-psychological explanation for poverty, which detracts from systemic critiques of capitalism's failure to provide for all. In so doing, this bio-psycho-social framing legitimates intervention in the lives of the "irrational" under the register of consciousness for their own good,

---

[45] One prototypical example in the literature is to place healthy food in a cafeteria at eye level, while unhealthy food is placed below in order to make the former easier to access, both mentally and physically. See: Thaler and Sunstein, *Nudge: Improving Decisions about Health, Wealth and Happiness*.
[46] Gregory Mitchell, 'Libertarian Paternalism Is an Oxymoron', *Northwestern University Law Review* 99, no. 3 (2005): 1245–78.
[47] Sarah Conly, *Against Autonomy: Justifying Coercive Paternalism* (Cambridge: Cambridge University Press, 2012), 30.
[48] Conly, 8.

and this in turn legitimates forms of experimental governance.[49] Biases reconfigured as 'cognitive deficits' are of particular note in attempts to understand why those of lower socio-economic backgrounds are in that situation. This *deficit of rationality* as imagined against the universal figure of *homo economicus* becomes the reason the poor are poor, displacing structural issues of inequality and placing the onus of poverty on the individual.[50] By way of example, experimental neuroeconomics combines behavioural data with brain data at the time of decision making.[51] In principle, this is supposed to help pinpoint the biological foundations of "anomalous choices", as seen against a standard of rationality deriving, broadly speaking, from economic figurations like von Neumann's game theory and neoclassical economics.[52] The correlated and burgeoning field of 'genoeconomics' is similar in its attempt to map differences in economic decision-making processes to specific gene expressions and polymorphisms.[53] Further, seen through lenses of behavioural science and neuroscientific research, these theories are lent a veneer of facticity and naturalness that works to obscure the ideological benefits of individualising responsibility for inequality.

In fact, I think we could go so far as to argue that this is a (re)biologisation of inequality that has a long history and familial relation to racist sciences of phrenology and eugenics, which similarly secured legitimacy for paternalistic, colonial and imperial intervention. In the same way that we saw Rostow's theory of modernization designating entire populations as irrational and incapable of governing themselves, the behavioural and neuroeconomic theories of human rationality

[49] This picture becomes further complicated when we contend with the uptake of Nudge departments not just in the UK and US government departments, but for instance, in the World Bank, UN agencies, OECD and other organisations. See: 'Mind, Behavior and Development Unit: Applying Behavioral Science to End Poverty and Enhance Equity', Brochure (World Bank Group), accessed 30 January 2020, http://documents.worldbank.org/curated/en/744191532458732002/pdf/128784-eMBeD-Brochure-DIGITAL.pdf; Zeina Afif, '"Nudge Units" – Where They Came from and What They Can Do', *World Bank Blogs* (blog), 25 October 2017, http://blogs.worldbank.org/developmenttalk/nudge-units-where-they-came-and-what-they-can-do.

[50] Jennifer Sheehy-Skeffington, 'Decision-Making Up Against the Wall', in *Socio-Economic Environment and Human Psychology: Social, Ecological and Cultural Perspectives*, ed. Ayse K. Üskül and Oishi Shigehiro (Oxford: Oxford University Press, 2018), 105–29; Conly, *Against Autonomy: Justifying Coercive Paternalism*.

[51] Neuromarketing is a profitable offshoot of this biological-behavioural turn. As influenced by neuroeconomics, neuromarketing is an increasingly popular and utilised set of marketing techniques, using 'brain- and bio-imaging technologies to track consumers sensorimotor, cognitive and affective responses to advertising stimulus'. Neuromarketing explicitly aims to target the unconscious or 'pre-rational' aspects of human thought and decision-making in order to intervene in and shape behaviour in line with commercial goals.

[52] Bijou Yang and David Lester, 'Reflections on Rational Choice—The Existence of Systematic Irrationality', *The Journal of Socio-Economics* 37, no. 3 (June 2008): 1218–33; Colin Camerer, George Loewenstein, and Drazen Prelec, 'Neuroeconomics: How Neuroscience Can Inform Economics', *Journal of Economic Literature* 43, no. 1 (February 2005): 9–64; F. S. C. Northrop, 'The Neurological and Behavioristic Psychological Basis of the Ordering of Society by Means of Ideas', *Science* 107, no. 2782 (23 April 1948): 411–17; Bernhard Neumärker, 'Neuroeconomics and the Economic Logic of Behavior', *Analyse & Kritik* 29, no. 1 (1 January 2007), https://www.degruyter.com/view/j/auk.2007.29.issue-1/auk-2007-0105/auk-2007-0105.xml.

[53] Benjamin, Daniel, J. et al. 2012. 'The promises and Pitfalls of Genoeconomics'. Annual Review of Economics. 4:627-62

describe target populations that demonstrate "anomalous choices" as always already irrational and hence requiring increasingly intimate administration through the modelling of choice architectures and other tactics of manipulation and persuasion. To recall Grosfuegel's succinct summary of the evolving grounds for intervention throughout the continuing expansion of coloniality/modernity, '[w]e went from the sixteenth century characterization of "people without writing" to the eighteenth and nineteenth century characterization of "people without history" to the twentieth century characterization of "people without development" and more recently to the early twenty-first century of "people without democracy"', to, I think, the current, overlapping and expansive format of "people without rationality".[54]

While a great deal of academic attention focuses on the structural, political and ideological causes of poverty, popular, governmental and media discourse tends to focus on the individual. Under what some are calling 'Neuroliberalism', the question of irrational economic decision-making takes precedence in policy formation.[55] In the UK, welfare reform under the auspices of 'Austerity' emerged alongside the instantiation of the UK's first "Nudge Unit"; the "Behavioural Insights Team".[56] Kitty S Jones shows that the use of BE and the Nudge Unit in the development of austerity policy and benefits sanctions disproportionately, if not exclusively, affects the poorest in society. Pathologising the individual rather than tackling structural causes of poverty or recognising poverty as 'an inevitable feature of a socioeconomic form of organisation founded on competitive individualism', the Nudge Unit has conducted countless experiments and trial runs of punitive programs aimed at changing the behaviours of citizens perceived to make the wrong economic choices.[57] The Department for Work and Pensions (DWP) has worked closely with a number of think tanks, including the Behavioural Insights Team, exploring how Nudge theory could be used to "motivate" those on benefits; including the use of the behavioural economic notion of "Loss Aversion" to reduce the number of people claiming benefits.[58] In other words, they sought to

[54] Ramón Grosfoguel, 'The Epistemic Decolonial Turn: Beyond Political-Economy Paradigms', *Cultural Studies* 21, no. 2–3 (March 2007): 214; Here, we might also turn to Lugones, Mignolo or Mbembe for a fuller account of 'irrationality' as a colonial construct: Maria Lugones, 'The Coloniality of Gender', *Worlds and Knowledges Otherwise* Spring (2008): 1–17; W. D. Mignolo, 'The Geopolitics of Knowledge and the Colonial Difference', *South Atlantic Quarterly* 101, no. 1 (1 January 2002): 57–96; Achille Mbembe, *A Critique of Black Reason*, trans. Laurent Dubois (Durham: Duke University Press, 2017).

[55] Whitehead et al., *Neuroliberalism: Behavioural Government in the Twenty-First Century*.

[56] The Behavioural Insights Team was originally set up as a team within the UK Government Cabinet Office in 2010, however has since become privatised and is in part owned by the Cabinet office and Nesta, a charity focused on innovation. In an article in the Financial Times, the move was criticised as part of 'plans to shrink central government and create a private enterprise culture in Whitehall'. Plimmer, Gill. "UK Cabinet Office 'Nudge' Team to be Spun Off into Private Group." *FT.Com* (Feb 05, 2014). Available at: [https://www.ft.com/content/571eef16-8d99-11e3-9dbb-00144feab7de] Accessed 02/09/2019

[57] Kitty S. Jones, 'Nudging Conformity and Benefit Sanctions: A State Experiment in Behaviour Modification – Politics and Insights', *Politics and Insights* (blog), 14 November 2015, https://politicsandinsights.org/2015/11/14/nudging-benefit-sanctions/.

[58] Kizzy Gandy et al., 'Poverty and Decision-Making: How Behavioural Science Can Improve Opportunity in the UK', Policy Recommendation (Behavioural Insights Team, October 2016); Amy Tarr and Tim Riley, 'Employing BELIEF: Applying Behavioural Economics to Welfare to Work', Recommendations for Policy (esg & Centre for Economic and Social Inclusion, November 2010).

increase the use of sanctions and stringent conditionality to welfare in order to make it more difficult and more uncomfortable for people to claim benefits. These punitive sanctions are regarded as "incentivising" people to find work, essentially regarding unemployment and disability as the result of personal and/or cognitive deficits. It is necessary to note that these sanctions are *not* nudge strategies per se; they rather masquerade as such – they are *not* consonant with libertarian paternalism, because it is not the arrangement of a choice architecture when people cannot choose otherwise. This should be instead be understood as actual operant conditioning straight out of Skinner's behaviourism.[59]

This should also be read as another example of the deleterious effects of the logistical representational order of world-as-data. In this framework, people are seen by and subjected to policy that erases the complexity of life lived under poverty; subject to a world organised as data that both refuses to and is incapable of comprehending the profound harm, distress and suffering these policies cause.[60] Nudge here is purely about legitimating the micromanagement of a population, ensuring obedience, and the production of a scientific veneer for a violent programme of austerity that has killed thousands so far.[61] That the outcome of this experimental, nudge-driven austerity programme is directed at those seeking welfare demonstrates the differential effects of these theories and methods as they come to shape policy and logics of inclusion and exclusion.

I argue then that we can think of this as a new civilising project – wrapped in scientific discourse, based on the measurement and mapping of decision-making processes that determine that some are more rational than others, and hence, must be "nudged" in the right direction. That BE and libertarian paternalism have developed in response to, but nonetheless as an extension of, the neoclassical understanding of the self-maximising, rational *homo economicus*, reflects and again extends a universal vision of the subject, one that at base is flawed and must be intervened upon. This extends a paternal vision of the civilising mission – if populations are positioned as fundamentally flawed and irrational when compared against this universal figure of the rational subject then they must be administered in increasingly exacting ways. Where before the overarching aim of the imperialist mission was to map and control the physical world, the current

[59] See here for an example of current critiques of the return to behaviourism under "Big Data" regimes, for example: Antoinette Rouvroy, 'The End(s) of Critique : Data-Behaviourism vs. Due-Process.', in *Privacy, Due Process and the Computational Turn. Philosophers of Law Meet Philosophers of Technology*, ed. Mireille Hildebrandt and Ekatarina De Vries (London: Routledge, 2012), 143–69.

[60] Benefits claimants have been subjected to the potentially lethal cessation of welfare as a result of targets for sanctions (whether these targets are implicit or explicit, or if there is any meaningful distinction between the two, is still debated) See: John Domokos, 'Government Admits Jobcentres Set Targets to Take Away Benefits', *The Guardian*, 8 April 2011, sec. Politics, https://www.theguardian.com/politics/2011/apr/08/jobcentres-benefits-sanctions-targets.

[61] For an excellent exposition of the violence of the UK's regime of austerity, see: China Mills, '"Dead People Don't Claim": A Psychopolitical Autopsy of UK Austerity Suicides', *Critical Social Policy* 38, no. 2 (May 2018): 302–22.

logistical project extends this programme into the lifeworld of the "human", which is treated as measurable, extractable and administrable in the same way as the physical landscape.

All this is a corollary of the logistical representational order of world-as-data, and indicative of the necessity of extending Zuboff's analysis to make clear the differential and violent effects of contemporary domination. To connect the behavioural economic themes that I have argued are central to this project with their RANDian and cybernetic heritage, out to the broader scope of the "age of Big Data", we can return to the problems of control and prediction. As I have shown, under the BE conception of the "human" as something that *ought to be homo economicus*, a person is treated as a servomechanism. Input the right messages, arrange the "choice architecture", and the human-as-system will produce the corrected behaviour. Karen Yeung contends that Big Data analytics and the cycle of data analysis, predictive products and their application to further data in marketing and the like *itself* constitutes a form of 'nudge', where they channel user choices in directions preferred by the choice architect 'through processes that are subtle, unobtrusive, yet extraordinarily powerful.' [62] She shows how Big-Data driven nudges, such as Google Maps' highlighting of congestion,

> make it possible for automatic enforcement to take place *dynamically*, with both the standard and its execution being continuously updated and refined within a networked environment that enables real-time data feeds which, crucially, can be used to *personalise* algorithmic outputs.[63]

In this sense, we can see Big Data-driven decision-guidance technologies and the users that come into contact with them as operating as cybernetic systems, with modulation and control of behaviour implemented as a recursive feedback loop which 'allows dynamic adjustment of both standard-setting and behaviour modification phases … enabling an individual's choice architecture to be *continuously reconfigured in real time*'.[64]

If a cybernetic system is always goal-oriented, purposive, and the purpose or goal of the economy is technically to distribute resources most efficiently, it manages this through feedback mechanisms. Control is again the crux here. The individuals operating or acting in the market then can be seen as feedback mechanisms – and in fact can be fed into and modulated themselves, if Zuboff and the arguments surrounding behavioural modification are to be taken seriously. It is about producing regular and replicable behaviours within a system particularly in the presence of disturbance. Recalling Seb Franklin, writing on the "control episteme" and cybernetics, who argues that the notion of

[62] Karen Yeung, '"Hypernudge": Big Data as a Mode of Regulation by Design', *Information, Communication & Society* 20, no. 1 (2 January 2017): 118–36.
[63] Yeung, 122.
[64] Yeung, 122. Emphasis my own

> control introduces a programmable object in place of the subject through a process of discipline, and channels the metaphorical energies associated with the subject into (equally metaphorical) discrete and valorizable quantities. The digitization of desire through the flexible but synchronic system of projected target demographics … stands out as one example of this disciplining process.[65]

The conception of the subject that follows from BE, and as we see in the final section, successive methodologies like Target Audience Analysis, can be compared to that of the cybernetic programmable black box. What is important is the input and the output – the behavioural data turned executable programme turned data again – and the measurability of these effects. In a feedback loop, information about what Zuboff calls 'human experience' is extracted and translated into behavioural data, used to create predictive products and tailored interventions, begetting further and more refined measurement, extraction and modulation. Representation and replication and the move to world-as-data here are repeated. The resultant representation is no longer a subject but a programmable object, one that given the right intervention can be replicated. As Franklin writes, the

> real is filtered into discrete steps or on/off states before the subject can apprehend it [and] the realm of possibility becomes governed by the prefatory limitations that facilitate cybernetic techniques of statistical forecasting. Overt behaviour becomes nothing more than an outcome cued by a "throw of the dice of the real". Following this process, the properly unmeasurable fields of possible behaviours and affects are reduced to a finite series of outcomes that can be cued or programmed by symbolic inputs.[66]

What is lost in translation – what cannot be translated into discrete steps, or what is lost in the reduction of the essentially infinite complexity of experience and lived lives to mere inputs and outputs in a model of behaviour – is erased here. What I am arguing is threefold: that "nudge", libertarian paternalism and related commercial strategies are not only consonant with the cybernetic-logistical-imperial representational order of world-as-data but are also genealogically tied to it via figures like Simon and the RAND network; that this order has become infrastructural to both contemporary politics and digital commercial applications; and that it allows for logistical logics to order the world in this image. While BE and libertarian paternalism have important consequences for policy making, these theories and insights have been equally taken up, applied and reworked in both commercial and military sectors. However, this mutualist interaction is overlooked by authors like Zuboff. As I've sought to argue, the continuity between cybernetics, early logistical rationality, the imperial forms of knowledge they emerged from, and

[65] Franklin, *Control: Digitality as Cultural Logic*, 142.
[66] Franklin, 148–49.

contemporary forms of surveillance can only be understood if we trace the longer history of logistical rationality. This, as I argued at the beginning of this chapter, is something that Zuboff's model cannot allow us to do, and why we must draw out the colonial signature of contemporary surveillance technology that she overlooks. Where this is true, similarly, the complex entanglement between surveillance and "Big Data" capitalism with military networks is another integral part of the shape of contemporary domination that her model cannot account for.

In the final section I briefly consider the militaristic history of the multinational internet corporation, setting the tone for moving on to a closer analysis of the broader networks of Cambridge Analytica and its specific methodologies. I will first look to Google as a clear example of the partnership between these forms of governance and commercial and military realms in developing contemporary surveillance infrastructures.

Section Three: Military, Political, and Commercial Operations

This section develops an analysis of the networks, methodologies, theories and actors that informed and preceded Cambridge Analytica's operations. I begin by looking at the co-development of contemporary digital surveillance between the state, the military and private corporations before moving on to talk about Cambridge Analytica and the constellation of companies and methodologies centred on 'influence operations' that surround it.

In her outline of Google's rise to prominence and its role in the shaping of 'surveillance capitalism', Zuboff indicates what she calls an 'elective affinity' or 'mutual magnetism' between surveillance capitalist organisations and the post-9/11 culture of 'surveillance exceptionalism'.[67] She notes the creation of In-Q-Tel, the CIA's venture capital firm operating in Silicon Valley, its connection to Keyhole (the foundational software of Google Earth), and Google's links to the secretive Highlands Forum – an elite and regular networking event in which military and intelligence officials meet with tech industry leaders, academics and defence contractors.[68] In drawing out the links between such corporations as Google and the military complex, however, we can go further than this. From its inception, Google was incubated and financed by the US intelligence community, or affiliates and interested parties closely aligned with US intelligence and military. In its early development as a search engine, Sergey Brin – one of Google's founders and a PhD student at the time – reported regularly to two non-faculty members, Thuraisingham and Steinheiser. Both were representatives of a US intelligence research programme on data mining. The core code of the search engine, Query Flocks, was developed at Stanford University under a CIA & National Security Agency (NSA)-funded programme.[69] The very architecture of Google – as

[67] Zuboff, *The Age of Surveillance Capitalism*, 116.
[68] Zuboff, 116–18.
[69] For an excellent piece of investigative journalism on the continued links between Google and the U.S. Military and Intelligence Community, see the following articles by Nafeez Ahmed.

the indexer of the internet – from the very beginning was constructed with the exigencies of intelligence agencies in mind.[70]

The case of Google is indicative of how the infrastructure of the internet and the architectures of mass surveillance built into the very foundations of the commercial web are inseparable from military and intelligence funding and concerns. We should understand the relationship between private organisations and state institutions as interdependent: on the one hand, the global surveillance apparatus has been largely created by private companies and start-ups under the employment of the Pentagon and intelligence services and, on the other, the new capabilities these organisations have produced have had a formative effect on the structure and operation of those institutions. This interdependency has, in turn, created new forms of governance, military action and deployment based on these capabilities. Indeed, *in conjunction* with intelligence agencies and militaries, Google, Amazon, Microsoft, and many large corporations like them, have all helped create the conditions of possibility, infrastructures and mechanisms that allow for the kinds of mass behavioural modification that Zuboff details in her book. In this context, while Zuboff ascribes the source of mass behavioural modification primarily to commercial concerns, there were other factors – such as military and security concerns – that played a crucial role in laying out the conditions of possibility for surveillance capitalism. If we take the role of governmental agencies into account then the emergence of digital surveillance technologies does not occur *contra* liberal systems of government, but as part of the very infrastructure they built. They are, in effect, co-constituted – the lines between military, corporate and government have blurred beyond distinction when the logics that underpin their technological development and capability are extractive, predictive, *logistical.* It is for these reasons that we must go beyond critiques like Zuboff's that leave liberal systems of government unchallenged and as somehow distinct from the "worst excesses" of capitalism.

Recent scholarship has come to study the deep imbrication between algorithmic surveillance and military force in critiques, for example, of drone bombing. Contemporary drone technology uses machine learning to determine targets, for example, through "pattern of life" analysis or training algorithms for real-time facial recognition. Machine learning algorithms for counterinsurgency and intelligence purposes can be trained on the same data-sets as commercial companies attempting to establish patterns toward the end of Zuboff's 'guaranteed outcomes' of consumption.[71] Fundamentally, then, there can be no clear distinction between the behavioural

https://medium.com/insurge-intelligence/how-the-cia-made-google-e836451a959e

[70] For more information and further context on this, see: Levine, *Surveillance Valley*; David Lyon, 'The World Wide Web of Surveillance: The Internet and Off-world Power-flows', *Information, Communication & Society* 1, no. 1 (March 1998): 91–105; Norman Davis, 'An Information-Based Revolution in Military Affairs', *Strategic Review* 24, no. 1 (1996): 43–53; Tamsin Shaw, 'The New Military-Industrial Complex of Big Data Psy-Ops', *The New York Review of Books* (blog), 21 March 2018, https://www.nybooks.com/daily/2018/03/21/the-digital-military-industrial-complex/.

[71] Data brokerage is a multi-billion-dollar industry that sees commercial data scraped, packaged and sold to other companies and militaries alike. See Adam Harvey's art and research investigation into the ethics, origins and privacy implications of facial recognition datasets created 'in the wild'. Adam Harvey

data that is used for commercial behavioural modification and behavioural data that is used to train the algorithms that allow drones to target unknown individuals in signature strikes based on their "pattern of life". As Afxentis Afxentiou remarks in relation to drone bombing pattern-of-life analysis, the identity of a targeted individual is understood as a fluid category – the 'notion of a personal identity, which is unique to each person, gives way to a representation of identity within a set of socio-military criteria such as geographical location, social connections and a profiling based on the grand sum of someone's daily activities.'[72] That the same could be said for target audiences of political and commercial campaigns and advertising highlights the significance of the underlying logics at work here.

Here lies a central point of contention with Zuboff's analysis; she considers surveillance capitalism to be a blunt weapon, *non-violent*. In her understanding of the power of surveillance capitalism as 'instrumentarian', she argues that the surveillance capitalists – or, as she calls them and the assemblage of technologies they work through, 'Big Other' – are a non-violent bunch. According to her, instrumentarian power aims for the deletion of uncertainty and hence

> for a condition of *certainty without terror* in the form of "guaranteed outcomes." Because it does not claim our bodies for some grotesque regime of pain and murder, we are prone to undervalue its effects and lower our guard. Instead of death, torture, re-education, or conversion, instrumentarianism effectively exiles us from our own behaviour. It severs us from our outsides, our subjectivity and interiority from our observable actions. It lends credibility to the behavioral economists' hypothesis of the frailty of human reason by making it so, as otherized behavior takes on a life of its own that delivers our futures to surveillance capitalism's aims and interests.[73]

In closing its eyes to the epistemological foundations of surveillance capitalism, Zuboff's analysis simply cannot account for the differential effects of its instantiations, nor the violence that is wrought with the same methods. Technologies of surveillance are deployed differentially across the globe and within states. What is at stake in pattern-of-life analysis is very different depending on your location, race, socio-economic or minority status; for someone in the Anglo-American world, in practical terms this could be a violation of privacy – for someone in Yemen, it could result in violent death, injury, or terror. This is also a racialised process – for instance, in the

---

ahprojects.com, 'MegaPixels', MegaPixels: Analysing Face Recognition Datasets, accessed 26 February 2020, https://megapixels.cc/; Or, see this RAND report on the use of social media for defence and information operations, for example: William Marcellino et al., *Monitoring Social Media: Lessons for Future Department of Defense Social Media Analysis in Support of Information Operations* (RAND Corporation, 2017).

[72] Afxentis Axentiou, 'The Politics and Ethics of Drone Bombing in Its Historical Context' (Unpublished PhD Thesis, Brighton, University of Brighton, 2018), 53.

[73] Zuboff, *The Age of Surveillance Capitalism*, 378.

violent scrutiny faced by Muslims under counterterrorism surveillance in the UK. What is being targeted, then, is less specific people and more *patterns of life* suggestive of either (racialised and imagined) hostile intent, or in the case of the commercial sector and influence operations more broadly, *suggestive of suggestibility*, as the next subsection shows.

Put differently, the form of power she delimits is in fact inseparable from the forms of power that do claim bodies (or rather, capitalism in itself claims bodies in a myriad of ways – and surveillance capitalism is not a separate entity to that but works entirely in conjunction). I take issue with the idea that surveillance capitalism is a separate, clean capitalism – in fact that she may end up buying into the techno-narratives she herself attempts to decry. Taking the point that the everyday person does not witness or fall victim to this violence, there is a danger that Zuboff sanitises the very issue she is critiquing here. These same methods, techniques, protocols are used to temper conflict and quell dissent to violent projects. We simply must recognise that the arguments, theories and technologies that underpin the 'capabilities of Big Other' are violent in themselves – that they have violent histories the techniques of translation are themselves violent, and that they continue to underpin and propagate violent enterprise in the form of extractive projects and wars.

INFLUENCE OPERATIONS, PSYOPS, AND STRATEGIC COMMUNICATION

For these reasons, we must undertake a deeper analysis of the violence of contemporary digital surveillance and the predictive programming of control in the area of "influence studies". Here I return to Cambridge Analytica; or, more pertinently, to the networks of methodologies, theories and actors that informed and preceded its operations. As such, these final pages necessarily move variously between these different levels of analysis. Zuboff identifies the MyPersonality database as the larger resource that 'a small consultancy called Cambridge Analytica' used in order to inform its behavioural micro-targeting; as well as having become 'the database of choice for the scoping, standardization, and validation of the new models capable of predicting personality values from ever smaller samples of Facebook data and meta-data'.[74] There is a danger here in representing Cambridge Analytica as a small consultancy and almost entirely devoid of its connections to militaries and governments, even if for polemic effect in this particular statement. In actuality, Cambridge Analytica was an offshoot of a broader swathe of companies – its parent company, Strategic Communication Laboratories (SCL) or SCL Group was an umbrella for a number of companies – Cambridge Analytica, SCL Strategic Ltd, SCL Behavioural Ltd, SCL Elections Ltd, SCL Social Ltd, SCL Commercial Ltd, SCL Defence Ltd, SCL USA Inc, to name a few of

[74] Zuboff, 273.

the main groups. SCL Group was also connected to a number of other groups in the area of "Strategic Communications" or "influence operations" and has since gone into liquidation. [75]

I start here, with SCL, to drive home the importance of looking beyond Cambridge Analytica. The conceptual framework used by them and major players in this area takes its conceptualisation of the malleability of rationality and behaviour from BE as outlined above, and these organisations propose politics, interventions and forms of violence based on these assumptions. Here I elucidate the networks of overlapping and interconnected companies, actors, their military and defence contracts, and a short (and often corporate) history of the development of military "influence ops". I do so in part through tracing the methodology of Target Audience Analysis (TAA), demonstrating the continuities between this kind of work, behavioural economics and the work done in Chile with simulations like POLITICA, or the experiments conducted by Kennedy in Peru. In this section I also highlight one particularly well-connected actor and champion of TAA – Steve Tatham – in order to trace the networks surrounding Cambridge Analytica and the mobility of this methodology in military, political, and commercial campaigns and operations. I think it is also important to note that since the scandal surrounding Cambridge Analytica broke in 2018 many of the companies and organisations discussed in the following pages have taken down or significantly sanitised their websites. As a result, a significant portion of the research here is only possible thanks to the work of the 'wayback machine', a non-profit initiative of the Internet Archive.

STRATEGIC COMMUNICATIONS LABORATORY & ELECTION MANAGEMENT

For example, the SCL Defence website (since taken down) boasts that '[a]rmed with profound psychological insight we apply our Methodology to change the behaviour of individuals, groups and *even governments* by confronting or reorienting the *existing behavioural misalignment*'.[76] The oblique description of 'behavioural misalignment' raises the question of what the behaviour *should* be aligned with – what is the standard or value against which behaviour is assessed here? The answer, it seems, is whatever behavioural goal of the contractor for the services. This 'misalignment' also recalls the language of 'deficiency' in behavioural economics, and further, in the anthropological experiments outlined in earlier chapters in the attempt to bring behaviours deemed undesirable in line with defined goals of rationality and stability. The 'Methodology' described here is Target Audience Analysis, which we will unpack throughout this section. The site also claims that SCL have trained numerous militaries in information operations, and, 'having established teams of in-country researchers in many countries across the globe', can

[75] 'SCL GROUP LIMITED - Overview (Free Company Information from Companies House)', Companies House, accessed 20 February 2020, https://beta.companieshouse.gov.uk/company/05514098.
[76] It is also worth noting that Steve Tatham also headed the Defence arm of SCL, overseeing all projects related to military and conflicts. 'SCL Defence | Services', SCL GROUP, 29 October 2016, https://web.archive.org/web/20161029140805/http://sclgroup.cc/defence/services/consultancy. Emphasis my own.

clandestinely 'deal with research in conflict areas, most notably *zero-footprint* research and research into sensitive topics'.[77] These research projects then are the means to the end of 'behavioural change', available to all kinds of different organisations: 'We've worked with brands, political organizations and advocacy groups all over the world, and our Methodology has been approved by the UK Ministry of Defence, the US State Department, Sandia National Laboratories and NATO'.[78] SCL and its partner organisations have been working with governments and in politics and militaries for a long time before Cambridge Analytica cast such a spotlight on its operations.

As noted above, SCL formerly had a branch named 'SCL Elections' which boasted having a hand in multiple elections across multiple continents. This includes in the post-invasion elections in Iraq, in elections Nigeria in 2015, and in Kenya in 2017 where widespread, often fear-mongering viral videos were circulated to sow divisions in the voting public. Cambridge Analytica was, in effect, the Anglophone world's iteration of what SCL Elections had been doing in the Global South for well over a decade.[79] SCL is now understood as having been implicated in as many as 68 elections, largely in the Global South.[80] SCL Elections and Cambridge Analytica alike used political microtargeting, based on their trademark TAA methodology and other predictive technologies deemed to have access to and the ability to exploit target audiences psychological biases. That these companies initially offered 'Election Management' services in the Global South reiterates colonial tropes of experimentation and refining in the non-West before those models and tactics are trialled elsewhere.[81] This too recalls Kennedy and Holmberg's experiments in Peru, taking the 'step of making a laboratory out of a community and region' still further.[82]

Again, what I am interested in here is not necessarily to do with how *effective* these techniques are at influencing, nor am I arguing that SCL or Cambridge Analytica are unique in terms of their operations. I am concerned here with the set of logics that is infrastructural to these operations, and the easy commutability between state politics and governance, advertising and public relations corporations, and state and private militaries alike. I am concerned with how these logics have become infrastructural to global organisation in each of these sectors. In a 2019 report on computational propaganda, Samantha Bradshaw and Phillip Howard have evidenced influence operations and conducted by governments and political parties in 70 countries.[83] All the world-

[77] 'SCL Defence | Services'. Emphasis my own.
[78] 'SCL Defence | Services'.
[79] 'SCL Elections | Projects: All', SCL GROUP, 29 October 2016, https://web.archive.org/web/20161029140831/http://sclgroup.cc/elections/projects.
[80] Carole Cadwalladr, 'Fresh Cambridge Analytica Leak "Shows Global Manipulation Is out of Control"', *The Observer*, 4 January 2020, sec. UK news, https://www.theguardian.com/uk-news/2020/jan/04/cambridge-analytica-data-leak-global-election-manipulation.
[81] 'SCL Elections | Projects: All'.
[82] Holmberg et al., 'Experimental Research in the Behavioural Sciences and Regional Development', 2.
[83] Samantha Bradshaw and Phillip N. Howard, 'The Global Disinformation Order: 2019 Global Inventory of Organised Social Media Manipulation', Working Paper (Oxford: Oxford Internet Institute: Computational Propaganda Project, 2019).

as-data can become a (Strategic Communications) Laboratory under these conditions. How did we get here?

BEHAVIOURAL DYNAMICS INSTITUTE

What follows will dig down into the history, framework and applications of TAA as illustrative of this shift. The Behavioural Dynamics Institute (BDi) is as good a place as any to begin to untangle this narrative. According to the Institute's now taken-down website, it was established in 1989 by Nigel Oakes. Oakes was educated at Eton and a Conservative Party member, who at the same time as the establishment of the BDi created SCL Group – the parent company of the now infamous Cambridge Analytica (CA) – as the commercial and operative branch of the BDi. The BDi and SCL group offer commercial, political and military services under the broader umbrella term of "strategic communication". It is worth bearing in mind that the BDi was established well before the advent of "Big Data" or the ubiquitous digital infrastructures that CA utilised. However, the basic framework, strategies and ethos of SCL and CA were developed here.

The BDi website stated that the key objective of the unit was to 'produce a workable model of communication and persuasion that could be used in crisis and social situations', that 'could be applied to any homogeneous group situation' in order to achieve 'measureable behaviour change'. [84] By its own description, the BDi was 'an academic institute that specialises in understanding influence and persuasion in order to change audiences' attitudes and behaviour. The Institute specialises in applying its methodology to military and political campaigns, where the audiences are hostile or friendly, national or international'.[85] The Institute boasted that it was comprised of a 'global network of leading academics from the fields of psychology, sociology, political science, system dynamics, statistics, and cultural anthropology'.[86] It was in the BDi that this group of 'leading academics' (though none of them were explicitly named on the site) developed this methodology of communication and behaviour change. This came to be known as Target Audience Analysis (TAA), which has now become widely institutionalised in governments, militaries and commercial sectors alike. TAA is a central component of the behavioural political microtargeting campaigns used by Cambridge Analytica.[87]

Commander Steve Tatham is a key actor in the development and dissemination of this methodology. He was head of the 15 PSYOPS brigade from 1991 onwards, managing info ops and

[84] 'Behavioural Dynamics Institute: History', BDi, 23 February 2009, http://web.archive.org/web/20090223092657/http://www.bdinstitute.org/02_history.html; 'Behavioural Dynamics Institute: Home', BDi, 21 February 2009, http://web.archive.org/web/20090221155203/http://www.bdinstitute.org/01_home.html.
[85] 'Behavioural Dynamics Institute: Research', BDi, 21 February 2009, http://web.archive.org/web/20090221142147/http://www.bdinstitute.org/05_research.html.
[86] 'Behavioural Dynamics Institute: Home'.
[87] Cambridge Analytica, 'Leave.EU: Profile Raising and Outreach' (Cambridge Analytica), accessed 31 January 2020, https://www.parliament.uk/documents/commons-committees/culture-media-and-sport/Arron-Banks-appendix.pdf.

psychological warfare in Iraq, Afghanistan and Sierra Leone. He worked extensively with Nigel Oakes in the BDi, and was the director of SCL Defense. Again, the BDi was the think tank that spawned SCL, and Cambridge Analytica was just one offshoot of SCL Group. Tatham also headed up an organisation named IOTA Global and had a central role in the governance of the Influence Advisory Panel (IAP).[88] IOTA Global was once the partner company and training branch of SCL Group, also directed by Nigel Oakes and headed by Andrew Mackay and Tatham. IOTA boasted on its website (also since taken down) that it 'is an organisation of the world's most recognised military Information Operations, Psychological Operations and Influence professionals' whose members 'have commanded Information Operations and Psychological Operations units on operations; they have written NATO and national doctrine; they lecture in the world's Defence Academies.'[89] These groups, who themselves patented "influence" and manipulation technologies then also wrote the guidance and "best-practice" standards for governments and supranational military organisations on using them.

In 2011, Tatham co-authored a book entitled *Behavioural Conflict* with Mackay, which is a behavioural economics approach to conflict and information operations in war.[90] This book outlines central concepts in behavioural economics that would be effective in shaping contemporary war and counterinsurgency. The authors argue that StratCom and military info ops must incorporate insights from BE, as, 'if we seek to influence behaviour in order to determine more appropriate choices then we will have to radically change both our approach and methodologies.'[91] They cite 5 key ideas to be taken from BE. First, 'Prospect Theory', another name for 'Loss Aversion' as we saw in relation to benefits sanctions earlier in the chapter.[92] Second, 'Anchoring', which claims that 'individuals when conflicted between "gut" and "head" can be easily manipulated by "anchoring" their choice to a predetermined value.'[93] Third, the 'wisdom of crowds', that is, the notion that an individual's opinion can have an important effect on influencing the activity of a crowd.[94] Fourth is the 'framing of choices', where experience in Afghanistan led them to believe 'that the coalition has struggled to frame the choice we are asking a war-torn nation to consider, and in a manner that would make sense culturally and that is

[88] The Influence Advisory Panel, chaired by Major General Andrew Mackay, co-author with Steve Tatham of 'Behavioural Conflict', was set up to review 'best practice and acts as an advisory panel for government institutions that are interested in developing their own influence capabilities'. See their (also taken down) website:
'Influence Advisory Panel: The Panel', Influence Advisory Panel, 19 August 2014, https://web.archive.org/web/20140819140826/http://www.x-iap.com/.
[89]It should be noted that the claim on the website of having written NATO doctrine comes shortly after the above NATO doctrine report on influence operations was published. 'IOTA Global: Home', IOTA Global Information Operations Training & Advisory Services, 19 August 2014, https://web.archive.org/web/20140819084002/https://www.iota-global.com/.
[90] Steve Tatham and Andrew Mackay, *Behavioural Conflict: Why Understanding People and Their Motivations Will Prove Decisive in Future Conflict* (Essex: Military Studies Press, 2011).
[91] Tatham and Mackay, 64.
[92] Tatham and Mackay, 64.
[93] Anchoring is a widely used technique in advertising and public relations. Tatham and Mackay, 65.
[94] Tatham and Mackay, 65.

sympathetic to the environment.'[95] Finally, they explicitly reference libertarian paternalism, arguing that behavioural nudges can be used to 'influence behaviour in positive ways'.[96] The insights taken from behavioural economics as outlined above are a consistent feature in Tatham's work, and are fundamental to the conceptual basis for the TAA method. Alongside this book, and his work in the BDi, SCL Group, IOTA Global and the IAP, Tatham has written Influence Operations and Strategic Communications (StratCom) reports for NATO, the UK Ministry of Defense (MOD) and Foreign Office, and the US military.[97]

NATO INFLUENCE

StratCom was recognised by NATO as an integral part of achieving its political and military objectives in 2009.[98] Already by 2014, BDi methodologies figure heavily in the NATO Psychological Operations Joint Doctrine. In this document, NATO defines info op, PSYOPS and StratCom respectively:

1) 'info ops is focused on affecting *will, understanding, and capability* through military information activities. … By influencing approved target audiences directly, PSYOPS, has a direct effect on both understanding and will, together with an indirect effect on capability'.[99]
2) 'it must be noted that PSYOPS *has influence activity as its main purpose'* and is defined as *'planned activities using methods of communication and other means directed at approved audiences in order to influence perceptions, attitudes and behaviour, affecting the achievement of political and military objectives.'* [100]
3) 'Strategic Communications (StratCom) are the coordinated and appropriate use of NATO communications activities and capabilities— public diplomacy, public affairs, military public affairs, information operations, and PSYOPS, as appropriate.' Strategic communications are deployed for the *'advancing national interests by using all Defence means of communication to influence the attitudes and behaviours of people.* It is an MOD level function that seeks to align words, images and actions…'[101]

[95] Tatham and Mackay, 66.
[96] Tatham and Mackay, 66.
[97] Steve Tatham, 'US Governmental Information Operations and Strategic Communication: A Discredited Tool or User Failure? Implications for Future Conflict' (Carlilse PA: Strategic Studies Institue: US Army War College, December 2013); Steve Tatham, 'Strategic Communication: A Primer in Advanced Research and Assessment Group' (British Defence Academy, 2008); Dr Steve Tatham, 'Defence Strategic Communications', n.d., 148; Andrew Mackay, Steve Tatham, and Jim Derleth, 'Instability, Profitability, and Behavioural Change in Complex Environments' (Conflict Studies Research Centre, July 2014).
[98] Mark Laity, 'NATO and Strategic Communications', *Three Swords Magazine*, 2018.
[99] 'Allied Joint Doctrine for Psychological Operations', NATO STANDARD (NATO: NATO Standardization Office: Ministry of Defence: Development, Concepts and Doctrine Centre, 2014), IX. Emphasis in original.
[100] 'Allied Joint Doctrine for Psychological Operations', IX, 1–1. Emphasis in original.
[101] 'Allied Joint Doctrine for Psychological Operations', 1–2. Emphasis in original.

Here, the idea of an 'information environment' has come to be central to strategic military concerns. Indeed, for NATO, 'information flow is now so prevalent, potent and unavoidable … it forms as much a part of the operations environment as the terrain or weather.'[102] This NATO doctrine document elaborates the informational environment as consisting of information, technology and the minds that receive and process it – both echoing the cybernetic understanding of the human-machine system and combining it with what appears to be insights from behavioural economics:

> Events in the world are transmitted as information through networks before getting into people's minds; once there, the information is subject to pre-conception, interpretation, bias, agenda, adjustment and possibly retransmission. This is the information environment which is defined as: *the information itself, organizations that receive, process and convey the information, and the cognitive processes that people employ, including the virtual and physical space in which this occurs.* The environment encompasses the full range of traditional, new and emerging media technologies, all of which provide new possibilities for dialogue including delivery of PSYOPS messages and persuasive content.[103]

The mind is viewed here as part of the information environment; or, rather, the environment in which military operations are devised and enacted is extended into 'people's minds' and their 'cognitive processes'. This literal world-as-data is laid out as the new battleground, the mind consonant with and merely a terrain to be opened up for military operations, political messaging and consumer advertising alike.[104]

TARGET AUDIENCE ANALYSIS

This 2014 Allied Joint Doctrine for NATO utilises the concept and method of Target Audience Analysis as developed by the BDi, and used by SCL and Cambridge Analytica in most, if not all of their campaigns.[105] Steve Tatham defines TAA as

> the ability to empirically diagnose the exact groupings that exist within target populations. Knowing these groupings allow them to be ranked and the ranking depends upon the degree of influence they may have in either promoting or mitigating

[102] 'Allied Joint Doctrine for Psychological Operations', 1–1.
[103] 'Allied Joint Doctrine for Psychological Operations', 1–1. Emphasis in original.
[104] There is an important history here of conceptualising information as a fifth dimension in war, and in the push especially from the US to gain control of information as an environment. See, for example: John Arquilla and David Ronfeldt, eds., *In Athena's Camp: Preparing for Conflict in the Information Age* (National Defense Research Institute: RAND Corporation, 1997); Davis, 'An Information-Based Revolution in Military Affairs'.
[105] For example, see work by Cambridge Analytica for the Leave.EU campaign: Cambridge Analytica, 'Leave.EU: Profile Raising and Outreach'.

> constructive behaviour. The methodology involves a comprehensive study of a social group of people. It examines this group of people across a host of psycho-social research parameters, and it does so in order to determine how best to change that group's behaviour. … TAA is a decision-maker's tool, which will explain and forecast behaviour – and make scientifically justifiable recommendations to implement programmes to change problematic behaviours. [106]

Over the past decade the BDi (and SCL Group) delivered a number of training programs for NATO, and in Britain, for the Home Office, Ministry of Defence and the Foreign Office. TAA and their patented 'Measure Of Effectiveness' methods are now 'best practice' in NATO and UK Defence and info/PSYOPS departments and are widely used across different domains of counterinsurgency.[107] In the 2014 doctrine TAA is seen as a vital method in the tailoring of strategic communications and PSYOPS. The doctrine states that

> [u]nderstanding and empathy are key to PSYOPS; target audience analysis is the tool by which this is achieved. Effective analysis should provide a rich contextual understanding of the cultural, historic and social composition of the target audience, along with a deep awareness of emotive and credible themes and symbols, all of which can be used to effect short-term behavioural and long-term attitudinal change.[108]

One example of the method in practice is Project DUCO; a sensitive UK Ministry of Defence trial in a 'hybrid' TAA approach in 2013 that was run by SCL Group.[109] The stated aim of the pilot was 'to assess the utility of this approach to identify emerging groups, the motivations behind their formation and their likely behaviours in a given context'.[110] The report states that 'SCL deployed their BDi Country Sweep methodology to identify key factors affecting instability in [redacted] and the Target Audiences (TA) associated with them. This approach isolated 25 key TAs as being critical to stability. The TAA methodology was then deployed to home in on understanding and intervening on 'Young Unmarried Males' (YUMS), seen as one of the most critical TAs [redacted]'.[111] In using this methodology, the authors of the report cite the behavioural economic

[106] Steve Tatham, 'Target Audience Analysis', *The Three Swords Magazine*, 2015, 51.
[107] See this Canary report for a list of SCL contracts and dealings with defence organisation: Tom Coburg, 'SCL and Cambridge Analytica's Links with Defence Establishment Revealed. And It's Not Just Contracts.', *The Canary*, 26 March 2018, Online edition, https://www.thecanary.co/uk/analysis/2018/03/26/scl-and-cambridge-analyticas-links-with-defence-establishment-revealed-and-its-not-just-contracts/.
[108] 'Allied Joint Doctrine for Psychological Operations', 1–4.
[109] See the heavily redacted document here: 'Project DUCO: An Impartial Technical Evaluation', Sensitive (United Kingdom: Defence Science and Technology Department, 2014), https://www.whatdotheyknow.com/request/389795/response/975478/attach/3/FOI%202017%2003434%2020170508%20Rpt.pdf. Accessed 31/01/2020
[110] 'Project DUCO: An Impartial Technical Evaluation', 1.
[111] 'Project DUCO: An Impartial Technical Evaluation', 1.

theory of "locus of control". In an exposition of Project Duco in a report for the US Army War College, Tatham explains that a

> [t]arget audience's locus of control represents that audience's view of what determines the course of future events. … A number of revelations flow from the finding that a given audience is characterized by, for example, an external locus of control. … An audience with an external locus of control is less inclined to take action, because in their worldview, doing so will have little influence on how matters will play out.[112]

He goes on to state that it is essential to determine the locus of control in a target population, as it shapes the target messaging and likelihood of revisions of behaviour. Further, he alludes to '[a] research project of the [Nigerian] electorate to establish under what conditions the public might rise up against the government if fraudulent practices were observed', which 'actually revealed that there were almost none – because their locus of control was particularly low.'[113] Here, we should recall that SCL ran the election campaign in Nigeria 2015.[114]

In chapter 3 we saw the development of numerous social science projects funded by the US military across Latin America in the 1960's with the most controversial being Project Camelot. This project and others like it attempted to create workable models of societies that would predict and pre-empt civil unrest by incorporating insights from sociology, anthropology, psychology and systems analysis. I have argued that these projects are another form of extractive 'scientific colonialism', where information about a nation (or in this case, a population or 'target audience') is extracted from it from the outside and manufactured into workable knowledge, and either exported back or used against it. Again, these were counterinsurgency tactics – the aim being to predict and prevent insurgent thought and practice. As a doctrine seeking to model population behaviour, TAA thus resembles the kind of cybernetic thinking I explored in the first half of the thesis, and is in many ways its spiritual (and genealogical) successor. TAA reflects this logistical turn in the modelling, prediction of and attempts to intervene in and change behaviour. In the first half of this thesis, we saw cybernetic modelling as an attempt to create a standard, unified language and hence model of everything that would describe, explain and thus help predict and modulate futures. I show that though by name, cybernetics dropped out of fashion, its methodologies and fundamental model of the world became subsumed into various disciplines as an aspect of logistical rationality. In TAA and across the persuasive architectures of the

[112] Steve Tatham, 'Using Target Audience Analysis to Aid Strategic Level Decisionmaking' (Carlilse PA: Strategic Studies Institute, US Army War College, August 2015), 30.
[113] Tatham, 31.
[114] There is unfortunately no way to tell for sure whether the study he is citing is connected to this election campaign, as there is very little published about the research SCL did for Nigeria. However, it is not unreasonable to assume that the (un)cited report, understood as using the methodology and theoretical framework developed by SCL and evinced by Tatham in a secondary report about this methodology, was one conducted by them.

internet more broadly, the turn toward personalisation appears at first glance to be a move away from the more explicit claim to universal modelling. As Tatham writes,

> There exists no universal communication model applicable to all groups and cultures. All communication efforts must be tailored to the local dynamics, and with respect to the behaviours one is seeking to change. Because audiences are multi-faceted and cannot be grouped as a population, influencing the different component groups of a society requires precisely targeted methods and approaches: *One message – no matter how culturally relevant – does not fit all.* Working out who to influence, why, how, when, and whether it is possible, constitutes the first steps of the TAA. Often, it will be necessary to influence one group in order to influence another.[115]

That TAA is deemed to be an empirical and 'scientifically verifiable' method to determine 'exact groupings' within a population, claiming to be able to both definitively induce and measure behaviour change within a particular audience or population seems to run counter to this claim. Though there is an increasing focus on difference, personalisation and precise targeting, within TAA, StratCom, info/PSYOPS and most widespread, throughout the commercial marketing sector, the overarching 'model' is the same. This is to extract knowledge and experience, translate it into (inherently impoverished and exclusionary) machine-readable data, and to use said data to create predictions and modulate behaviour *as outcomes* in line with organizational goals. That TAA is said to be applicable and is deployed across diverse situations and toward a multitude of goals – political, economic, commercial and military – is indicative of the scope and reach of this particular iteration of logistical rationality. In fact, TAA can be understood an updated and more comprehensive iteration of this dream of finding universal rules of communication and modelling: it works to enfold culture and identity into this project of universality. Here, differences can universally be mapped, and the world can still universally be rendered as data because the science, the models and the algorithms are complex enough to capture the complexity of the world itself.

DATA EXTRACTION FOR EXTRACTIVE INDUSTRY

Finally, I want to look to a project of Steve Tatham that is demonstrably a culmination of the logics outlined throughout. Tatham *was* listed as a senior advisor in Mackay's company 'Complexas', a company deploying TAA and the various behavioural science and influence methodologies developed in the BDi and following the principles of behavioural economics, Public Relations (PR) and strategic communications, *for the explicit purpose* of helping to negate resistance to extractive

[115] Tatham, 'Target Audience Analysis', 52.

industries projects in 'frontier markets' in Africa specifically.[116] Tatham's name has since been taken off the website and his involvement in this company scrubbed from the internet, save for the Internet Archive. In a supporting co-authored paper by Mackay and Tatham, they argue for the use of TAA in helping multinational corporations conduct extractive operations in 'complex and unstable regions of the world'.[117] They begin the paper by recognising that 1.5 billion people live in areas affected by conflict or other forms of instability; however, that 'these areas are often also rich in resources', and therefore ways to ameliorate conflict for the purposes of smoother extractive industries is vital.[118] The correlation between a wealth of natural resources and the causes and legacies of conflict remains unexplored.[119] Here as well we should think back to those programmes of modernisation and development that favoured infrastructure heavy, extractive, and export-led development, and the necessarily violent and extractive architecture of debt they produced as outlined in chapters two and three.

The paper laments lost profits due to MNCs collective failure to recognise, mitigate for and assuage local populations before resistance to projects occur – using the infamous example of Shell's operations in the Niger Delta. In a sparse and underdeveloped account of the case, the authors argue that yes, there were some environmental damages, but overall, Shell spent too much on security and not enough on the development of the community, and that this led to unhappiness, hence resistance, hence a massive profit loss. No mention is made of the documented fact of Shell's misreporting of the causes of leaks (accusing the community of sabotage when they have been identified as corrosion), the massive ecological consequences of the annual 240,000 barrels spilt in the area, the mounting evidence of neonatal deaths and other health complications, and not to mention the history of military and security repression and murders associated with the government and Shell themselves.[120] Instead, the failure of Shell to generate maximal profits is seen as a lack of understanding of the 'operational environment' – assuming that security and development (in a very narrow sense of the word) will equal stability. Here again we see the need to go beyond Zuboff's analysis of these processes as essentially nonviolent. Erasing these complex histories of violence, expropriation and the well-documented crimes of Shell in the Niger Delta, Tatham and Mackay create a blueprint for counterinsurgency

[116] 'How We Operate — Complexas', Complexas, 16 March 2016, https://web.archive.org/web/20160316003332/http://www.complexas.com/how-we-operate/.
[117] Mackay, Tatham, and Derleth, 'Instability, Profitability, and Behavioural Change in Complex Environments', 1.
[118] Mackay, Tatham, and Derleth, 4.
[119] For an investigation into the 'resource curse' that reckons with imperial histories, see for example: John Bellamy Foster and Brett Clark, 'Ecological Imperialism: The Curse of Capitalism', *The Socialist Register* 40 (2004): 186–201; or Liam Downey, Eric Bonds, and Katherine Clark, 'Natural Resource Extraction, Armed Violence, and Environmental Degradation', *Organization & Environment* 23, no. 4 (December 2010): 417–45.
[120] Ben Amunwa, 'Counting the Cost: Corporations and Human Rights Abuses in the Niger Delta' (London: Platform, 2011), http://platformlondon.org/nigeria/Counting_the_Cost.pdf; Best Ordinioha and Seiyefa Brisibe, 'The Human Health Implications of Crude Oil Spills in the Niger Delta, Nigeria: An Interpretation of Published Studies', *Nigeria Medical Journal* 54, no. 1 (2013): 10–16.

focusing on how to influence opinion and quell legitimate dissent to damaging projects. The erasure of forms of domination enacted on communities and lands afflicted by large scale extractive projects forms the foundation for further domination and extraction. This epistemic violence, apparent in the circumscription of *what is deemed worthy of inclusion* in the models upon which the world is organised, actively shapes the organisation of violence in future projects, and further, people's futures.

They propose a modified TAA –'Stakeholder Audience Analysis', or SAA, as the '*sine qua non* of behavioural campaigns', using 'quantitative and qualitative social science methodologies to understand groups, measure their current behaviour, identify motivations, and predict future behaviour'.[121] They liken SAA to the process of medical diagnostics procedures, in which group behaviours are measured 'against multiple and empirically derived parameters' and examined to gather behavioural data. The main purpose of SAA then, is 'to "diagnose the audience" in order to understand what "diseases" could be treatable, and how'.[122] Recall here the language of 'insurgency prophylaxis' in the plan for Project Camelot in chapter three.[123] In both of these cases, the implication of certain *resistant* behaviours as diseases immediately implies that a cure is needed. This folds the deeply colonial strategy of the pathologisation of local populations into the equally colonial proposition that the Western saviour (here modelled as corporation) must come and cleanse/prepare/render productive the land. Making clear the transposability of the methodologies used, they write that, when deployed by British and American militaries,

> … over 45 different behavioural parameters are measured. Examples include group membership, rituals, power structures, initiating sets, normative values, propensity for change, reward structures, grievance and values. The product of this process is a detailed map of the human and psychological terrain of the operational environment area.[124]

Their behavioural campaigns aim at 'creating a consensus between local communities and MNCs' in order to improve long-term profit margins.[125] While the paper does argue for better integrated and holistic community development as a means to this end of greater profitability, the underlying violence and degradation of extractive industries is minimised, ignored, or worse still, explained away as the 'cure' – and as this thesis maintains, the extraction and translation of lived lives and sociality as a means of influence and control represents a significant violence and degradation in and of itself. The deployment of these techniques here is a prime example of

[121] Mackay, Tatham, and Derleth, 'Instability, Profitability, and Behavioural Change in Complex Environments', 11.
[122] Mackay, Tatham, and Derleth, 12.
[123] Reprinted in: Horowitz, *The Rise and Fall of Project Camelot: Studies in the Relationship Between Social Sciences and Practical Politics*, 48.
[124] Mackay, Tatham, and Derleth, 'Instability, Profitability, and Behavioural Change in Complex Environments', 15.
[125] Mackay, Tatham, and Derleth, 13.

epistemic violence as supporting practices of domination, disproportionately affecting those living with and fighting against ecological degradation and corporate and governmental violence.

Several forms of erasure and domination overlap here. First, the historical and political contexts of either extant or prospective extractive operations are sanitised, preparing the ground for the next stage of data extraction. Second, and corollary in a sense, a community is translated into variables consonant only with the aims of influence operations. What is left out of this translation is all but what is deemed salient to the extractive industries; that data necessary to effectively and efficiently quell dissent to its operations. As we have seen, there is a violence inherent to the 'pure abstraction of life into a digitally stored data trace'.[126] This violence is *multiplied* in the use of these diminished traces as the means through which to conduct corporate-state-military info ops, or PSYOPs, against that population in the service of often deleterious extractive operations. Or, in the case of Cambridge Analytica or SCL Elections, in the service of helping secure elections for often right-wing, lobbyist-friendly political candidates. Or, in the case of SCL defense, in the service of waging war, winning war, or directing counterinsurgency action. We have seen antecedents to these epistemological operations of logistical rationality as they were deployed in Chile, Peru, Vietnam, in the service of similar goals of preparing the ground for literal extractive activities and as counterinsurgency.

Cambridge Analytica, Strategic Communications Laboratory and the material and conceptual infrastructures they are situated within represent stark examples through which we can trace these logics. They are important to unpack not only in terms of the wholesale extraction, translation and manipulation of data, but in the fundamental epistemological framework that enables its methodologies to traverse commercial, governmental and militaristic applications. Further still, it is vital to trace how this framework has become infrastructural to the contemporary form of the modern in each of these areas. The above examples show the need to expand on prior analyses to provide an explanatory framework for a logistical rationality that is understood to be colonial and that can account for the violence inherent to its apparently neutral project.

CONCLUSION

Here I am drawing attention not to the broad *applicability* of these logics of translation, extraction, and behavioural modification, but to demonstrate the way in which they have come to act as interoperatively infrastructural in civil, commercial and militaristic realms. I have shown that we cannot draw definitive lines between these spheres and their uses and applications of the technologies of influence here outlined, and argue that the logistical rationalities that structure these seemingly novel technologies of prediction and control are fundamental to processes of domination – whether in terms of corporate, state and military power, surveillance, or as above,

[126] Belcher, 'Sensing, Territory, Population', 420.

ecological devastation. This chapter has articulated some of the various trajectories of these logistical logics and trace them as they have come to structure the shape of contemporary, digital modernity.

This chapter, and the thesis more broadly, has been an attempt to excavate the common ground and long histories of the contemporary methods, technologies and theoretical justifications that legitimise and allow for widespread intervention into and administration of peoples' lives. Ranging from welfare policies in the UK government, commercial and political advertising, and military and counterinsurgent action, these interventions are made possible by a logistical-colonial epistemic framework that relies on techniques of measurement and calculation, extraction and translation, prediction and the control of uncertainty, and representation and standardization. Here I have sought to trace not only the genealogical connection between contemporary forms of digital surveillance and earlier forms of logistical rationality, showing that the field of BE and many of the methods and concepts it has generated (such as TAA) is a recent iteration of logistical rationality, but I have also sought to map the many links between this field of theories as a more or less academic practice and both governmental and military doctrine. My aim in doing so has been at once to place these technologies of government in the longer history of logistical rationality that I offer in this thesis, and to offer a corrective to Zuboff's all-too-neat distinction between surveillance capitalism and colonial, capitalist modernity, which, in my view, has always been more or less logistical.

Here I have shown how looking through the lens of the epistemic and representational orders of logistical rationality and the world-as-data can be useful in unpacking forms of contemporary domination. This approach allows us to re-centre those violent histories that are erased in its own framework and in accounts like Zuboff's, and demonstrates that the current force of contemporary surveillance is not merely a co-optation of a generally benevolent liberal capitalism, but the extension and instantiation of violent logics of colonial modernity in a technocratic guise of efficiency and scientific neutrality. In recasting and organising the world-as-data, the translation of people's already mediated experience into behavioural data and its rendering as predictive products can interchangeably take the form of drone strikes, commercial advertising or political microtargeting. The form of 'the human' that all these forms of governance and intervention are based on is an incomplete *representation* that is extracted and translated automatically by tools and processes unknown to us; into information unknown by us; often used for purposes unknown to us. The erasure that is necessarily enacted in this ordering of the world-as-data is one foundation of exploitation and domination – the epistemic violence outlined here forms a literal basis for and prepares the ground for domination. Where people are seen and organised as objects in this order, their commonality, being, and relationality are undermined and rendered simultaneously as commodity, as superfluous and regularly, as threatening to a violent order that purports to simply seek order.

CONCLUSION

This thesis has argued that a complex, contradictory and interweaving set of logics constituting what I call *logistical rationality* have come to actively structure and sediment the organisation of the world. The central logics I have dealt with are measurement, prediction, the control of uncertainty, extraction, translation, standardisation, and complex logistical spatio-temporalities. I have argued that logistical rationality is fundamentally, epistemically structured by coloniality and simultaneously structures the contemporary shape of coloniality/modernity. I have endeavoured to demonstrate these epistemic foundations of logistics and how they come to bear on other areas traditionally seen as outside its remit.

In chapters one to three, I focus on the lineage of contemporary logistics. Beginning in the 1940s with an exploration of cybernetics, I show that its treatment of the world as a series of servomechanisms reflected and reworked a colonial representational order, which, following Mitchell, I termed the world-as-data. I showed how cybernetic methods and ideology influenced the development of early computing and vitally, the 'revolution in logistics', and how this ultimately came to structure economic and political organisation in the US thereafter. In chapter two, I looked at counterinsurgency and modernisation and how they took up these same methods of extraction, modelling, and translating the world-as-data. Here I showed how colonial narratives justified prescribed programmes of modernisation along an evolutionary continuum of development. Many of these programmes were determined by and implemented through extractive social science research which aimed to model populations in order to influence their collective behaviour – both in order to modernise, and as counterrevolutionary efforts to mitigate any resistance to these externally determined programmes. This led me to a discussion of development and the resultant extractive architectures of debt that relied on these modernisation theories in chapter three. Here, I argue that an imperative to industrialise through the construction of material logistical infrastructure helped to entrench unequal economic and political relationships and further replicate the conditions of coloniality/modernity. I show this tendency through the disciplinary mechanisms of credit rating and the debt trap of the Export Credit Agency-Paris Club-IMF assemblage.

In the final two chapters, I bring these analyses together to demonstrate the continuities between logistical rationality as it developed in response to the shifting, decolonising global landscape, and contemporary logistical formations in an age of 'Big Data'. Chapter four looked at standardisation, specifically in relation to international standards and logistical computation systems as means by which the world is increasingly rationalised and translated into logistical legibility. I also open up some questions around the complex spatio-temporalities of contemporary logistics in the world-as-data. In the final chapter, I attempt to consolidate the arguments posed throughout the thesis. I take the tip of the iceberg of mass social manipulation in the example of Cambridge Analytica, alongside an analysis of Zuboff's surveillance capitalism, to demonstrate the necessity of

excavating and laying bare the epistemic violence and coloniality inherent to their operations. I show that this perspective is vital in understanding the various violences they enact.

I have argued that logistical rationality can be understood as a kind of grammar of organisation – one that retains, reworks and recalibrates a coloniality of power, in part through the translation of material, social and cultural structures into logistical legibility, with the ultimate aim of administration and control. I have shown that these logics intersect at different registers and have become infrastructural to the organisation of many spheres of life – the material, political, economic, and now the psychic, cultural and social. I have also tried to demonstrate the threads that link the translation of our intimate experience with the translation of the physical world. The logic of extraction as the literal, physical removal of resources and their manufacturing and movement along supply chains is irrevocably connected to the extraction of experience and its translation or manufacture into knowledge. Thinking logistics and logistical rationality together allows us to consider the intersections between the material-infrastructural and political-epistemic operations of logistics, and how they intersect to shape contemporary coloniality/modernity. The logic of standardisation I've outlined here, for example, operates in several interrelated ways; in epistemic terms, in the translation of knowledge and experience into logistical legibility and the world-as-data; in material terms with the formatting of the world as global circulatory system via prescriptive industrial modernisation and standards bodies; in economic terms through dominant economic theory and disciplinary mechanisms like debt and sovereign credit ratings; and in political terms in the replication of the form of the nation-state and governmental structures, and related interventions and counterinsurgency practices.

All of this relates back to the logic of prediction and its corollary, the control of uncertainty. In this thesis I highlight this *expansionism* of logistical rationality, not only in its accelerating attempt to translate the world, *but also its futures,* into logistical legibility and hence control. The frontiers of logistics, in tandem with physical incorporation via practices like standards, extend out into futurity by way of extending further into our (digitally mediated) cultural, social and mental lives. Our so-called interiority (which is of course always already shared and social) is factored too as a landscape to be conquered in this quest, and we as "informational environment" become the battleground upon which it is fought. As I have argued, this is neither new nor is it evenly affecting. Cultural and political subversion as tactics of counterinsurgency were honed and deployed against Othered populations since colonial times. Target populations are differentiated, excavated and analysed for the most effective method of manipulation.

And so related, is that these populations are rendered as objects of experiment, or objects to be *ordered, optimally,* in a system. Populations are circumscribed and intervened upon via the translation and hence reduction of their rich complexities into machine-readable data. Whether this is the anthropology of gesture in Bateson & Mead (chapter one); interventionist modelling in Kennedy, Project Camelot, or the HES in Vietnam (chapter two); experimental modernisation programs, structural adjustment and Western-led development more broadly (chapter three);

targeted behavioural interventions in Iraq, Kenya, the UK or almost anywhere via nudge theory and digital surveillance (chapter five). This kind of experimentation is always, on some fundamental level, a reworking of the colonial, paternalistic notion that these populations are irrational and incapable of governing themselves. Or, at the very least, that they should be rendered profitable. This mode of organising subjects requires that they are legible; that they are circumscribable within the epistemic territory of logistical modernity.

Translation then presents an attempt to map the unmappable – to chart and render legible the generative indeterminacy that resists capture and translation, that resists rationalisation and instrumentalization. For Moten and Harney, this might be something like what they call Blackness, Logisticality, or Fugitivity.[1] Thinking through Vazquez, it might be the constitutive outside – other ways of being and relating to the world against which modernity defines its own epistemic borders and their attempted erasure. This is not to say that these organising logics are totalizing, complete or even very effective – but that the steady process of building them into the infrastructures of everyday life has widespread, differential and differentializing effects that we must interrogate.

One of the most complicated aspects of writing this thesis was to navigate is its changing scales of analysis. From specific actors and institutions to broader infrastructures and currents in the history of ideas, or from the high-dimensional spaces within algorithms to spatio-temporal conceptualisations of logistical modernity, the arguments made here attempt to traverse the micro and the macro. The logics identified work at these different scales, and as noted above, they intersect at different registers. There is, and should be, a fear that this can lead to a grand or totalising narrative, running counter to the very point of the project – and without wanting to add too many caveats, I would hope that this work has not made that mistake. There is much that this thesis, in all of its broad strokes and its movement between different levels of analysis, has not done justice to. A fuller account could look more deeply into finance, its regulation, and insurance with its roots in the slave trade; or, for example, high frequency trading and its use of risk and its monetisation. It could look at agribusiness and extractivism and new logistical geographies through these lenses. It could trace specific supply chains and the porosity of borders for capital and goods against the backdrop of militarising borders in the midst of humanitarian crises. It could unravel the code that creates those algorithms that are increasingly, and often invisibly, governing much of our on- and offline lives. It could interrogate different colonial powers and experiences, and, most vitally, it could give the proper space required to resistance and revolution - without which we are missing half of the story.

The central point remains, however, that there is an epistemic lineage to trace that shows the deep connections to this moment of increasing digitisation and surveillance to the project of modernity; and doing this genealogical work allows us to excavate the layers of epistemic

[1] Harney and Moten, *The Undercommons*.

violence and coloniality that they work to obscure. This thesis, despite having attempted to highlight this violence and to reckon with aspects of coloniality as they structure contemporary organisation, has not done enough to think through the practical, embodied, and highly racialised outcomes for particular communities. Primary research is needed to collate and amplify the voices and experiences of those whom this structural coloniality racialises. It is not enough to create frameworks for thinking about domination; we must be centring those voices and viewpoints that have been subject to erasure as, by definition, that is essential to counter its violence.

I find myself concluding this thesis in the time of both Covid-19 and in the very early days of what must already be understood as the largest civil rights movement in history. Both of these inherently global issues have necessarily thrown up questions about the analyses in this thesis, and the utility or worth of critique on its own. This, however, is not to say that the logics identified here have radically changed; in fact, if anything, they have intensified in both respects. Both crises have highlighted what is important to states and governments. It is not the most vulnerable in our societies. It is not human life, and it most *certainly* is not Black life. At the intersections of these crises, we see images of militarised police forces mobilised with astonishing speed and with state-of-the-art equipment, side by side with images of doctors and nurses wearing bin bags and swimming goggles. We see a highly developed and well-equipped surveillance apparatus spring into action, with, for one example, US military drones with facial recognition tech scrambled to observe protests against police brutality as they are met with further brutality. Across the world in this movement, we see people putting their lives at risk – precisely *because* Black lives already are – and being condemned for it, by governments who have already told their citizens it is safe to go back to work.

Naomi Klein in an early piece on the crisis, before the Black Lives Matter protests erupted, called this a pandemic shock doctrine – a 'screen new deal', in which an acceleratingly digital future is being rushed into being while the bodies pile up, and people are unable to amass on the streets or form a coherent, swift and coordinated response to the emergency measures being ushered in.[2] Many of these measures massively increase state surveillance powers – and, much like in the years after 9/11, the extension of these powers is likely to end up permanent. States and big tech corporations alike are scrambling to create contact-tracing and quarantine apps, either to trace the movement of the virus through the population or to enforce quarantine measures. The technology used for these apps is not entirely new – in fact, as we have seen, much of the tracking technology is already used in commercial applications, where a multitude of companies can track an individual user in their online and offline movements, across various platforms and devices to paint a detailed picture of their daily life in real time. Further, the nature of the pandemic has

[2] Naomi Klein, 'Naomi Klein: How Big Tech Plans to Profit from the Pandemic', *The Guardian*, 13 May 2020, sec. News, https://www.theguardian.com/news/2020/may/13/naomi-klein-how-big-tech-plans-to-profit-from-coronavirus-pandemic.

meant that so much more of our time and our relationships, our work and our learning has been conducted online, mediated through a proliferation of communication technologies and apps to facilitate this changing sociality. This inevitably means that more of our time is spent in extractive environments, more of us is mediated, more is subject to digital translation. In the throes of the Black Lives Matter movement, the injunction has been to educate ourselves and share resources – again due to the pandemic, this has been largely digitally mediated, with online reading groups, shared documents and an incredibly widespread social media takeover. With so much of our politics being done on for-profit platforms and at a safe distance, it is a question for future research what kind of effect this will have.

Of course, simply living every day in a pandemic requires logistical thinking. In the early days of the pandemic as it hit the UK, newspapers lamented selfish shoppers for hoarding, when in fact the increase of purchases fitted well in line with the required amount of food and household goods to quarantine for two weeks with, which was itself government advice.[3] The problem was one of a highly sensitively calibrated supply chain that could not account for an unplanned increase in sales – it was the incapacity of just-in-time logistics. We saw this echoed in the sudden and disastrous halt to business as usual. When the incessant circulation of people, goods and capital was forced to slow down and even, in some cases, stop, economic catastrophe loomed. In the UK, as elsewhere, record unemployment numbers surged when businesses laid off staff in an attempt to weather the storm.[4] Renters couldn't then pay their landlords mortgages. Businesses and corporations, small and large, required government bailouts to remain afloat, whilst continuing to lay staff off – this including massive companies that had recently registered record profits, and those who had paid little to no corporation tax in recent years. Where individuals facing financial difficulties regularly face admonishment for having saved too little for a rainy day (in other words, for behaving irrationally) this turn of events begs the question, where did all those record profits go?

People will of course profit from this crisis, as Klein warns us. Jeff Bezos, CEO and founder of Amazon, is set to become the world's first trillionaire, following the growth of Amazon's

[3] Helen Lewis, 'How Panic-Buying Revealed the Problem With the Modern World', *The Atlantic*, 26 March 2020, sec. Global, https://www.theatlantic.com/international/archive/2020/03/coronavirus-panic-buying-britain-us-shopping/608731/; 'Stay at Home: Guidance for Households with Possible or Confirmed Coronavirus (COVID-19) Infection', GOV.UK, accessed 25 June 2020, https://www.gov.uk/government/publications/covid-19-stay-at-home-guidance/stay-at-home-guidance-for-households-with-possible-coronavirus-covid-19-infection.

[4] Universal Credit, the UK's benefit system, algorithmically and automatically conducts risk assessments to determine the level of validation and amount of remuneration to claimants. Big Brother Watch, 'Universal Credit, Benefits and Automated Risk Scores – Are You Affected? — Big Brother Watch', Universal Credit, benefits and automated risk scores – are you affected? — Big Brother Watch, accessed 30 June 2020, https://bigbrotherwatch.org.uk/2019/01/automated-decisions-risk-scores-and-benefits-are-you-affected/.

monopoly during the pandemic.[5] Logistics workers in Amazon warehouses and along its supply chains have repeatedly struck for hazard pay, for sick pay, and for safer working environments and been repeatedly ignored and in some cases, staff have been fired.[6] The NHS have been using Amazon to deliver its Covid-19 tests. The UK government have awarded hundreds of millions of pounds worth of contracts to private companies to carry out the work of its response to the virus: one of which consolidates covid-19 datasets in the NHS into a single "datastore" including sensitive health information of potentially everyone in the UK.[7] Two of the major contractors involved, Faculty and Palantir, have run disinformation campaigns and are wildly controversial companies for a multitude of reasons.[8]

The disastrous early response of the UK government was (in part) driven by nudge theory and the attempt to *balance* the effects of halting business as usual on the economy with the number of lives lost. To reiterate, the UK Government, in no uncertain terms, put the lives of hundreds of thousands of people (according to the Imperial College model) on par with the continued running of the economy.[9] The early model the government touted was a non-peer reviewed model coming out of Oxford University's Evolutionary Ecology of Infectious Diseases group, which suggested that around half of the population had already been infected by late March.[10] Though its validity had been questioned, it was promoted to the press by a PR agency that has ties to the government – Sugrue Communications, the director of which, Caibre Sugrue, has worked for the UK's MOD Defence, Science and Technology Laboratory (who ran Project Duco with SCL we saw in chapter

[5] Tyler Sonnemaker, 'Jeff Bezos Is on Track to Become a Trillionaire by 2026 — despite an Economy-Killing Pandemic and Losing $38 Billion in His Recent Divorce', Business Insider, accessed 30 June 2020, https://www.businessinsider.com/jeff-bezos-on-track-to-become-trillionaire-by-2026-2020-5.
[6] Kenya Evelyn, 'Amazon Fires New York Worker Who Led Strike over Coronavirus Concerns', *The Guardian*, 31 March 2020, sec. US news, https://www.theguardian.com/us-news/2020/mar/31/amazon-strike-worker-fired-organizing-walkout-chris-smallls.
[7] Mary Fitzgerald and Cori Crider, 'Under Pressure, UK Government Releases NHS COVID Data Deals with Big Tech', *OpenDemocracy*, 5 June 2020, https://www.opendemocracy.net/en/under-pressure-uk-government-releases-nhs-covid-data-deals-big-tech/.
[8] Palantir, is a big data firm founded and run by Peter Thiel, the rightwing billionaire who founded PayPal, invested heavily in Facebook, and was an extravagant donor to Trump's election campaign (and to many republicans running for congress). Palantir's advisers include former CIA directors, and its customers include the NSA, FBI, CIA and the UK's GCHQ. The company has been deployed by the US Marines in Afghanistan and, other commercial clients include the Bank of America, JPMorgan, Newscorp and big pharma. The whistleblower Christopher Wylie, who we met in chapter five, told British MP's that Palantir had several meetings with Alexander Nix, the CEO of Cambridge Analytica, and that senior Palantir employees worked on its datasets.
Faculty is an AI company embroiled in the question of herd immunity – it is said that they ran a simulation on herd immunity but have since denied that it took place. This company also ran the Vote Leave campaign, and has ties with Dominic Cummings, Boris Johnson's chief advisor. Faculty was previously known as Advanced Skills Initiative (ASI), under which name it was listed as a supplier for Vote Leave campaign (fronted by Boris). Likewise, Faculty admits that its parent company ASI provided training for SCL interns.
[9] N Ferguson et al., 'Report 9: Impact of Non-Pharmaceutical Interventions (NPIs) to Reduce COVID19 Mortality and Healthcare Demand' (Imperial College London, 16 March 2020).
[10] Jose Lourenco et al., 'Fundamental Principles of Epidemic Spread Highlight the Immediate Need for Large-Scale Serological Surveys to Assess the Stage of the SARS-CoV-2 Epidemic', preprint (Epidemiology, 26 March 2020).

5) and for the company that co-owns the Cabinet Office Behavioural Insights Team, or nudge unit.[11] It has become clearer that behavioural scientists in the Government's Scientific Advisory Group on Emergencies (SAGE) advised the government to use the notion of 'herd immunity' to justify keeping the economy moving.[12]

The guidance the 'nudge unit' has given and the assumptions they made disbelieved any sense of community action, solidarity and cooperation in times of crisis. Again, this is based on predictions about people's behaviour determined by narrow questions and assumptions of what behaviour *should be* baked into them. The reason they gave for not banning large events initially was concerns that 'fatigue' will set in, and people will circumvent the measures in place when they get bored. A central issue is the opacity of the models that the government and the nudge unit have based these predictions on. As highlighted in chapter five, the nudge approach sees the general public as incapable of self-discipline, limited in intellectual capacity and fundamentally irrational; in short, it implies and reinforces an absolute and fundamental asymmetry with the ruling classes and the rest. Initiating lockdown, or rather, the temporary closure of businesses sooner (with a robust plan in place to support those people affected by the sudden stoppage) would have saved countless lives. Vitally, what use are simulations and models when they are selectively ignored if the results do not fit with the ideologies of the governments issuing them? The UK ran a commission on pandemic preparedness that determined that much more spending and management of existing PPE stocks would be necessary to mitigate the worst of an airborne disease pandemic.[13] It has recently emerged that no plans were made for maintaining the UK's economy in this global pandemic event despite this report, and which the scientific community had largely accepted was a case of when, not if.[14] The political decisions underlying the interventions made, or here, the lack thereof, are belied in the governments oft-rehearsed refrain that they are always 'guided by the science'.

Having said all of this, commissions and the modelling of risk and ways of mitigating it, or handling crises such as this as best as possible, are of course vital work that must be done to protect people. PPE stocks, food, medicine, energy; all of these supply systems must function in crisis or people will die. I have spent *a great deal of time* criticising the contemporary form of, or the rationality that underpins logistics as having a fundamental coloniality inherent to its

[11] Sugrue Communications is a strategic communication company, and states on its website that 'We thrive on shaping the hot debates of the moment … we know how to translate complex concepts into authentic stories that resonate.' This may sound familiar. 'Sugrue Communications – Smart Communications', accessed 24 June 2020, https://www.sugruecomms.com/.

[12] Nafeez Ahmed, 'COVID-19 SPECIAL INVESTIGATION: Part Three – Behavioural Scientists Told Government to Use "Herd Immunity" to Justify Business-As-Usual', *Byline Times*, 23 March 2020, https://bylinetimes.com/2020/03/23/covid-19-special-investigation-part-three-behavioural-scientists-told-government-to-use-herd-immunity-to-justify-business-as-usual/.

[13] 'Exercise Cygnus Report: Tier One Command Post Exercise Pandemic Influenza 18 to 20 October 2016', Sensitive/redacted (UK: Public Health England, 2017).

[14] Rajeev Syal, 'Permanent Secretaries "Not Aware of Any Economic Planning for a Pandemic"', *The Guardian*, 15 June 2020, sec. Politics, https://www.theguardian.com/society/2020/jun/15/permanent-secretaries-not-aware-of-any-economic-planning-for-a-pandemic.

overarching epistemology. Coloniality is infrastructural to logistics, and logistics is likewise infrastructural to contemporary colonial modernity. What this critique does not amount to is a denial of the need to organise – of the need to ensure that whatever it is people need to survive (and in fact flourish) is accessible and available at the time that it is needed. Of course, we need systems that allow us to ensure this on a global scale, with as little waste and environmental impact as possible. It also is not a negation of the need to model and prepare for crises such as global pandemics and climate change – I hope I have not been misunderstood.

All the above specificities of the relation of logistics to Covid-19 mean very little without noting that most fundamentally, this pandemic did not happen in a vacuum. Indeed, it has arisen precisely out of logistical, capitalist, colonial modernity. Extractivist, commodity agriculture and their global supply chains are organised around "efficient" practices that serve to 'accelerate the evolution of pathogen virulence and subsequent transmission.' [15] This, as many decolonial thinkers have pointed out, is part of an environmental crisis borne out of a dualistic, dominating relationship with the earth. Coloniality thus irrevocably links the pandemic, racism, environmental destruction, and global inequality. To not only avoid the worst of these intersecting and intensifying global crises but to bring about justice and equality, we need to decolonise from the root; meaning 'abandoning settler ideologies, reintroducing humanity back into Earth's cycles of regeneration, and rediscovering our sense of individuation in multitudes beyond capital and the state. … disalienation must dismantle these multifold hierarchies of oppression and the locale-specific ways they interact with accumulation.'[16] The pandemic has shed a great deal of light on the myriad processes that go into social reproduction and the ways in which this work is racialised and gendered. The social conditions created by capitalist colonial modernity are to blame for the disproportionate mortality of Black people and POC.[17] This is absolutely where further research should be headed – to look at the historical colonial, racialised and gendered lines along which a crisis like this has unfolded, and to begin to deconstruct and rebuild the lines along which we start to repair it.

We will need to dismantle our logistics, our economies, and our states and rebuild with all knowledge and frameworks available to us, which means *decolonising.* We will need models and a globally coordinated response to comprehend and deal with the incoming, or rather ongoing,

[15] Rob Wallace et al., 'Monthly Review | COVID-19 and Circuits of Capital', *Monthly Review* (blog), 1 May 2020, https://monthlyreview.org/2020/05/01/covid-19-and-circuits-of-capital/; Jay P. Graham et al., 'The Animal-Human Interface and Infectious Disease in Industrial Food Animal Production: Rethinking Biosecurity and Biocontainment', *Public Health Reports* 123, no. 3 (May 2008): 282–99.

[16] Wallace et al., 'Monthly Review | COVID-19 and Circuits of Capital'.

[17] According to the Institute of Fiscal Studies, a third of all working-age Black Africans living in the UK are employed in 'key worker' roles – 50% more than the share amongst the white British population. Pakistani, Indian and Black African men in Britain are respectively 90%, 150%, and 310% more likely to work in healthcare than white British men.
It is also women, especially low-paid, BAME & migrant women who hold the lions share of high-risk work. According to research by Autonomy, there are 3 million people in high exposure jobs; of which 77% are women, and 1.06 million of which are earning poverty wages (and of those one poverty wages, 98% are women).

climate catastrophe. We will equally need an emotional and embodied response, as so much of what has caused so many of the things I have written about in these pages prior are the result of the disembodied-objective-exploiter-observer position of the coloniser. If we are to move to a more just, less wasteful, more sustainable and circular economy we will need more robust tracking and accounting for resources. In order to determine the current state of this damaged planet, and ensure that its resources are managed and distributed equitably (which would then necessarily include reparations for slavery, imperialism and colonialism) we would need to undertake a serious mapping of global resources and develop the means to carry that out.

We need to find a way to shift away from racialised, colonial, extractive profit and control to planetary flourishing – which will absolutely require reparative justice for the damage and the violence done in the name of modernity. We need a logistics that is centred on providing for everyone, one that doesn't erase its violent history but that *uses it* to deconstruct and repair the systemic inequalities it has been in the business of servicing. The Black Lives Matter movement has sparked a sustained and global conversation and some of the most radical collective reimaginings of what the world could look like on the other side of *all this.* We ought all to be a part of making that happen.

BIBLIOGRAPHY

Afif, Zeina. '"Nudge Units" – Where They Came from and What They Can Do'. *World Bank Blogs* (blog), 25 October 2017. http://blogs.worldbank.org/developmenttalk/nudge-units-where-they-came-and-what-they-can-do.

Agnew, John. 'The New Global Economy: Time-Space Compression, Geopolitics, and Global Uneven Development'. *Journal of World-Systems Research* 7, no. 2 (26 August 2001): 133–54.

Ahmad, Furqan. 'Colonialism and Neocolonialism: Impact of Decolonization'. In *International Politics: Concepts, Theories and Issues*, by Rumki Basu, 97–121. New Delhi: SAGE Publications, 2012.

Ahmed, Nafeez. 'COVID-19 SPECIAL INVESTIGATION: Part Three – Behavioural Scientists Told Government to Use "Herd Immunity" to Justify Business-As-Usual'. *Byline Times*, 23 March 2020. https://bylinetimes.com/2020/03/23/covid-19-special-investigation-part-three-behavioural-scientists-told-government-to-use-herd-immunity-to-justify-business-as-usual/.

ahprojects.com, Adam Harvey. 'MegaPixels'. MegaPixels: Analysing Face Recognition Datasets. Accessed 26 February 2020. https://megapixels.cc/.

'Allied Joint Doctrine for Psychological Operations'. NATO STANDARD. NATO: NATO Standardization Office: Ministry of Defence: Development, Concepts and Doctrine Centre, 2014.

Alpaydin, Ethem. *Introduction to Machine Learning*. 3rd ed. Cambridge: MIT Press, 2014.

Amadae, S. M. *Rationalizing Capitalist Democracy: The Cold War Origins of Rational Choice Liberalism*. Chicago: University of Chicago Press, 2003.

Amoore, Louise. *Algorithmic Life: Calculative Devices in the Age of Big Data*. 1st ed. Abingdon, Oxon ; New York, NY : Routledge is an imprint of the: Routledge, 2015.

Amunwa, Ben. 'Counting the Cost: Corporations and Human Rights Abuses in the Niger Delta'. London: Platform, 2011. http://platformlondon.org/nigeria/Counting_the_Cost.pdf.

Appy, Christian G. *Working Class War: American Combat Soldiers and Vietnam*. North Carolina: University of North Carolina Press, 1993.

Aradau, Claudia, and Tobias Blanke. 'Politics of Prediction: Security and the Time/Space of Governmentality in the Age of Big Data'. *European Journal of Social Theory* 20, no. 3 (August 2017): 373–91. https://doi.org/10.1177/1368431016667623.

Ariely, Dan. *Predictably Irrational: The Hidden Forces That Shape Our Decisions*. Canada: Harper Collins, 2008.

'Army Field Manual 3-24: Counterinsurgency'. United States: Department of the Army, 2006.

Arquilla, John, and David Ronfeldt, eds. *In Athena's Camp: Preparing for Conflict in the Information Age*. National Defense Research Institute: RAND Corporation, 1997.

Arrow, Kenneth. *Social Choice and Individual Values*. New York: John Wiley & Sons Inc, 1951.

Ashby, Ross. *An Introduction to Cybernetics*. Martino Fine Books, 1956.

———. *Design for a Brain*. New York: Wiley, 1954.

Aspray, William. *John von Neumann and the Origins of Modern Computing*. Cambridge, Mass.: MIT Press, 1990.

Amazon Web Services, Inc. 'AWS Smart Business - ERP'. Accessed 4 March 2020. https://aws.amazon.com/campaigns/smart-business/ERP/.

Axentiou, Afxentis. 'The Politics and Ethics of Drone Bombing in Its Historical Context'. Unpublished PhD Thesis, University of Brighton, 2018.

Baber, Zaheer. 'Modernization Theory and the Cold War'. *Journal of Contemporary Asia* 31, no. 1 (January 2001): 71–85.

Barnes, Trevor J., and Matthew Farish. 'Between Regions: Science, Militarism, and American Geography from World War to Cold War'. *Annals of the Association of American Geographers* 96, no. 4 (December 2006): 807–26.

Beer, Stafford. 'What Has Cybernetics to Do with Operational Research?' *Operations Research* 10, no. 1 (March 1959): 1–21.

BDi. 'Behavioural Dynamics Institute: History', 23 February 2009. http://web.archive.org/web/20090223092657/http://www.bdinstitute.org/02_history.html .

BDi. ‘Behavioural Dynamics Institute: Home’, 21 February 2009. http://web.archive.org/web/20090221155203/http://www.bdinstitute.org/01_home.html.
BDi. ‘Behavioural Dynamics Institute: Research’, 21 February 2009. http://web.archive.org/web/20090221142147/http://www.bdinstitute.org/05_research.html.
Belcher, Oliver. ‘Sensing, Territory, Population: Computation, Embodied Sensors, and Hamlet Control in the Vietnam War’. *Security Dialogue* 50, no. 5 (October 2019): 416–36.
Belcher, Oliver Christian. ‘The Afterlives of Counterinsurgency: Postcolonialism, Military Social Science, and Afghanistan 2006-2012’. PhD Thesis, University of British Columbia, 2013.
Berardi, Franco ‘Bifo’. *The Soul at Work*. California: Semiotext(e), 2009.
Berger, Mark T. ‘From Nation-Building to State-Building: The Geopolitics of Development, the Nation-State System and the Changing Global Order’. *Third World Quarterly* 27, no. 1, (2006): 5–25.
Bernays, Edward L. *Propaganda*. New York: IG Publishing, 1928.
Berner, Martin, Enrico Graupner, and Alexander Maedche. ‘The Information Panopticon in the Big Data Era’. *Journal of Organization Design* 3, no. 1 (10 April 2014): 14.
Bhabha, Homi K. *The Location of Culture*. Routledge Classics. London ; New York: Routledge, 2004.
Bhambra, Gurminder K. ‘Postcolonial and Decolonial Dialogues’. *Postcolonial Studies* 17, no. 2 (3 April 2014): 115–21.
Big Brother Watch. ‘Universal Credit, Benefits and Automated Risk Scores – Are You Affected? — Big Brother Watch’. Universal Credit, benefits and automated risk scores – are you affected? — Big Brother Watch. Accessed 30 June 2020. https://bigbrotherwatch.org.uk/2019/01/automated-decisions-risk-scores-and-benefits-are-you-affected/.
Boisen, Camilla. ‘The Changing Moral Justification of Empire: From the Right to Colonise to the Obligation to Civilise’. *History of European Ideas* 39, no. 3 (2013): 335–53.
Bosak, Jon. ‘UBL Is an ISO International Standard, so Now What?’ *Tradeshift Blog* (blog). Accessed 29 January 2020. https://hub.tradeshift.com/tradeshift-blog/ubl-is-an-iso-international-standard-so-now-what.
Bowersox, Donald J. ‘Distribution Logistics: The Forgotten Marketing Tool’. In *Readings in Physical Distribution Management: The Logistics of Marketing*, edited by Donald J. Bowersox, Bernard J. La Londe, and Edward W. Smykay, 69–84. London: The Macmillan Company, 1969.
Bowles, Nelie. ‘After Cambridge Analytica, Privacy Experts Get to Say “I Told You So”’. *The New York Times*. 13 April 2018, International Edition edition, sec. Technology. https://www.nytimes.com/2018/04/12/technology/privacy-researchers-facebook.html.
Bradshaw, Samantha, and Phillip N. Howard. ‘The Global Disinformation Order: 2019 Global Inventory of Organised Social Media Manipulation’. Working Paper. Oxford: Oxford Internet Institute: Computational Propaganda Project, 2019.
Bradshaw, York W., and Jie Huang. ‘Intensifying Global Dependency: Foreign Debt, Structural Adjustment, and Third World Underdevelopment’. *The Sociological Quarterly* 32, no. 3 (1991): 321–42.
Bright, Laura, and Kristen Sussman. ‘Consumers Need to Be More Aware of What They Are Giving Facebook’. *UT News*, 19 November 2019, Online edition. https://news.utexas.edu/2019/11/19/consumers-need-to-be-more-aware-of-what-they-are-giving-facebook/.
Brown, Wendy. *Undoing the Demos: Neoliberalism’s Stealth Revolution*. MIT Press, 2015.
Browne, Simone. *Dark Matters: On the Surveillance of Blackness*. Durham: Duke University Press, 2015.
Brynildsen, Øygunn Sundsbø. ‘Exporting Goods or Exporting Debts? Export Credit Agencies and the Roots of Developing Country Debt’. European Network on Debt and Development, December 2011.
Bullard, Nicola, Walden Bello, and Kamal Mallhotra. ‘Taming the Tigers: The IMF and the Asian Crisis’. *Third World Quarterly* 19, no. 3 (1998): 505–55.
Bunge, Mario. ‘A General Black Box Theory’. *Philosophy of Science* 30, no. 4 (October 1963): 346–58.

Bunker, Stephen G. ‘Modes of Extraction, Unequal Exchange, and the Progressive Underdevelopment of an Extreme Periphery: The Brazilian Amazon, 1600-1980’. *American Journal of Sociology* 89, no. 5 (1984): 1017–64.

Cadwalladr, Carole. ‘Fresh Cambridge Analytica Leak “Shows Global Manipulation Is out of Control”’. *The Observer*, 4 January 2020, sec. UK news. https://www.theguardian.com/uk-news/2020/jan/04/cambridge-analytica-data-leak-global-election-manipulation.

Cadwalladr, Carole, and Emma Graham-Harrison. ‘How Cambridge Analytica Turned Facebook “Likes” into a Lucrative Political Tool’. *The Guardian*, 17 March 2018, sec. Technology. https://www.theguardian.com/technology/2018/mar/17/facebook-cambridge-analytica-kogan-data-algorithm.

———. ‘Revealed: 50 Million Facebook Profiles Harvested for Cambridge Analytica in Major Data Breach’. *The Guardian*, 17 March 2018, sec. News. https://www.theguardian.com/news/2018/mar/17/cambridge-analytica-facebook-influence-us-election.

Cadwalladr, Carole, and Mark Townsend. ‘Revealed: The Ties That Bind Vote Leave’s Data Firm to Controversial Cambridge Analytica’. *The Guardian*, 24 March 2018, sec. UK news. https://www.theguardian.com/uk-news/2018/mar/24/aggregateiq-data-firm-link-raises-leave-group-questions.

Callinicos, Alex. *Imperialism and Global Political Economy*. Cambridge: Polity Press, 2009.

Cambridge Analytica. ‘Leave.EU: Profile Raising and Outreach’. Cambridge Analytica. Accessed 31 January 2020. https://www.parliament.uk/documents/commons-committees/culture-media-and-sport/Arron-Banks-appendix.pdf.

Camerer, Colin, George Loewenstein, and Drazen Prelec. ‘Neuroeconomics: How Neuroscience Can Inform Economics’. *Journal of Economic Literature* 43, no. 1 (February 2005): 9–64.

Chapman, Robert L., John L. Kennedy, Allen Newell, and William C. Biel. ‘The Systems Research Laboratory’s Air Defense Experiments’. *Management Science* 5, no. 3 (April 1959): 250–69.

Chen, Yongxi, and Anne S. Y. Cheung. ‘The Transparent Self Under Big Data Profiling: Privacy and Chinese Legislation on the Social Credit System’. *SSRN Electronic Journal*, 2017.

Christ, Carl. ‘Economic Theory and Measurement: A Twenty Year Research Report 1932-1952’. Maryland: Cowles Commission for Research in Economics, 1952. https://cowles.yale.edu/sites/default/files/files/pub/rep/r1932-52.pdf.

Chua, Charmaine, Martin Danyluk, Deborah Cowen, and Laleh Khalili. ‘Introduction: Turbulent Circulation: Building a Critical Engagement with Logistics’. *Environment and Planning D: Society and Space* 36, no. 4 (August 2018): 617–29.

Chun, Wendy Hui Kyong. *Updating to Remain the Same: Habitual New Media*. Cambridge, MA: The MIT Press, 2016.

Chwastiak, Michele. ‘Rationality, Performance Measures and Representations of Reality: Planning, Programming and Budgeting and the Vietnam War’. *Critical Perspectives on Accounting* 17, no. 1 (January 2006): 29–55.

CIA. ‘The Break-Up of Colonial Empires and Its Implications for US Security’. [Confidential] CIA Report. Central Intelligence Agency, 3 September 1948. https://www.cia.gov/library/readingroom/docs/DOC_0000258342.pdf.

‘CIA Activities in Chile — Central Intelligence Agency’. Central Intelligence Agency, 18 September 2000. https://www.cia.gov/library/reports/general-reports-1/chile/.

Cidell, Julie L. ‘The Rule of Logistics: Walmart and the Architecture of Fulfillment’. *The AAG Review of Books* 6, no. 1 (2 January 2018): 25–26.

Coburg, Tom. ‘SCL and Cambridge Analytica’s Links with Defence Establishment Revealed. And It’s Not Just Contracts.’ *The Canary*, 26 March 2018, Online edition. https://www.thecanary.co/uk/analysis/2018/03/26/scl-and-cambridge-analyticas-links-with-defence-establishment-revealed-and-its-not-just-contracts/.

Conly, Sarah. *Against Autonomy: Justifying Coercive Paternalism*. Cambridge: Cambridge University Press, 2012.

Constantin, James A. *Principles of Logistics Management: A Function Analysis of Physical Distribution Systems*. California: Appleton-Century-Crofts, 1966.

Cornelissen, Lars. ‘The Market and the People: On the Incompatibility of Neoliberalism and Democracy’. Unpublished PhD Thesis, University of Brighton, 2018.

'Country Risk Classification - OECD'. Accessed 29 January 2020. http://www.oecd.org/trade/topics/export-credits/arrangement-and-sector-understandings/financing-terms-and-conditions/country-risk-classification/.
Cowen, Deborah. 'A Geography of Logistics: Market Authority and the Security of Supply Chains'. *Annals of the Association of American Geographers* 100, no. 3 (25 June 2010): 600–620.
———. *The Deadly Life of Logistics*. Minneapolis: University of Minnesota Press, 2014.
'Criteria, Governments, Sovereigns: Sovereign Rating Methodology'. S&P Global, 18 December 2017. https://www.spratings.com/documents/20184/4432051/Sovereign+Rating+Methodology/5f8c852c-108d-46d2-add1-4c20c3304725.
Cullather, Nick. 'Damming Afghanistan: Modernization in a Buffer State'. *The Journal of American History*, 2002, 26.
Cuppini, N., M. Frapporti, and M. Pirone. 'Logistics Struggles in the Po Valley Region: Territorial Transformations and Processes of Antagonistic Subjectivation'. *South Atlantic Quarterly* 114, no. 1 (1 January 2015): 119–34.
Cutler, Tom. 'Recycling Petrodollars to the Third World: A Critique of the IMF Oil Facility'. *World Affairs* 139, no. 189–205 (1977): 18.
'Data, Democracy and Dirty Tricks'. 7 Part Series. United Kingdom: Channel Four, 19 March 2018. https://www.channel4.com/news/data-democracy-and-dirty-tricks-cambridge-analytica-uncovered-investigation-expose.
Davis, Norman. 'An Information-Based Revolution in Military Affairs'. *Strategic Review* 24, no. 1 (1996): 43–53.
Deitchman, Seymour J. *The Best-Laid Schemes: A Tale of Soial Research and Bureacracy*. Cambridge, Mass.: MIT Press, 1976.
Del Solar, Daniel. 'The "POLITICA" Game: Playing It for Keeps'. *The Berkeley Barb* 18, no. 10 (14 September 1973): 1–40.
Derrida, Jacques. 'The Double Session'. Translated by Barbara Johnson. *Dissemination*, 1981, 173–285.
Dillard, Jesse F., Linda Ruchala, and Kristi Yuthas. 'Enterprise Resource Planning Systems: A Physical Manifestation of Administrative Evil'. *International Journal of Accounting Information Systems* 6, no. 2 (June 2005): 107–27.
'Disinformation and "Fake News": Interim Report - Digital, Culture, Media and Sport Committee - House of Commons'. Interim Report. United Kingdom: United Kingdom Parliament, 29 July 2018. https://publications.parliament.uk/pa/cm201719/cmselect/cmcumeds/363/36306.htm.
Dixon-Román, Ezekiel. 'Toward a Hauntology on Data: On the Sociopolitical Forces of Data Assemblages'. *Research in Education* 98, no. 1 (August 2017): 44–58.
Domokos, John. 'Government Admits Jobcentres Set Targets to Take Away Benefits'. *The Guardian*, 8 April 2011, sec. Politics. https://www.theguardian.com/politics/2011/apr/08/jobcentres-benefits-sanctions-targets.
DonVito, P. A. 'The Essentials of a Planning Programming Budgeting System'. The RAND Corporation, 1969.
Downey, Liam, Eric Bonds, and Katherine Clark. 'Natural Resource Extraction, Armed Violence, and Environmental Degradation'. *Organization & Environment* 23, no. 4 (December 2010): 417–45.
Drucker, Peter F. 'The Economy's Dark Continent'. *Fortune* 48 (1962): 103, 265–70.
Durand, Cedric. *Fictitious Capital: How Finance Is Appropriating Our Future*. Translated by David Broder. London: Verso, 2017.
Easterling, Keller. *Extrastatecraft: The Power of Infrastructure Space*. London ; New York: Verso, 2014.
Edwards, Paul N. 'The World in a Machine: Origins and Impacts of Early Computerized Global Systems Models'. In *Systems, Experts, and Computers: The Systems Approach in Management and Engineering, World War II and After*, edited by Agatha C. Hughes and Thomas P. Hughes, 221–53. Cambridge, Mass.: MIT Press, 2000.
Erickson, Paul. *The World the Game Theorists Made*. Chicago: University of Chicago Press, 2015.
Escobar, Arturo. 'Anthropology and Development'. *International Social Science Journal* 49, no. 154 (1997): 497–515.

———. *Encountering Development: The Making and Unmaking of the Third World*. Princeton Studies in Culture/Power/History. Princeton, N.J: Princeton University Press, 1995.
Evelyn, Kenya. 'Amazon Fires New York Worker Who Led Strike over Coronavirus Concerns'. *The Guardian*, 31 March 2020, sec. US news. https://www.theguardian.com/us-news/2020/mar/31/amazon-strike-worker-fired-organizing-walkout-chris-smallls.
'Exercise Cygnus Report: Tier One Command Post Exercise Pandemic Influenza 18 to 20 October 2016'. Sensitive/redacted. UK: Public Health England, 2017.
Ferguson, N, D Laydon, G Nedjati Gilani, N Imai, K Ainslie, M Baguelin, S Bhatia, et al. 'Report 9: Impact of Non-Pharmaceutical Interventions (NPIs) to Reduce COVID19 Mortality and Healthcare Demand'. Imperial College London, 16 March 2020.
Fitzgerald, Mary, and Cori Crider. 'Under Pressure, UK Government Releases NHS COVID Data Deals with Big Tech'. *OpenDemocracy*, 5 June 2020. https://www.opendemocracy.net/en/under-pressure-uk-government-releases-nhs-covid-data-deals-big-tech/.
Forrester, Jay Wright. *Industrial Dynamics*. Student's Edition. Cambridge, Mass.: MIT Press, 1961.
Fortun, M., and S. S. Schweber. 'Scientists and the Legacy of World War II: The Case of Operations Research'. *Social Studies of Science* 23, no. 4 (1993): 595–642.
———. 'Scientists and the Legacy of World War II: The Case of Operations Research (OR)'. *Social Studies of Science* 23, no. 4 (1993): 595–642.
Foster, John Bellamy, and Brett Clark. 'Ecological Imperialism: The Curse of Capitalism'. *The Socialist Register* 40 (2004): 186–201.
Fourcade, Marion. 'State Metrology: The Rating of Sovereigns and the Judgement of Nations'. In *The Many Hands of the State: Theorizing Political Authority and Social Control*, edited by Kimberly J. Morgan and Ann Shola Orloff, 103–31. Cambridge: Cambridge University Press, 2017.
Franklin, Seb. *Control: Digitality as Cultural Logic*. Cambridge, Mass.: MIT Press, 2015.
'Free Basics in Real Life: Six Case Studies on Facebook's Internet "On Ramp" Initiative from Africa, Asia and Latin America'. Advox Global Voices, 27 July 2017.
Friedman, Walter A. *Fortune Tellers: The Story of America's First Economic Forecasters*. Princeton: Princeton University Press, 2014.
Galtung, Johan. 'Scientific Colonialism'. *Transition*, no. 30 (1967): 10–15.
Galván-Álvarez, Enrique. 'Epistemic Violence and Retaliation: The Issue of Knowledges in Mother India'. *American Studies.*, 2010, 16.
Gandy, Kizzy, Katy King, Pippa Streeter Hurle, Chloe Bustin, and Kate Glazebrook. 'Poverty and Decision-Making: How Behavioural Science Can Improve Opportunity in the UK'. Policy Recommendation. Behavioural Insights Team, October 2016.
Gasiorowski-Denis, Elizabeth. 'Why Intelligent Supply Chains Will Rule the World'. ISO, 11 September 2017. http://www.iso.org/cms/render/live/en/sites/isoorg/contents/news/2017/09/Ref2214.html.
Gebhart, Genevieve. 'Zero-Rating in Emerging Mobile Markets: Free Basics and Wikipedia Zero in Ghana'. In *Proceedings of the Eighth International Conference on Information and Communication Technologies and Development - ICTD '16*, 1–9. Ann Arbor, MI, USA: ACM Press, 2016.
Gibson, James W. *The Perfect War: The War We Couldn't Lose and How We Did*. New York: Vintage Books, 1986.
Gonzalez, Roberto J. *American Counterinsurgency: Human Science and the Human Terrain*. Prickly Paradigm Press, 2009.
Google. 'Activity Recognition API'. *Google Developers* (blog). Accessed 5 March 2020. https://developers.google.com/location-context/activity-recognition.
Gordon, Martin, Daniel Grady, Janet Moore, John Blaxall, David Merrill, and Daniel Del Solar. 'CoCon - Counterconspiracy (POLITICA): The Development of a Simulation of Internal National Conflict under Revolutionary Conflict Conditions. Volume 1': Fort Belvoir, VA: Defense Technical Information Center, 1 October 1966. http://www.dtic.mil/docs/citations/AD0644519.
Govindaraju, Rajesri. 'Enterprise Systems Implementation Framework: An Organisational Perspective'. *Procedia - Social and Behavioral Sciences* 65 (December 2012): 473–78.

Graham, Jay P., Jessica H. Leibler, Lance B. Price, Joachim M. Otte, Dirk U. Pfeiffer, T. Tiensin, and Ellen K. Silbergeld. 'The Animal-Human Interface and Infectious Disease in Industrial Food Animal Production: Rethinking Biosecurity and Biocontainment'. *Public Health Reports* 123, no. 3 (May 2008): 282–99.
Grandi, Elisa. 'International Financial Credit and Economic Development in Colombia', n.d., 21.
Grappi, Giorgio, and Brett Neilson. 'Elements of Logistics: Along the Line of Copper'. *Environment and Planning D: Society and Space* 37, no. 5 (October 2019): 833–49.
Graulau, Jeannette. '"Is Mining Good for Development?": The Intellectual History of an Unsettled Question'. *Progress in Development Studies* 8, no. 2 (April 2008): 129–62.
Grosfoguel, Ramón. 'Decolonizing Post-Colonial Studies and Paradigms of Political-Economy: Transmodernity, Decolonial Thinking, and Global Coloniality'. *TRANS-MODERNITY: Journal of Peripheral Cultural Production of the Luso-Hispanic World* 1, no. 1 (2011).
———. 'The Epistemic Decolonial Turn: Beyond Political-Economy Paradigms'. *Cultural Studies* 21, no. 2–3 (2007): 211–23.
Grubbs, Larry. *Secular Missionaries: Americans and African Development in the 1960s*. Massachusetts: University of Massachusetts Press, 2009.
Halpern, Orit. *Beautiful Data: A History of Vision and Reason since 1945*. London: Duke University Press, 2014.
———. 'Schizophrenic Techniques: Cybernetics, the Human Sciences, and the Double Bind'. *Scholar and Feminist Online*, no. 10.3 (2012): 15.
Harley, John B. *The New Nature of Maps: Essays in the History of Cartography*. Edited by Paul Laxton. Baltimore: Johns Hopkins University Press, 2001.
Harney, Stefano, and Fred Moten. *The Undercommons: Fugitive Planning & Black Study*. Wivenhoe: Minor Compositions, 2013.
Harrison, Emma. 'Activism, Refusal, Expertise: Responses to Digital Ubiquity'. University of Sussex, Forthcoming.
Hartwig, Richard E. *Roads to Reason: Transportation Administration and Rationality in Colombia.* Pittsburgh: University of Pittsburgh Press, 1983.
Harvey, David. *The Condition of Postmodernity: An Enquiry into the Origins of Cultural Change*. Oxford [England] ; Cambridge, Mass., USA: Blackwell, 1989.
———. *The New Imperialism*. Oxford: Oxford University Press, 2003.
Haynes, L, O Service, B Goldacre, and D Torgerson. 'Test, Learn, Adapt: Developing Public Policy with Randomized Controlled Trials.' Policy Paper. London: Cabinet Office Behavioural Insights Team, 14 June 2012. https://www.gov.uk/government/publications/test-learn-adapt-developing-public-policy-with-randomised-controlled-trials.
Hayter, Teresa. *Aid as Imperialism*. Harmondsworth: Penguin, 1971.
Heidegger, Martin. 'The Age of the World Picture'. In *Science and the Quest for Reality*, edited by Alfred I. Tauber, 115–36. London: Palgrave Macmillan, 1977.
Herring, Eric, and Glen Rangwala. 'Iraq, Imperialism and Global Governance'. *Third World Quarterly* 26, no. 4/5 (2005): 667–83.
Heymann, M., and J. Martin-Nielsen. 'Introduction: Perspectives on Cold War Science in Small European States'. *Centaurus* 55, no. 3 (2013): 221–42.
Hildyard, Nicholas. 'Snouts in the Trough: Export Credit Agencies, Corporate Welfare and Policy Incoherence'. Corner House Briefing 14. ECA Watch, June 1999.
Hitch, Charles. 'An Appreciation of Systems Analysis'. RAND Corporation, 1955.
Hoag, Malcom W. 'An Introduction to Systems Analysis'. Research Memorandum. RAND Corporation, 1956.
Holmberg, Allan, John L. Kennedy, Harold Lasswell, and Charles Lindblom. 'Experimental Research in the Behavioural Sciences and Regional Development'. Proposal. Cornell University, 1955. https://hdl.handle.net/1813/11758.
Hoogvelt, Ankie. 'Globalization and Post-Modern Imperialism'. *Globalizations* 3, no. 2 (June 2006): 159–74. https://doi.org/10.1080/14747730600702873.
Hope, Matt. 'Web of Power: Cambridge Analytica and the Climate Science Denial Network Lobbying for Brexit and Trump'. DeSmog UK, 21 March 2018. https://www.desmog.co.uk/2018/03/21/web-power-how-cambridge-analytica-sits-heart-brexit-trump-and-climate-science-denial.

Horowitz, Irving Louis. *The Rise and Fall of Project Camelot: Studies in the Relationship Between Social Sciences and Practical Politics*. Cambridge: MIT Press, 1967.
Hounshell, David A. 'The Medium Is the Message, or How Context Matters: The RAND Corporation Builds an Economics of Innovation, 1946-1962'. In *Systems, Experts, and Computers: The Systems Approach in Management and Engineering, World War II and After*, edited by Agatha C. Hughes and Thomas P. Hughes, 255–310. Cambridge, Mass.: MIT Press, 2000.
Complexas. 'How We Operate — Complexas', 16 March 2016. https://web.archive.org/web/20160316003332/http://www.complexas.com/how-we-operate/.
Influence Advisory Panel. 'Influence Advisory Panel: The Panel', 19 August 2014. https://web.archive.org/web/20140819140826/http://www.x-iap.com/.
International Monetary Fund. 'The Uses and Abuses of Sovereign Credit Ratings'. In *Global Financial Stability Report October 2010: Sovereigns, Funding and Systemic Liquidity*. International Monetary Fund, 2010.
International Standards Organization. *Friendship Among Equals: Recollections from ISO's First Fifty Years*. Geneva, Switzerland: ISO, 1998.
IOTA Global Information Operations Training & Advisory Services. 'IOTA Global: Home', 19 August 2014. https://web.archive.org/web/20140819084002/https://www.iota-global.com/.
Isard, Walter. *Location and Space-Economy*. New York: John Wiley & Sons Inc, 1956.
Ish-Shalom, Piki. 'Theory Gets Real, and the Case for a Normative Ethic: Rostow, Modernization Theory, and the Alliance for Progress'. *International Studies Quarterly* 50, no. 2 (2006): 287–311.
Ismi, Asad, and Halifax Initiative Coalition. *Impoverishing a Continent: The World Bank and the IMF in Africa*. Halifax, NS? Halifax Initiative Coalition, 2004.
ISO 9001 Quality Management Systems. New York, NY: Springer Berlin Heidelberg, 2017.
'ISO 9075:1987: Information Technology - Database Languages - SQL - Part 1: Framework (SQL/Framework)'. International Standard. International Standards Organisation, 6 January 1987.
'ISO/IEC 7810:2019 Identification Cards - Physical Characteristics'. International Standard. International Standards Organisation, December 2019.
'ISO/IEC 19845:2015 Information Technology - Universal Business Language Version 2.1 (UBLv2.1)'. International Standard. International Standards Organisation, December 2015.
James Petras. 'Brazil: Extractive Capitalism and the Great Leap Backward'. *World Review of Political Economy* 4, no. 4 (2013): 469.
Jardini, David R. 'Out of the Blue Yonder: The Transfer of Systems Thinking from the Pentagon to the Great Society, 1961-1965'. In *Systems, Experts, and Computers: The Systems Approach in Management and Engineering, World War II and After*, edited by Agatha C. Hughes and Thomas P. Hughes, 311–57, 2000.
Jones, Kitty S. 'Nudging Conformity and Benefit Sanctions: A State Experiment in Behaviour Modification – Politics and Insights'. *Politics and Insights* (blog), 14 November 2015. https://politicsandinsights.org/2015/11/14/nudging-benefit-sanctions/.
Joshi, Prateek, and Alberto Artasanchez. *Artificial Intelligence with Python: Your Complete Guide to Building Intelligent Apps Using Python*. 2nd ed. Birmingham: Packt, 2020.
Joweth, Garth, S., and Victoria O'donnel. *Propaganda and Persuasion*. 7th ed. California: SAGE Publications, 2018.
Kahneman, Daniel, and Amos Tversky. 'The Psychology of Preferences'. *Scientific American* 246, no. 1 (1982): 160–73.
Kahneman, Daniel, Amos Tversky, and Stewart Paul Slovic, eds. *Judgement under Uncertainty: Heuristics and Biases*. Cambridge: Cambridge University Press, 1982.
Karuka, Manu. *Empire's Tracks: Indigenous Nations, Chines Workers, and the Transcontinental Railroad*. California: University of California Press, 2019.
Kennan, George F. 'Review of Current Trends [in] U.S. Foreign Policy'. In *The State Department Policy Planning Staff Papers 1947-1949*, 2:103–34. New York: Garland, 1948.
Kennedy, John L. 'A Display Technique for Planning'. In *Symposium on Air Force Human Engineering, Personnel and Training Research*, 201–5. Committee on Military Psychology, Division of Anthropology and Psychology: National Academies, 1956.

———. ‘The Uses and Limitations of Mathematical Models, Game Theory, and Systems Analysis in Planning and Problem Solution.’ In *Current Trends in Psychology in the World Emergency*, edited by John C. Flanagan, 97–116. Pittsburgh: University of Pittsburgh Press, 1952.
Khalili, Laleh. *Time in the Shadows: Confinement in Counterinsurgencies*. Stanford, California: Stanford University Press, 2013.
Kipp, Jacob, Lester Grau, Karl Prinslow, and Don Smith. ‘The Human Terrain System: A CORDS for the 21st Century.’ *Military Review*, 2006, 8–15.
Kish, Zenia, and Justin Leroy. ‘Bonded Life: Technologies of Racial Finance from Slave Insurance to Philanthrocapital’. *Cultural Studies* 29, no. 5–6 (3 September 2015): 630–51.
Klein, Naomi. ‘Naomi Klein: How Big Tech Plans to Profit from the Pandemic’. *The Guardian*, 13 May 2020, sec. News. https://www.theguardian.com/news/2020/may/13/naomi-klein-how-big-tech-plans-to-profit-from-coronavirus-pandemic.
Klose, Alexander. *The Container Principle: How a Box Changes the Way We Think*. Infrastructures Series. Cambridge, Massachusetts: The MIT Press, 2015.
———. *The Container Principle: How a Box Changes the Way We Think*. Infrastructures Series. Cambridge, Massachusetts: The MIT Press, 2015.
Kosinski, M., D. Stillwell, and T. Graepel. ‘Private Traits and Attributes Are Predictable from Digital Records of Human Behavior’. *Proceedings of the National Academy of Sciences* 110, no. 15 (9 April 2013): 5802–5.
Laity, Mark. ‘NATO and Strategic Communications’. *Three Swords Magazine*, 2018.
LaLonde, Bernard J. ‘IDM: The American Perspective’. In *Readings in Physical Distribution Management: The Logistics of Marketing*, by Donald J. Bowersox, Edward W. Smykay, and Bernard J. LaLonde. New York: Macmillan, 1969.
Lamoreaux, Naomi, and Ian Shapiro, eds. *The Bretton Woods Agreements: Together with Scholarly Commentaries and Essential Historical Documents*. Yale: Yale University Press, 2019.
Latham, Michael E. *Modernization as Ideology: American Social Science and ‘Nation Building’ in the Kennedy Era*. London: University of North Carolina Press, 2000.
Leonard, Robert. *Von Neumann, Morgernstern, and the Creation of Game Theory: From Chess to Social Science, 1900-1960*. Cambridge: Cambridge University Press, 2010.
Leonard, Robert J. ‘From Parlor Games to Social Science: Von Neumann, Morgenstern, and the Creation of Game Theory 1928-1944’. *Journal of Economic Literature* 33, no. 2 (1995): 730–61.
———. ‘War as a “Simple Economic Problem”; The Rise of an Economics of Defense’. In *Economics and National Security: A History of Their Interaction*, edited by Craufurd D. Goodwin, 261–83. London: Duke University Press, 1991.
Leonard, Thomas Hoskyns. ‘A Personal History of Bayesian Statistics: Bayesian History’. *Wiley Interdisciplinary Reviews: Computational Statistics* 6, no. 2 (March 2014): 80–115.
Levine, Yasha. *Surveillance Valley: The Secret Military History of the Internet*. New York: PublicAffairs, 2018.
Levinson, Marc. *How the Shipping Container Made the World Smaller and the World Economy Bigger*. Princeton: Princeton University Press, 2006.
Levi-Strauss, Claude. *Structural Anthropology*. New York: Basic Books, 1963.
———. *The Savage Mind*. Chicago: University of Chicago Press, 1966.
Levitch, Richard M., Giovanni Majnoni, and Camen Reinhart. *Ratings, Ratings Agencies and the Global Financial System*. Vol. 9. The New York University Salomon Series on Financial Markets and Insitutions. New York: Springer Science & Business Media, 2002.
Lewis, Dianne. ‘Anthropology and Colonialism’. *Current Anthropology* 14, no. 5 (1973): 581–602.
Lewis, Helen. ‘How Panic-Buying Revealed the Problem With the Modern World’. *The Atlantic*, 26 March 2020, sec. Global. https://www.theatlantic.com/international/archive/2020/03/coronavirus-panic-buying-britain-us-shopping/608731/.
Lourenco, Jose, Robert Paton, Mahan Ghafari, Moritz Kraemer, Craig Thompson, Peter Simmonds, Paul Klenerman, and Sunetra Gupta. ‘Fundamental Principles of Epidemic Spread Highlight the Immediate Need for Large-Scale Serological Surveys to Assess the Stage of the SARS-CoV-2 Epidemic’. Preprint. Epidemiology, 26 March 2020.

LU, Allen, Chris Mason, Scott Dunlap, Carl Evankovich, Schuyler E. Eckstrom, Bassel Elias Dagher, and Haoran Lui. System and Method for In-store Tracking. Pittsburgh. Accessed 30 January 2020. https://patentimages.storage.googleapis.com/7a/bf/b8/97f0eb8162c1a5/US20150278829A1.pdf.

Lugones, Maria. 'The Coloniality of Gender'. *Worlds and Knowledges Otherwise* Spring (2008): 1–17.

Lyon, David. 'The World Wide Web of Surveillance: The Internet and Off-world Power-flows'. *Information, Communication & Society* 1, no. 1 (March 1998): 91–105.

Lysandrou, Photis. 'The Colonization of the Future: An Alternative View of Financialization and Its Portents'. *Journal of Post Keynesian Economics* 39, no. 4 (October 2016): 444–72.

Mackay, Andrew, Steve Tatham, and Jim Derleth. 'Instability, Profitability, and Behavioural Change in Complex Environments'. Conflict Studies Research Centre, July 2014.

Maldonado-Torres, Nelson. 'Colonialism, Neocolonial, Internal Colonialism, the Postcolonial, Coloniality, and Decoloniality'. In *Critical Terms in Caribbean and LAtin American Thought*, edited by Y. Martínez-San Miguel, B. Sifuentes-Jáuregui, and M. Belausteguigoitia, 67–78. New York: Palgrave Macmillan, 2016.

Marcellino, William, Meagan Smith, Christopher Paul, and Lauren Skrabala. *Monitoring Social Media: Lessons for Future Department of Defense Social Media Analysis in Support of Information Operations*. RAND Corporation, 2017.

Marx, Karl. *Grundrisse: Foundations of the Critique of Political Economy*. London: Penguin, 1857.

Matz, S. C., M. Kosinski, G. Nave, and D. J. Stillwell. 'Psychological Targeting as an Effective Approach to Digital Mass Persuasion'. *Proceedings of the National Academy of Sciences* 114, no. 48 (28 November 2017): 12714–19.

Mbembe, Achille. *A Critique of Black Reason*. Translated by Laurent Dubois. Durham: Duke University Press, 2017.

McGarry, E.D. 'Some Functions of Marketing Reconsidered'. In *Theory in Marketing*, edited by R. Cox and W. Alderson, 263–79. Homewood IL: Richard D. Irwin, 1950.

McNamara, Robert S. *In Retrospect: The Tragedy and Lessons of Vietnam*. New York: Times Books, 1995.

Mead, Margaret. 'Cybernetics of Cybernetics'. In *Purposive Systems*, edited by H. von Foerster, L Peterson, and J Russell. New York: Spartan Books, 1968.

Mezzadra, Sandro, and Brett Neilson. 'Extraction, Logistics, Finance: Global Crisis and the Politics of Operations'. *Radical Philosophy*, 2013, 8–18.

———. 'On the Multiple Frontiers of Extraction: Excavating Contemporary Capitalism'. *Cultural Studies* 31, no. 2–3 (4 May 2017): 185–204.

———. *The Politics of Operations: Excavating Contemporary Capitalism*. Durham: Duke University Press, 2019.

Mignolo, W. D. 'The Geopolitics of Knowledge and the Colonial Difference'. *South Atlantic Quarterly* 101, no. 1 (1 January 2002): 57–96.

Mignolo, Walter D. 'DELINKING: The Rhetoric of Modernity, the Logic of Coloniality and the Grammar of de-Coloniality'. *Cultural Studies* 21, no. 2–3 (March 2007): 449–514.

Mignolo, Walter D. *The Darker Side of Western Modernity: Global Futures, Decolonial Options*. North Carolina: Duke University Press, 2011.

Mills, China. '"Dead People Don't Claim": A Psychopolitical Autopsy of UK Austerity Suicides'. *Critical Social Policy* 38, no. 2 (May 2018): 302–22.

'Mind, Behavior and Development Unit: Applying Behavioral Science to End Poverty and Enhance Equity'. Brochure. World Bank Group. Accessed 30 January 2020. http://documents.worldbank.org/curated/en/744191532458732002/pdf/128784-eMBeD-Brochure-DIGITAL.pdf.

Mirowski, Philip. *Machine Dreams: Economics Becomes a Cyborg Science*. Cambridge ; New York: Cambridge University Press, 2002.

Mirowski, Phillip, and Edward Nik-Khah. 'The Role of the Cowles Commission in the History of Information Economics'. *Methodological Studies* 36 (2016): 59–85.

Mishra, Madhup. 'Translytical Has Become Synonymous with Real-Time'. InfoWorld, 6 March 2018. https://www.infoworld.com/article/3261028/translytical-has-become-synonymous-with-real-time.html.

Mission to Colombia, IBRD. *The Basis of a Development Program for Colombia. Report of a Mission Headed by Lauchlin Currie and Sponsored by the International Bank for Reconstruction and Development in Collaboration with the Government of Colombia*. Second Printing. Baltimore: Johns Hopkins University Press, 1950.

Mitchell, Gregory. 'Libertarian Paternalism Is an Oxymoron'. *Northwestern University Law Review* 99, no. 3 (2005): 1245–78.

Mitchell, Timothy. *Colonising Egypt*. Berkeley: University of California Press, 1988.

———. *Colonising Egypt*. Berkeley: University of California Press, 1988.

———. 'Orientalism and the Exhibitionary Order'. In *The Visual Culture Reader*, 495–505. London: Routledge, 1989.

———, ed. *Questions of Modernity*. Contradictions of Modernity, v. 11. Minneapolis: University of Minnesota Press, 2000.

———. *Rule of Experts: Egypt, Techno-Politics, Modernity*. Berkeley: University of California Press, 2002.

———. 'The Stage of Modernity'. In *Questions of Modernity*, edited by Timothy Mitchell, 1–34. Contradictions of Modernity, v. 11. Minneapolis: University of Minnesota Press, 2000.

Mohanty, Chandra T. 'Under Western Eyes: Feminist Scholarship and Colonial Discourses'. *Feminist Review* 30 (1988): 61–88.

Morse, Phillip M., and George E. Kimball. *Methods of Operations Research*. 1st Revised. New York: John Wiley & Sons Inc, 1951.

Mosher, Frederick C. 'Program Budgeting in Foreign Affairs: Some Reflections'. Memorandum. Washington D.C.: Subcommittee on National Security and International Operations, Committee on Government Operations, US. Senate 90th Cong. Government Printing Office, 1968.

Mountfield, Peter. 'The Paris Club and African Debt'. *IDS Bulletin* 21, no. 2 (April 1990): 42–46.

Nanni, Giordano. *The Colonisation of Time: Ritual, Routine and Resistance in the British Empire*. Manchester: Manchester University Press, 2012.

Neilson, Brett. 'Five Theses on Understanding Logistics as Power'. *Distinktion: Journal of Social Theory* 13, no. 3 (December 2012): 322–39.

Neumärker, Bernhard. 'Neuroeconomics and the Economic Logic of Behavior'. *Analyse & Kritik* 29, no. 1 (1 January 2007). https://www.degruyter.com/view/j/auk.2007.29.issue-1/auk-2007-0105/auk-2007-0105.xml.

Newman, Nic. 'Apple IBeacon Technology Briefing'. *Journal of Direct, Data and Digital Marketing Practice* 15 (2014): 222–25.

Noble, David F. *Forces of Production: A Social History of Industrial Automation*. London ; New York: Routledge, 2011.

Nolan, Richard. 'Systems Analysis and Planning-Programming-Budgeting Systems for Defense Decision Making'. *Naval Research Logistics Quarterly* 17, no. 3 (1970).

Northrop, F. S. C. 'The Neurological and Behavioristic Psychological Basis of the Ordering of Society by Means of Ideas'. *Science* 107, no. 2782 (23 April 1948): 411–17.

Oliver, A. *Behavioural Public Policy*. Cambridge: Cambridge University Press, 2013.

Ordinioha, Best, and Seiyefa Brisibe. 'The Human Health Implications of Crude Oil Spills in the Niger Delta, Nigeria: An Interpretation of Published Studies'. *Nigeria Medical Journal* 54, no. 1 (2013): 10–16.

Organisation for Economic Co-operation and Development. 'Arrangement on Officially Supported Export Credits. TAD/PG(2018)1'. OECD, 1 January 2018. http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?doclanguage=en&cote=tad/pg(2018)1.

Ouelett, Maxine, Jacqueline Best, and Matthew Paterson. 'Cybernetic Capitalism and the Global Information Society: From the Global Panopticon to a "brand" New World'. In *Cultural Political Economy*, 177–96. New York: Routledge, 2010.

Park, Gregory, H. Andrew Schwartz, Johannes C. Eichstaedt, Margaret L. Kern, Michal Kosinski, David J. Stillwell, Lyle H. Ungar, and Martin E. P. Seligman. 'Automatic Personality Assessment through Social Media Language.' *Journal of Personality and Social Psychology* 108, no. 6 (June 2015): 934–52.

Paudyn, Bartholomew. *Credit Ratings and Sovereign Debt: The Political Economy of Creditworthiness through Risk and Uncertainty*. International Political Economy Series. New York: Palgrave Macmillan, 2014.
Pias, Claus. *Cybernetics - The Macy Conferences 1946-1953. The Complete Transactions*. Chicago: University of Chicago Press, 2016.
Pickering, Andy. 'Cyborg History and the World War II Regime'. *Perspectives on Science* 3, no. 1 (1995): 48.
Price, David H. *Cold War Anthropology: The CIA, the Pentagon, and the Growth of Dual Use Anthropology*. Durham: Duke University Press, 2016.
Price, David H. 'Gregory Bateson and the OSS: World War II and Bateson's Assessment of Applied Anthropology'. *Human Organization* 57, no. 4 (1998): 379–84.
———. 'Soft Power, Hard Power, and the Anthropological "Leveraging" of Cultural "Assets": Distilling the Politics and Ethics of Anthropological Counterinsurgency'. In *Anthropology and Global Counterinsurgency*, edited by John D. Kelly, Beatrice Jauregui, Sean T. Mitchell, and Jeremy Walton, 254–70. Chicago: University of Chicago Press, 2010.
'Project DUCO: An Impartial Technical Evaluation'. Sensitive. United Kingdom: Defence Science and Technology Department, 2014. https://www.whatdotheyknow.com/request/389795/response/975478/attach/3/FOI%202017%2003434%2020170508%20Rpt.pdf.
Pykett, Jessica. 'Neurocapitalism and the New Neuros: Using Neuroeconomics, Behavioural Economics and Picoeconomics for Public Policy'. *Journal of Economic Geography* 13, no. 5 (September 2013): 845–69.
'Quality Management Principles'. International Standards Organisation, 2015. https://www.iso.org/files/live/sites/isoorg/files/store/en/PUB100080.pdf.
Quijano, Aníbal. 'Coloniality and Modernity/Rationality'. *Cultural Studies* 21, no. 2–3 (March 2007): 168–78.
Ricaurte, Paola. 'Data Epistemologies, The Coloniality of Power, and Resistance'. *Television & New Media* 20, no. 4 (May 2019): 350–65.
Rieffel, Alexis. *The Role of the Paris Club in Managing Debt Problems*. Essays in International Finance, no. 161 (Dec. 1985). Princeton, N.J: International Finance Section, Dept. of Economics, Princeton University, 1985.
Robert Jacobs, F., and F.C. 'Ted' Weston. 'Enterprise Resource Planning (ERP)-A Brief History'. *Journal of Operations Management* 25, no. 2 (March 2007): 357–63.
Roberts, Geoffrey. 'Moscow and the Marshall Plan: Politics, Ideology and the Onset of the Cold War, 1947'. *Europe-Asia Studies* 46, no. 8 (January 1994): 1371–86.
Robertson, Roland, and Bryan S Turner, eds. *Talcott Parsons: Theorist of Modernity*. London: SAGE Publications, 1991.
Romero, David, and François Vernadat. 'Enterprise Information Systems State of the Art: Past, Present and Future Trends'. *Computers in Industry* 79 (June 2016): 3–13.
Rosen, George. *Western Economists and Eastern Societies: Agents of Change in South Asia, 1950-1970*. Baltimore: Johns Hopkins University Press, 1985.
Ross, E. B. 'Reflections on Vicos'. In *Vicos and Beyond: A Half Century of Applying Anthropology in Peru*, edited by Tom Greaves, Ralph Bolton, and Florencia Zapata, 129–61. Plymouth: AltaMira Press, 2011.
Ross, Eric B. 'Cold Warriors without Weapons'. *Identities* 4, no. 3–4 (June 1998): 475–506.
Rossiter, N. 'Coded Vanilla: Logistical Media and the Determination of Action'. *South Atlantic Quarterly* 114, no. 1 (1 January 2015): 135–52.
Rostow, Walter W. *The Stages of Economic Growth: A Non-Communist Manifesto*. 1st ed. Cambridge: Cambridge University Press, 1960.
Rostow, Walter W., and Max F. Millikan. *A Proposal: Key to an Effective Foreign Policy*. New York: Harper & Brothers, 1957.
Rouvroy, Antoinette. 'The End(s) of Critique : Data-Behaviourism vs. Due-Process.' In *Privacy, Due Process and the Computational Turn. Philosophers of Law Meet Philosophers of Technology*, edited by Mireille Hildebrandt and Ekatarina De Vries, 143–69. London: Routledge, 2012.
Said, Edward W. *Orientalism*. 1st Vintage Books ed. New York: Vintage Books, 1979.

Sanchez-Rola, Iskander, Xabier Ugarte-Pedrero, Igor Santos, and Pablo G. Bringas. 'The Web Is Watching You: A Comprehensive Review of Web-Tracking Techniques and Countermeasures'. *Logic Journal of IGPL* 25, no. 1 (February 2017): 18–29.
Sassen, Saskia. 'Predatory Formations Dressed in Wall Street Suits and Algorithmic Math'. *Science, Technology and Society* 22, no. 1 (March 2017): 6–20.
Saunders, Frances Stonor. *The Cultural Cold War: The CIA and the World of Arts and Letters*. New York: New Press, 2013.
Schubert, Frank N. 'U.S. Army Corps of Engineers and Afghanistan's Highways 1960–1967'. *Journal of Construction Engineering and Management* 117, no. 3 (September 1991): 445–59.
SCL GROUP. 'SCL Defence | Services', 29 October 2016. https://web.archive.org/web/20161029140805/http://sclgroup.cc/defence/services/consultancy.
SCL GROUP. 'SCL Elections | Projects: All', 29 October 2016. https://web.archive.org/web/20161029140831/http://sclgroup.cc/elections/projects.
Companies House. 'SCL GROUP LIMITED - Overview (Free Company Information from Companies House)'. Accessed 20 February 2020. https://beta.companieshouse.gov.uk/company/05514098.
Scott, Brett. *The Heretic's Guide to Global Finance: Hacking the Future of Money*. Pluto Press, 2015.
Sen, Rijurekha, Sohaib Ahmad, Amreesh Phokeer, Zaid Ahmed Farooq, Ihsan Ayyub Qazi, David Choffnes, and Krishna P. Gummadi. 'Inside the Walled Garden: Deconstructing Facebook's Free Basics Program'. *ACM SIGCOMM Computer Communication Review* 47, no. 5 (25 October 2017): 12–24.
Sent, Esther-Mirjam. 'Herbert A. Simon as a Cyborg Scientist'. *Perspectives on Science* 8, no. 4 (December 2000): 380–406.
Shaw, Tamsin. 'The New Military-Industrial Complex of Big Data Psy-Ops'. *The New York Review of Books* (blog), 21 March 2018. https://www.nybooks.com/daily/2018/03/21/the-digital-military-industrial-complex/.
Sheehy-Skeffington, Jennifer. 'Decision-Making Up Against the Wall'. In *Socio-Economic Environment and Human Psychology: Social, Ecological and Cultural Perspectives*, edited by Ayse K. Üskül and Oishi Shigehiro, 105–29. Oxford: Oxford University Press, 2018.
Signanini, J., and F. Shnir. *Ghostery*. Cliqz GmbH, 2014. https://www.ghostery.com/.
Simon, Herbert A. *Administrative Behavior: A Study of Decision-Making Processes in Administrative Organisations*. New York: The Free Press, 1947.
———. 'Herbert Simon Biographical'. In *Nobel Lectures, Economics 1969-1980*, edited by Assar Lindbeck. Singapore: World Scientific Publishing Co., 1978. https://www.nobelprize.org/prizes/economic-sciences/1978/simon/biographical/.
Sinclair, Timothy J. *The New Masters of Capital: American Bond Rating Agencies and the Politics of Creditworthiness*. Ithaca: Cornell University Press, 2005.
Singer, Peter W. 'The Dark Truth about Blackwater'. *Brookings*, 2 October 2007. https://www.brookings.edu/articles/the-dark-truth-about-blackwater/.
Siroker, Dan, and Pete Koomen. *A / B Testing: The Most Powerful Way to Turn Clicks into Customers*. New Jersey: John Wiley & Sons Inc, n.d.
Smykay, Edward W., Donald J. Bowersox, and Frank H. Mossman. *Physical Distribution Management: Logistics Problems of the Firm*. New York: Macmillan, 1961.
Solovey, Mark, and Hamilton Cravens, eds. *Cold War Social Science: Knowledge Production, Liberal Democracy, and Human.* New York: Palgrave Macmillan, 2012.
Sonnemaker, Tyler. 'Jeff Bezos Is on Track to Become a Trillionaire by 2026 — despite an Economy-Killing Pandemic and Losing $38 Billion in His Recent Divorce'. Business Insider. Accessed 30 June 2020. https://www.businessinsider.com/jeff-bezos-on-track-to-become-trillionaire-by-2026-2020-5.
'Sovereign Credit Ratings: A Primer'. New York: Standard & Poor's, 2008.
'Sovereign Ratings Methodology'. Moody's Investors Service, 25 November 2019. https://www.moodys.com/researchdocumentcontentpage.aspx?docid=PBC_1158631.
Spivak, Gayatri. 'Can the Subaltern Speak?' In *Marxism and the Interpretation of Culture*, edited by Cary Nelson and Lawrence Grossberg, 271–313. Basingstoke: Macmillan, 1988.

GOV.UK. ‘Stay at Home: Guidance for Households with Possible or Confirmed Coronavirus (COVID-19) Infection’. Accessed 25 June 2020. https://www.gov.uk/government/publications/covid-19-stay-at-home-guidance/stay-at-home-guidance-for-households-with-possible-coronavirus-covid-19-infection.

‘Sudan: Staff Report for the 2016 Article IV Consultation - Debt Sustainability Analysis’. International Monetary Fund, 2016.

‘Sugrue Communications – Smart Communications’. Accessed 24 June 2020. https://www.sugruecomms.com/.

Sun, Zhaohao, Francisca Pambel, and Fangwei Wang. ‘Incorporating Big Data Analytics into Enterprise Information Systems’. In *Information and Communication Technology*, edited by Ismail Khalil, Erich Neuhold, A Min Tjoa, Li Da Xu, and Ilsun You, 9357:300–309. Cham: Springer International Publishing, 2015. http://link.springer.com/10.1007/978-3-319-24315-3_31.

Syal, Rajeev. ‘Permanent Secretaries “Not Aware of Any Economic Planning for a Pandemic”’. *The Guardian*, 15 June 2020, sec. Politics. https://www.theguardian.com/society/2020/jun/15/permanent-secretaries-not-aware-of-any-economic-planning-for-a-pandemic.

Tarr, Amy, and Tim Riley. ‘Employing BELIEF: Applying Behavioural Economics to Welfare to Work’. Recommendations for Policy. esg & Centre for Economic and Social Inclusion, November 2010.

Tatham, Dr Steve. ‘Defence Strategic Communications’, n.d., 148.

Tatham, Steve. ‘Strategic Communication: A Primer in Advanced Research and Assessment Group’. British Defence Academy, 2008.

———. ‘Target Audience Analysis’. *The Three Swords Magazine*, 2015.

———. ‘US Governmental Information Operations and Strategic Communication: A Discredited Tool or User Failure? Implications for Future Conflict’. Carlilse PA: Strategic Studies Institue: US Army War College, December 2013.

———. ‘Using Target Audience Analysis to Aid Strategic Level Decisionmaking’. Carlilse PA: Strategic Studies Institute, US Army War College, August 2015.

Tatham, Steve, and Andrew Mackay. *Behavioural Conflict: Why Understanding People and Their Motivations Will Prove Decisive in Future Conflict*. Essex: Military Studies Press, 2011.

Taylor, Phillip, M. *Munitions of the Mind: A History of Propaganda from the Ancient World to the Present Day*. 3rd ed. Manchester: Manchester University Press, 2003.

Teale, Edmund. ‘THE CONTRIBUTION OF COLONIAL GEOLOGICAL SURVEY TO THE DEVELOPMENT OF THE MINERAL AND OTHER RESOURCES OF EAST AND WEST AFRICA’. *Royal Society for the Encouragement of Arts, Manufactures and Commerce* 93, no. 4689 (1945): 245–56.

Thaler, Richard H., and Cass R. Sunstein. *Nudge: Improving Decisions about Health, Wealth and Happiness*. Yale: Yale University Press, 2008.

Thompson, Robert. *Defeating Communist Insurgency: The Lessons of Malaya and Vietnam*. New York: Frederick A. Praeger, 1966.

Tiger, Lionel, and Kwame Nkrumah. ‘Neo-Colonialism. The Last Stage of Imperialism’. *International Journal* 22, no. 1 (1966): 161.

Truman, Harry S. ‘Harry S. Truman: Inaugural Address. Thursday, January 20, 1949’. Bartleby.com. Accessed 22 January 2020. https://www.bartleby.com/124/pres53.html.

Tsing, Anna. ‘Supply Chains and the Human Condition’. *Rethinking Marxism* 21, no. 2 (April 2009): 148–76.

Tsing, Anna Lowenhaupt. ‘Empire’s Salvage Heart’. *Focaal* 2012, no. 64 (1 December 2012): 36–50.

Turner, Fred. *From Counterculture to Cyberculture: Stewart Brand, the Whole Earth Network, and the Rise of Digital Utopianism*. Chicago: University of Chicago Press, 2006.

US Congress, House Committee on Foreign Affairs. ‘Behavioural Sciences and the National Security, Report No.4, Together with Part IX of Winning the Cold War: The US Ideological Offensive’. Washington D.C.: Subcommittee on International Organizations and Movements, 6 December 1965.

Varnali, Kaan. ‘Online Behavioral Advertising: An Integrative Review’. *Journal of Marketing Communications*, 17 June 2019, 1–22.

Vázquez, Rolando. ‘Translation as Erasure: Thoughts on Modernity’s Epistemic Violence: Translation as Erasure’. *Journal of Historical Sociology* 24, no. 1 (2011): 27–44.
Verleysen, Michel, and Damien François. ‘The Curse of Dimensionality in Data Mining and Time Series Prediction’. In *Computational Intelligence and Bioinspired Systems*, edited by Joan Cabestany, Alberto Prieto, and Francisco Sandoval, 3512:758–70. Berlin, Heidelberg: Springer Berlin Heidelberg, 2005.
Virilio, Paul. *Speed and Politics*. 2006 ed. Semiotext(e) Foreign Agents Series. Los Angeles, CA: Semiotext(e), 2006.
———. *Speed and Politics*. 2006 ed. Semiotext(e) Foreign Agents Series. Los Angeles, CA: Semiotext(e), 2006.
Voorst, Michiel van. ‘Debt-Creating Aspects of Export Credits’. Paper for NGO ECA-Group. Eurodad, August 1998.
Wallace, Rob, Alex Liebman, Luis Fern, o Chaves, Rodrick WallaceTopics: Agriculture, Capitalism, Ecology, Health, and Political Economy Places: Global. ‘Monthly Review | COVID-19 and Circuits of Capital’. *Monthly Review* (blog), 1 May 2020. https://monthlyreview.org/2020/05/01/covid-19-and-circuits-of-capital/.
Wallerstein, Immanuel. *The Modern World-System*. New York: Academic Press, 1989.
Watts, Michael J. ‘Reflections on Circulation, Logistics, and the Frontiers of Capitalist Supply Chains’. *Environment and Planning D: Society and Space* 37, no. 5 (October 2019): 942–49.
Weiss, M. A. ‘The Paris Club and International Debt Relief’. CRS Report for Congress. Congressional Research Service, 2013.
White, Lawrence J. ‘Markets: The Credit Rating Agencies’. *The Journal of Economic Perspectives* 24, no. 2 (2010): 211–26.
Whitehead, Mark, Jessica Pykett, Rhys Jones, and Rachel Howell. *Neuroliberalism: Behavioural Government in the Twenty-First Century*. London: Routledge, 2017.
Whyte, David. ‘The Crimes of Neo-Liberal Rule in Occupied Iraq’. *The British Journal of Criminology* 47, no. 2 (2007): 177–95.
Wiener, Norbert. *Cybernetics or Control and Communication in the Animal and the Machine*. MIT Press, 1948.
———. *The Human Use of Human Beings: Cybernetics and Society*. New York: Da Capo Press, 1954.
Wiertsema, Wiert. ‘Export Credit Debt: How ECA Support to Corporations Indebts the World’s Poor’. Briefing Note. European ECA Reform Campaign, June 2008.
Wood, Deborah A. ‘Direct Cultural Change in Peru: A Guide to the Vicos Collection’. New York, 1975. Department of Manuscripts and University Archives, Cornell University Libraries.
Wood, Robert E. *From Marshall Plan to Debt Crisis: Foreign Aid and Development Choices in World Economy*. Berkeley: University of California Press, 1986.
‘World Standards Cooperation – About’. Accessed 29 January 2020. https://www.worldstandardscooperation.org/about/.
‘World Standards Cooperation – Government’. Accessed 29 January 2020. https://www.worldstandardscooperation.org/international-standards/the-case-for-business/.
WTO. Agreement on Technical Barriers to Trade, Pub. L. No. 1868 U.N.T.S. 120 (1995). https://www.wto.org/ENGLISH/docs_e/legal_e/17-tbt.pdf.
‘WTO | Technical Barriers to Trade - Technical Information’. Accessed 29 January 2020. https://www.wto.org/english/tratop_e/tbt_e/tbt_info_e.htm.
Wynter, Sylvia. ‘1492: A New World’. In *Race, Discourse and the Origin of the Americas: A New World View*, edited by Vera Lawrence Hyatt and Rex M. Nettleford. Smithsonian Institute, 1995.
Yang, Bijou, and David Lester. ‘Reflections on Rational Choice—The Existence of Systematic Irrationality’. *The Journal of Socio-Economics* 37, no. 3 (June 2008): 1218–33.
Yeung, Karen. ‘“Hypernudge”: Big Data as a Mode of Regulation by Design’. *Information, Communication & Society* 20, no. 1 (2 January 2017): 118–36.
Yianni, Andrew, and David Tinkler. ‘Is There a Recognized Legal Doctrine of Odious Debts?’ *North Carolina Journal of International Law and Commercial Regulation* 34, no. 4 (2007): 749–72.
Yuhanna, Noel, and Mike Gualtieri. ‘Emerging Technology: Translytical Databases Deliver Analytics At The Speed Of Transactions’, 2015, 13.

Zack-Williams, Alfred. ‘Neo-Imperialism and African Development’. *Review of African Political Economy* 40, no. 136 (2013): 179–84.

Zehle, Soenke. ‘The Autonomy of Gesture: Of Lifestream Logistics and Playful Profanations’. *Distinktion: Journal of Social Theory* 13, no. 3 (December 2012): 340–53.

Zhang, Yin, Rong Jin, and Zhi-Hua Zhou. ‘Understanding Bag-of-Words Model: A Statistical Framework’. *International Journal of Machine Learning and Cybernetics* 1, no. 1–4 (December 2010): 43–52.

Zuboff, Shoshana. ‘Google as a Fortune Teller: The Secrets of Surveillance Capitalism’. *FAZ.NET*, 5 March 2016. https://www.faz.net/1.4103616.

———. *The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power*. Profile Books, 2019.