



Colonial modernity and sustainability transitions: A conceptualisation in six dimensions

Saurabh Arora^{*}, Andy Stirling

Science Policy Research Unit, University of Sussex, Jubilee Building, Falmer, Brighton BN1 9SL, United Kingdom

ARTICLE INFO

Keywords:

Coloniality of power
Colonialism
Decoloniality
Decolonisation
Sustainability transformations

ABSTRACT

Through European colonialisms spanning five centuries, *coloniality* – as intersectional stratification and violence directed against ‘other worlds’ – has been central to the making of modern societies worldwide. However, these colonial modernities are very rarely addressed within studies on sustainability transitions. This dearth of attention means that transitions scholars risk failing to challenge the reproduction of colonially accumulated power and privilege in innovation and niche development processes. Building on theoretical insights from postcolonial and decolonial studies, alongside multiple other strands of critical social theory, we conceptualise six dimensions of colonial modernities. These are: assumptions of *comprehensive ‘superiority’*; appropriation of *cultural privileges*; assertions of *military supremacy*; enforcement of *gendered domination*; extension of *controlling imaginations*; and expansion of *toxic extraction*. Interrogating colonial modernities in such ways can help unsettle – and perhaps remedy – intersectional injustices, while also contributing to political struggles for a convivial pluriverse as ‘a world in which many worlds flourish together in difference’.

1. Introduction

Disruption of the Earth’s climate, interlinked with multiple forms of pollution and worsening biodiversity loss, intensifies pressures for political action toward ‘sustainability’ – a term centrally addressing elite responses to decades of social movement struggles against injustices and inequalities alongside environmental damage (Lélé, 1991; Leach et al., 2010). More crucially potent for their plurality and contestability than for any claimed definitive content, current notions of ‘sustainable development’ are generally comprehensive enough to include both social and environmental concerns. Appreciating the relevance of sustainable development as an extant political phenomenon in its own right, in this paper we call for linking it more directly with hegemonic formations conceptualised as colonial modernities.

Crucial in orienting political actions for sustainable development in the European Union and increasingly in other parts of the world, are ‘sustainability transitions’ frameworks like the multi-level perspective (MLP), protective spaces and strategic niche management (SNM) as well as transition management (e.g., Voß et al., 2009; Smith and Raven, 2012). Among many important contributions, these frameworks foreground experiments and innovations which can help realise a shift from an unsustainable to a more sustainable regime (Kemp, 1994). However, sustainability transitions frameworks, including conceptualisations of regimes and their shifts, tend to overlook *coloniality of power* (Quijano, 2000). Coloniality manifests as different forms of intersectional stratification and

^{*} Corresponding author.

E-mail address: s.arora@sussex.ac.uk (S. Arora).

<https://doi.org/10.1016/j.eist.2023.100733>

Received 3 June 2022; Received in revised form 16 February 2023; Accepted 28 April 2023

Available online 22 May 2023

2210-4224/© 2023 The Authors. Published by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

violence inflicted on worlds that sustain Other ways of living (Oy w m , 1997; Lugones, 2007; Escobar, 2010; de la Cadena and Blaser, 2018; Ndlovu-Gatsheni, 2018; Arora and Stirling, 2020). Coloniality’s constitution of unsustainable production and consumption ‘systems’ across *modern societies* (Figueroa Helland and Lindgren, 2016), and of innovations and niches promoted for sustainability, is thus under-examined in the transitions literature (for exceptions, see Lennon, 2017; 2021; Ghosh et al., 2021).

Recent research has focused on the conditioning of new niches and regimes, and production-consumption systems, by the same ‘global’ structures that have been critical in exacerbating unsustainability. For example, Feola (2019) and Sovacool et al. (2020) highlight how ‘global’ capitalism constitutes unsustainable regimes in ‘low-carbon transitions’ that exploit workers and spread toxicity in impoverished regions of the world. Within such critical analyses and further afield in transition studies, *older and deeper formations* of power and privilege (Awehali, 2007; Ocalan, 2017) – like patriarchy (Walby, 1990) and coloniality (Quijano, 2000) – are largely neglected. While these supremacist formations are realised in a diversity of ways (across empires and colonies), their historical prevalence around the world since the fifteenth century has been central in enabling and patterning ‘global’ developments like modernity (Lugones, 2007) and capitalism (Quijano, 2000; Grosfoguel and Cervantes-Rodr guez, 2002). Even within the most ostensibly circumscribed of socio-technical regimes and niches, expansively stratifying formations like coloniality often serve as the foundations on which incumbent power is strongly stabilised and accumulated privilege invisibly reinforced (Stirling, 2019c). That these constituting formations are largely neglected in sustainability transitions is therefore a serious problem.

It is here, we argue, that transition studies can benefit from deeper engagement with decolonial and postcolonial studies, where scholars show how global inequalities, accumulated privileges and ecological devastation are built on relations and structures of power assembled through the pillage and violence of cross-continental European colonialism (e.g., Rodney, 1973; Patnaik, 2018). Realised through many varieties of this colonialism since 1492, beginning with Spanish settler occupation of the Americas (Dussel, 2000; Quijano, 2000; Headrick, 2010), is the worldwide social and material formation called ‘*colonial modernity*’ (Chakrabarty, 2000, 2002; Mamdani, 2020). It is by constituting modern societies that coloniality (manifesting as multiple intersecting stratifications and violences unleashed by European colonialisms) has underpinned the rise of racial capitalism from the 18th century and experiments with socialism in the 19th and 20th centuries (Wallerstein, 1974; Quijano, 2000; Manjapra, 2020). Thus, unsustainable and unjust systems of production and consumption associated with different varieties of both capitalism (Hall and Soskice, 2001) and socialism (Berman 1982; Scott, 1998), are situated within alternative colonial modernities realised in different world regions (Gaonkar, 2001). Central to the realisation of alternative modernities has been colonial circulation and adaptation of ideas and materials (Raj, 2013), in which diverse roles are played by colonised people from different economic classes and political orientations (Bilgrami, 1998; Schulte Nordholt, 2018).

Unfortunately, even in those sustainability transition studies which are directly concerned with power (e.g., Avelino and Rotmans, 2009; Pel et al., 2020), colonial modernity is largely overlooked. Perhaps this lack of attention to racialised and other intersecting relations and structures of power and privilege in the modern world, is at least partly due to the fact that transitions frameworks were predominantly developed through research focused on European settings (that were largely approached as bounded nations and regions, without considering their constituting colonial relations). In these settings racialised patterns of discrimination and appropriation are generally overlooked or sidelined, and often inadvertently condoned through normalised reproduction of white privilege (Lentin, 2008; Weiner, 2014).

In transition studies focused on the Global South, particularly postcolonial countries, scholars identify a number of socio-political problems. These include “undemocratic political systems” (Hansen et al., 2018: 201) and the lack of trust and peace (Romijn and Cani ls, 2011). Here, while colonial histories may be acknowledged, the ways in which these histories shape ‘Southern’ problems and their framings are generally not analysed. Issues of colonial modernity and its reproduction (even in the problematisations themselves) are thus left largely unaddressed.

Overall then, transitions scholars routinely study problems in (presumptively localised) ‘Southern’ and ‘Northern’ regions with extensive colonial histories. But how these histories’ defining relations and structures constitute old and new socio-technical regimes and production-consumption systems, is largely left out of the picture (but see Lennon 2017, 2021). Neglected therefore are the socio-material bases of system innovations and entire transitions in colonial modernities, to which white privilege, racist dispossession, transnational extraction and institutional violence are central. Amongst many others, these colonial patterns are revealed – in the unequal suffering produced around health systems and regimes by the COVID-19 pandemic (Aguirre, 2020); in the blindness to imperatives to remedy underlying injustices in water or food regimes (Mehta et al., 2014; Guthman, 2011); and in the constraining blinkers often adopted in work on ‘energy justice’ and low-carbon transitions (Sovacool et al., 2019). Given the dearth of attention to colonial modernity, transitions scholars and activists risk failing to check the reproduction of intersecting racial and patriarchal injustices through innovation and niche development processes that are seen as contributing to sustainability transitions. Indeed, as James Baldwin observed six decades ago: “*Not everything that is faced can be changed; but nothing can be changed until it is faced.*” (Baldwin, 2010 [1962]: 110).

In the following we begin with an overview of some ways in which colonialism and postcolonial developments are considered within transition studies. Articulated subsequently based on a close reading of decolonial and postcolonial literatures, are six conceptual dimensions that we argue to be useful for analysing colonial modernity in and of sustainability transitions. These interwoven dimensions of colonial modernity are: a) assumptions of comprehensive ‘superiority’, b) appropriation of cultural privileges, c) assertions of military supremacy, d) enforcement of gendered domination, e) extension of controlling imaginations, and f) expansion of toxic extraction. It is crucial to note that considering the still globalising diversity of modern worlds, these dimensions are not generalisations to be applied everywhere but rather they are proposed as provisional and conditional abstractions that can potentially find relevance in different times and spaces of alternative colonial modernities.

2. Colonialism in transitions

Differences between colonising powers and colonised regions of the modern era are widely recognised in sustainability transitions studies, often through categorical distinctions between the Global ‘South’ and ‘North’, between the ‘West’ and the ‘Rest’, or between so-called ‘developing countries’ and the ‘developed world’. Using such distinctions, transitions frameworks like MLP and SNM are situated as products of Western/Northern/Developed settings (e.g., Lawhon and Murphy, 2012; Hopkins et al., 2020). These are often distinguished “from non-Western modes of thinking” (Hopkins et al., 2020: 5). In privileging such categories, not only are diverse “modes of thinking” clubbed together and *located* in the non-West, but also the production of conceptual knowledge is located squarely in the West. This locating of thinking and knowing, we argue, constitutes the ‘fallacy of simple location’ (Whitehead, 1925: 50), under which the *trans-local flux of ideas and materials* that underpins production of thought and knowledge is marginalised. This fallacy is particularly egregious in a global context where the West and the Rest have been asymmetrically connected through European invasions of Africa (Boahen, 1985), the Americas (Churchill, 2002) and Asia (Parthasarathi, 2011), over the past half millennium. While colonial appropriations and ‘global’ circulation of ideas and materials constitute modern scientific knowledges (see e.g., Raj, 2013), including those associated with clean technologies like solar and wind power in recent decades (e.g., Dunlap, 2018; Lennon, 2021), they are treated as originating in Western locations.

Having located the origin of their conceptual frameworks in the North/West, some transition scholars call for adapting the frameworks for application in postcolonial settings (e.g., Lawhon and Murphy, 2012; Wieczorek, 2018; Ghosh and Schot, 2019). Scholars also highlight the pitfalls involved in such application and adaptation due to significant differences identified between postcolonial regions and Northern/European settings. Amongst the highlighted differences, postcolonial regions are framed as governed by failing or predatory states or as dependant on foreign aid and global commodity chains (Lawhon and Murphy, 2012). Categorised as developing countries, they are framed as having “undemocratic political systems” (Hansen et al., 2018: 201) and as societies lacking in trust and peace (Romijn and Caniels, 2011). Local actors in so-called developing regions are framed as having “limited adaptive capacity” (Larbi et al., 2021: 14). Not only do such framings essentialise a wide diversity of cities and countries, they also frame postcolonial states and societies as lagging behind the polities and cultures of their former colonial rulers. In this way, erstwhile colonies may yet again be placed in the ‘savage slot’ of colonial modernity (see Trouillot, 2003).

Such framings of postcolonial ‘backwardness’ fail to examine how colonial relations of pillage and violence have been central to the reign of European powers in Asia and Africa as well as to the formation of their settler colonies across the Americas, Africa and the southern Pacific Ocean (Mamdani, 2020). It is through colonial violence, territorial domination and enslavement of racialised bodies that Western European and North American powers were able to orientate the flow of plundered resources and wealth, for ultimately concentrating many kinds of cultural and epistemological privileges for themselves (see e.g., Manjapra, 2020; Patnaik, 2018; Hall et al., 2014; Raj, 2013; Gunder Frank, 1978).

Recognising some of this “notorious colonial past” briefly in the transitions literature, Avelino (2011: 8) points to the legacy of Dutch imperialism as reflected by the prominent position of the Netherlands in 21st-century international trade (including hosting one of the world’s largest ports in Rotterdam). However, like much of the vast literature on sustainability transitions focusing on the Netherlands, even this insightful account (Avelino, 2011) does not analyse the role of Dutch colonial pasts in entrenching modern unsustainability and shaping sustainability transitions that concern the Netherlands. Thus, colonial processes behind the concentration and accumulation of privileges in parts of the Global North remain under-examined.

Colonial privileges are not just a matter of the past, as argued by Lennon (2017, 2021) in pointing to the importance of Black Lives Matter movement, on renewable energy transitions in the United States over the last decade. Lennon (2017) recognises that fossil fuel-based economies are distinctively embedded within racial capitalism developed through the colonisation of ‘native’ lands and the enslavement of black bodies. Observing inequities of racial capitalism in renewable energy supply chains of technocratic corporations, Lennon (2021) distinguishes these from attempts by energy democracy activists to build an egalitarian regenerative economy centred on cooperation, deep democracy, and ecological and social wellbeing. Inspired by this activism, Lennon (2021, 2017) calls for radical decolonisation of energy transitions, based not just on community-owned renewable energy production and accountable public institutions, but also on intersectional justice and direct solidarity with marginalised and exploited workers in the Global South, across renewable energy production networks. Despite the crucial insights offered by this research and the support it gives to the critical implications of analyses of colonialism and white supremacy for energy transitions, Lennon does not conceptualise coloniality as constitutive of a ‘green modernity’ within which racial capitalisms and energy transitions are currently unfolding.

In studies on sustainability transitions in the ‘Global South’, the importance of adapting rather than just transferring green technologies from the ‘North’ is well underscored (e.g., Wieczorek, 2018; Ghosh and Schot, 2019). This is argued to be crucial in order to avoid situations where people in the South see these technologies as “‘tools for Northern neocolonial oppression’.” (Wieczorek, 2018, quoting Amars et al., 2017: 16). However, this important observation is typically not complemented by a scrutiny of wider colonial processes, due to which the ostensible origin of green technologies may be situated in the Global North. Analysing how ‘innovative capacities’ are appropriated by and centred on privileged Northern settings within modernity, is thus neglected in the transitions literature.

Focusing on energy transitions for Kenya, Newell and Phillips (2016: 40) foreground “power and social relations that configure questions of energy access and energy justice” as “important starting points for analysis of the specific features of colonial and post-colonial socio-technical energy systems that have developed in the South.” However, no specific analysis is offered of colonial or post-colonial relations. Instead, as in the wider literature, attention is centred on more circumscribed formations of capitalism in a global political economy constituted by the power of transnational corporations and neoliberal ideologies (prevailing in institutions) (Scoones et al., 2015). Similarly, Hansen et al. (2018) and Baptista (2018) take seriously the unequal access to infrastructures and

services in configuring energy transitions in postcolonial or ‘developing’ settings. Focusing on urban regions, scholars also invoke the history of segregationist colonial planning (e.g., Larbi et al., 2021; Baptista, 2018). However, how (post)colonial history shapes neoliberal public policies and corporate strategies that configure unequal access in today’s regimes, is under-scrutinised in the transitions literature. By neglecting how coloniality asymmetrically structures modern regimes, sustainability transitions frameworks can inadvertently support Eurocentrism (Chakrabarty, 2000).

Using transition frameworks to analyse biofuels, Romijn and Caniels (2011) observe that Tanzanian citizen groups and non-governmental organisations highlight continuities between large-scale land acquisition for 21st-century biofuel plantations and colonial extraction for gold and Tanzanite in the past. Tanzanian activists also note how biofuel promotion neglects smallholder production while focusing on the export of (cash) crops, much in the same way as was done during the colonial era (Romijn and Caniels, 2011; Arora et al., 2014). However, rather than analysing these colonial processes as constitutive of the regime and landscape changes taking place in energy transitions, Romijn and Caniels (2011) invoke them as concerns of Tanzanian activists and scholars. Similarly, Alonso-Fradejas (2021) explores ‘global’ resource and land rush of the last two decades through the lens of ‘new extractivism’. Critical of approaches that view extractivism as a continuation of colonial patterns of plunder, Alonso-Fradejas (2021: 129) calls for analysing it as a “geographically and historically situated phenomenon,” in order to reveal “various trajectories, geographical unevenness, and ecologically and socially differentiated outcomes of resource extractivism today.” Here Alonso-Fradejas is rightly critical of a monolithic understanding of colonialism’s many different roles in producing modern unsustainability. However, left on its own, such a critique risks failing to take seriously postcolonial approaches to alternative modernities (e.g., Mookerjee, 2019; Chakrabarty, 2002; Gaonkar, 2001), in which geographical and social differences are examined alongside colonial-modern commonalities and continuities.

Unmasking modern slavery and its intersections with patriarchy in Congolese cobalt mining that fuels contemporary energy transitions, Sovacool (2021: 272) asks “what power relations does cobalt mining involve and embed?” However, these power relations are not framed as entangled with the brutal colonisation of the Congo by Leopold’s Belgium (van Reybrouck, 2014), and the ways in which this colonial history structures the present of Congolese mining (e.g., Laterza and Sharp, 2017). While concluding with a call to make “cobalt mining more inclusive, equitable, and sustainable”, Sovacool (2021: 290) refrains from explicitly highlighting the crucial responsibility in achieving this, of powerful corporations and associated nation-states that benefit from Congolese cobalt in their sustainability transitions. As a result, no suggestion is offered as to how sustainable mining might entail the dismantling of coloniality that constitutes modern societies undergoing transitions.

By largely overlooking colonial *modernity*, transition frameworks limit the scope of sustainability transformations to disproportionately focus attention on circumscribed features of incumbent regimes such as polluting technologies and co-evolving governance routines (Meadowcroft, 2009; Shove and Walker, 2007; Stirling, 2019b). Studies thus often examine how to promote the development of green technologies and coevolving institutions for shifts towards new ‘sustainable’ regimes (Kemp, 1994; Steward, 2012). In this way, despite their ‘global’ hegemony, colonial modern formations are routinely pushed out of the picture (but see Sheller, 2015; Lennon, 2017; 2021). So far, political struggles to decolonise modernities thus remain largely unappreciated – not just for realising intersectional and restorative justice (Perkins, 2019), but also for realising a world in which diverse ways of living across many worlds can thrive (de la Cadena and Blaser, 2018).

3. Six dimensions of colonial modernity

It is our argument in this paper that if colonial modernity is taken seriously as constitutive of incumbent and emerging socio-technical systems (including old and new rules, technologies, uses, industries and experiments, across regimes, niches and landscapes), then new decolonial imaginations of sustainability transitions can potentially be ‘opened up’ for transforming modernities (cf. Stirling, 2008; Arora et al., 2020). With no single scheme being generally accepted for the constituting dimensions of ongoing coloniality, or of colonial modernity, there are many contrasting frameworks under which this might be done. In order to avoid undue bias, what the present exercise requires is a heuristic scaffolding that attempts to engage with the highly diverse theoretical traditions from which the interdisciplinary field of transition studies has emerged alongside neighbouring fields of science and technology studies and the history of science and technology.

Also necessary is the avoidance of tacit claims (by us as authors who play peripheral roles at best in decolonisation debates) to be organising rich decoloniality literatures in our own terms. With these diverse strands of analyses still in-the-making, it remains for others variously to differentiate and characterise the main constituting perspectives. In the meantime, then, what suffices for present purposes is the identification of a set of distinct but inter-relating dimensions, from which key implications of colonial modernity can be observed for sustainability transition studies, which – alongside postcolonial studies (Spivak, 1988; 1992) and decolonial theories (Quijano, 2000; Lugones, 2007) – collectively span the broad critical traditions in modern social thought (Ritzer, 2000; Hadden, 1997). In particular, we rely on traditions such as relational understandings (Emirbayer, 1997), process thinking (Whitehead, 1978), structural perspectives (Winship and Rosen, 1988), a focus on meaning (and discourse) (Jessop, 1996), and practice theories (Bourdieu, 1990; Latour, 1993). Of course, other critical approaches could be added to this list. But the level of granularity and sweep of coverage aimed in the six resolved dimensions below, can offer serviceable ‘*principal components*’ for developing a wider constellation of dimensions.

To this end, we conceptualise the dimensions of colonial modernity in rough accordance with each of the above contrasting angles of view. First, while relying on decolonial theories, a key cluster of structural and relational gradients is addressed by unpicking *assumptions of comprehensive ‘superiority’* in colonial modernity. Second, a major relational-processual aspect highlighted in coloniality literatures lies in *appropriations of cultural privileges*. Third, multiplicities of violence in relation to coloniality, are perhaps most fully

embodied in intensely structured *assertions of military supremacy*. Fourth, it is crucially in the politics of everyday action that more broadly extant configurations of patriarchy are involved in *enforcement of gendered domination*. Fifth, it is with respect to interpretive meanings and attempts to enact them in relational practices, that coloniality is distinctively characterisable in the *extension of controlling imaginations*. Sixth, the entangling of materiality and sociality highlighted in practice theories, is perhaps most salient for the transitions field in the *expansion of toxic extraction*. After articulating these dimensions, we attempt to illustrate their usefulness for analyses of sustainability transitions, by revisiting the concept of regimes in transitions in the concluding section of the paper.

It is worth noting here that each of these dimensions is a qualitative aspect of colonial modernity, rather than a quantitatively measurable attribute (that either remains constant or changes in intensity along an axis). Even though each dimension may be approached as a provisional category, for us it crucially represents a historically constituted and structured *relation* (Glissant, 2010). Beyond processes of intersectional stratification, if coloniality is seen as involving violent attempts to compress and assimilate the ‘many worlds’ of the pluriverse into modernity (Escobar, 2018; de la Cadena and Blaser, 2018), then each dimension points to political-ontological struggles. Such struggles may be reduced to battles between social groups of settlers and natives, or even between wider cultures. However, from a political ontology perspective (Blaser, 2009), they are struggles between worlds – always entangling what modern ontologies categorically isolate as ‘nature’ (Escobar, 2005).

The ways in which a relation is actualised, and the kinds of identities of Self and Other that are constituted through an encounter, is obviously diverse across the enormously heterogeneous spatio-temporal situations of colonialism in the last five centuries. Developed on the bases of provisional and conditional understandings, each of the conceptual dimensions as resolved below is necessarily incomplete. Thus, no dimension should be approached as a complete account or a generalisation that is derived from a representative sample of specific occurrences. Instead we propose each dimension as an abstraction that can find resonance in plural conditional ways, across a range of alternative modern contexts.

Similarly, rather than approaching the dimensions as elements of a theoretical model of colonial modernity, we argue that the metaphor of weaves may offer a more illustrative topological grasp (Arora and Stirling 2021). The dimensions are then seen as partially overlapping and mutually constituting threads, which by knotting together form the weave of coloniality (in modernity). Not only does each thread take many conditional forms across different spatio-temporal situations (as discussed above), but the patterns of the weave itself, that is realised by the knotting of the different threads, can also be richly multiple.

3.1. Assumptions of comprehensive ‘superiority’

Often associated with asserted capacities to develop and use modern sciences and technologies (Adas, 1989; Escobar 2005), the ‘superiority’ presumed by white European elites for themselves, and their descendants, has come to condition most aspects of modern life over the last five hundred years. However, according to Quijano (2000), signifiers of this assumed ‘superiority’ in modern worlds, begin their life through the invention of race as an idea. Others argue that Europeans invented ‘race’ as an aid to manage problems of ruling over diverse peoples in conquered territories (Skinner, 2006). Bringing these arguments together, it may be argued that the fiction of race (Tilley and Shilliam, 2018), embeds and enacts a range of assumptions of comprehensive ‘superiority’. It is under such assumptions that: (a) European liberal philosophy embraced a metaphorical ladder in the 19th century, on which those akin to the Self were considered civilisationally ‘higher’ than those who were Othered (Jahn 2005); (b) European rulers gave themselves the legitimacy to define what ‘native’ customs truly looked like in parts of Africa and South Asia (Mamdani 2012); and (c) ‘Western’ societies are considered comprehensively more developed than the rest (Kapoor 2008). In the following, we attempt to outline some deeper ontological foundations of such assumptions.

First, beginning in the Americas, new racial categories such as Black, Indian, Mestizo and White, were constructed to group radically diverse communities and ethnicities, which were then stratified as culturally ‘superior’ and ‘inferior’ through the use of violence (Quijano, 2000). Privileging these categories over diverse relations between people(s), *racialised separation and hierarchy* were extended into many domains of life including plantation agriculture, colonial governance and knowledge production (eg., Manjapra 2020; Mamdani 2020). Within the latter, rational knowledge was widely presented as an exclusive feature of European modern science (Mignolo, 2002; Quijano, 2007), under which specific credit for scientific outputs was largely appropriated by privileged white elites (see e.g., Parrish, 2006; Hopkins, 2016).

Second, through its inextricable association with scientific knowledge production, modernity is seen as extending as its dominant ontology, the categorial borders between ‘nature’ made up of objectified nonhumans and ‘cultures’ constituted by human subjects (Haraway, 1991; Latour, 1993). These fictitious borders help present modern science as the only objective way to access ‘natural’ reality (Arora et al., 2020), meaning that there is just one *natural* science, while all other ways of knowing are cultural and therefore ‘inferior’. Deployed alongside colonial occupation, this epistemic colonisation of objectivity is seen as having paved the way for the ‘universalisation’ of modern scientific development (through the circulation of people, materials and ideas) around the world (Latour, 1999; Delbourgo and Dew, 2006; Raj 2013). The same capture of objectivity was also used to justify imperial assumptions of racial ‘superiority’ and of colonial domination as ‘natural order’ (Stepan, 1982).

While the marginalisation of other ways of knowing is widely documented as epistemic colonisation or ‘epistemicide’ (de Sousa Santos, 2007; Tilley, 2010; Grosfoguel, 2013), it is also often acknowledged that forms of resistance and refusal by the colonised have kept alive a wide diversity of ways of knowing that may be classified as indigenous or traditional (Agrawal 1995; Deloria et al., 2018). Despite this continued existence, however, diverse peoples’ plural ways of knowing can be approached as ‘inferior’ through the deployment of modern categorial separations (of nature from cultures, and so on). It is this ongoing inferiorisation, which may be termed as ‘coloniality of nature’ (Escobar, 2005; Cubillos et al., 2022). In the literature on sustainability transitions, coloniality of nature can inadvertently manifest even in valorisations of Indigenous peoples’ traditional ecological knowledges (as shown by Doyon

et al., 2021). Despite the best of intentions then, the deep normalisation and ‘globalisation’ of modern categorial ontologies poses significant challenges for scholarly attempts (including the present paper) aimed at dismantling assumptions of ‘epistemological superiority’ (ibid: 7). A divergent multiplicity of attempts might therefore be required (cf. Arora, 2019).

Third, colonial modernity has entailed the development of a variety of material infrastructures like national electric grids, dams and canals for irrigation, road and railway networks, citizenship of nation-states, international borders, apartheid walls and checkpoints, as well as gated neighbourhoods, which can entrench hierarchies between the colonisers and the colonised as well as amongst the (formerly) colonised (Adas, 1989; Headrick, 2010), particularly in settler societies like Israel and in occupied Palestine (e.g., Jabary Salamanca, 2016). The result is that social stratifications may be reinforced, not just through the categorial separations of race and nationality that are materialised into infrastructures, but also through other intersecting identities of caste, ethnicity, religion, class, and even ‘customary’ authority (Morrock, 1973; Dirks, 2001; Mamdani, 2012). By defining and translating these identities into frameworks of national and regional governance, relationally-constituted differences between fluid cultural identities are turned into categorical divides that variously form the bases of (post)colonial rule across political modernities (Mamdani, 1996, 2012; Dirks, 2001). The same divides have also often shaped processes of extreme violence between those claiming to be the national majority and other groups reduced to permanent minorities (Mamdani 2020).

Fourth, particularly in settler-colonial societies, violence can take the form of attempted assimilation of minoritised Indigenous peoples into ‘superiorised’ modern lifestyles that are equated with socio-economic progress and development (eg., Andolina, 2012; Nirmal, 2017). This process of assimilation can unfold as modern infrastructures and megaprojects are implemented in Indigenous territories (where existing lifeways are yet again considered dispensable) (eg, see Avila, 2018; Dunlap, 2018). Instead of fostering diverse forms of socio-material change based on Indigenous peoples’ ways of doing-knowing, this ‘coloniality of development’ continues their historic marginalisation by powerfully closing down patterns of change to the particular forms reflected in prevalent notions of (ecological) modernisation (Escobar, 2018; Arora et al., 2019; Ghosh et al., 2021).

Through resistance against such violent forms of modernisation and through people’s unequal agency to adapt modernisation in ways that are attuned to their local contexts, it is observed that different kinds of *alternative* and *regional modernities* have been realised in different parts of the world (Gaonkar, 2001; Sivaramakrishnan and Agrawal, 2003). Alternative modernities are also seen as hybridisations of the many pre-colonial ‘traditions’ of living within colonised societies and the administrative, techno-scientific and other cultural practices ushered by colonial and postcolonial rule (Bhabha, 1994; Mamdani, 1996). Such regional variations and hybrids highlight that colonial modernity is far from a one-size-fits-all process driven by ‘the West’ or by capitalism. However, while carefully attending to differences between alternative modern societies, it is equally crucial to grasp deeper commonalities that help characterise those societies as modern. Like the assumptions of ‘superiority’ conceptualised here, which ontologically privilege hierarchical categories over myriad relations, some common aspects of modernity have been widely normalised and deeply entrenched over five centuries of European colonialisms and their postcolonial legacies and continuities (Arora and Stirling, 2020).

In our necessarily incomplete account of the first dimension of this colonial modernity – assumptions of comprehensive ‘superiority’ – we have argued that such assumptions may have begun their life as Eurocentrism based primarily on the idea of race. However, through the many alternative colonial modernities that have been materialised due to the unequally structured agency of colonised peoples, such assumptions have come to encompass many other hierarchies include those associated with categories of religion, ethnicity, caste, class and ‘customary’ authority. Too often in the 21st century, these intersecting hierarchies can reinforce authoritarian nationalism that oppresses minorities in modern polities, from India and China to Brazil and Peru. The hierarchies can also support attempts to entrench Islamophobia and casteism in wider cultures (e.g., Ndlovu-Gatsheni, 2018; Upadhyay, 2020; Cháirez-Garza et al., 2022; Santana and Ferrario, 2022). Yet, hope is never missing from the picture, often due to the many different forms of resistance and refusal against colonial modern developments.

3.2. Appropriations of cultural privileges

Modern regimes as specified in transition studies, from mobility to energy and agriculture, involve significant (albeit complex) North-South asymmetries in accumulated socio-economic privileges (Sovacool 2021; Lennon 2021). Mainstream models of economic growth in the ‘North’ see accumulated wealth and associated privileges, as outcomes of long-term endogenous economic growth realised through technical innovations, human capital increases and strong institutions (eg., Acs and Varga, 2002; Altman 2009). In contrast, scholars of degrowth and some economic historians argue that relations of colonial pillage are central to historic economic growth observed in Europe and North America (e.g., Hickel, 2015; Patnaik, 2018; Nirmal and Rocheleau, 2019). For example, it is estimated that India’s share of the world economy was reduced to just 3–4% at the time of its independence from British rule (Mukherjee 2010). In pre-colonial times, this same share is estimated to be 24–27%. In terms of absolute figures, in the final decades of British colonialism after 1913 (until 1950), India’s GDP per capita was falling at an annual rate of –0.22% (Mukherjee 2010). Overall then, according to recent calculations, at least 45 trillion dollars (at current prices) were taken out of India and into Britain between 1765 and 1938 (Patnaik, 2018; Hickel, 2018).

The result is an accretion of modern socioeconomic privileges around the Global North through European colonial empires. Focusing on relations between Europe and its former colonies in the Global South, it may be observed how privileges continue to be concentrated and accumulated in postcolonial times through many asymmetric processes including:

- a) relations of economic dependence and worsening terms of international trade for regions impoverished by European colonialisms (Prebisch, 1950; Rodney, 1973; Cardoso and Faletto, 1979);

- b) ‘unequal exchange’ based on depressing the costs of labour (of colonised and racialised people) and of Southern resources (Manjapra, 2020; Patel and Moore, 2017), which “constitutes a ‘hidden transfer of value’ from the South to the North” (Hickel et al., 2021: 1031; Amin, 1976; Arghiri, 1972);
- c) ecologically unequal exchange from the South to the North, under which the real environmental (and social) cost of extractivist mining and industrial-agricultural commodities are not reflected in the export price (Muradian and Martinez-Alier, 2001; Dorninger et al., 2021).

These kinds of asymmetric processes can enable former metropolises to maintain their status as ‘developed countries’ within modern production-consumption systems. Colonially accumulated epistemic and economic privileges can then be used to develop and diffuse modern innovations like electric vehicles and system-on-a-chip that rely on the extraction of resources and labour-value from indebted former colonies (as discussed in more detail later). Debt repayments by impoverished countries add to the revenue flows entering the North (Patel, 2021). Within ‘globalised’ production-consumption systems and socio-technical regimes then, including the ones being built-up for emerging energy transitions, catch-up through technology transfer and ‘capability’ building is promoted for so-called ‘developing’ countries (Foray, no date).

Recent work has shown that asymmetries between Europe and former colonies are transforming in the last 4–5 decades, particularly due to emerging concentrations of socioeconomic privileges in China and India, which (when weighted by national populations) has produced substantial reductions in international inequality (e.g., Milanovic 2012, 2016). However, these reductions have been accompanied by an increase of within-country inequality and the persistence since the early 1980s, of high global inequality (that is calculated for the world’s entire population without making distinctions between nationalities). What this means then is that in the last four decades, the concentration of privileges in some centres (e.g., urban neighbourhoods, specific classes, religious or caste groups), is comparable to the continued accumulation of privileges in European countries as wholes. Therefore, it may be argued that as socio-material orders of modernity are ‘globalised’, its constituting coloniality has multiplied the circuits of appropriating privileges from other worlds. Rather than operating mainly on a Southern Colony to European Metropole axis (that continues to be asymmetrically structured, as discussed above), through these circuits socioeconomic privileges are now also being appropriated for concentration in many modern centres across the Global South (Milanovic 2012; 2016).

Beyond socioeconomic privileges, it is important to consider colonial concentrations of other associated cultural privileges like academic, artistic, and civic ‘advancements’, which are represented using specific criteria like citation rankings, fame, and quality (of governance). The literatures around diverse forms of cultural privileges in modernity are too vast to be covered adequately in the present paper (see e.g., Simbao 2017; Arias 2018).

It is nevertheless crucial to note here that colonial concentrations of privileges of all kinds, have often relied on violent appropriations of people with their ideas, values, languages, rhythms and practices, out of the socio-material worlds that supported diverse ways of living beyond modernity. Most violently perhaps, these appropriations have entailed the forced displacement of people out of colonised worlds across Africa and Asia into modern enslavement and indenture (see e.g., Manjapra, 2020). Incorporation of people into modern production-consumption systems, often as ‘low-wage’ industrial labourers (e.g., Scrase, 2003; Patel and Moore, 2017), have also entailed appropriations of people out of diverse worlds of craft production. Insights have been appropriated into the colonisers’ language, the impositions of which have been translated into many syncretic and ‘creole’ practices by the colonised (Glissant, 2010; Pyndiah, 2016), but the impositions have often produced erasures of marginalised languages and associated cultures in their extant forms throughout the modern era (Crystal, 2000; Simons, 2019). Colonial appropriations have also been attempted out of nomadic lifeways (and anticolonial dissent) into carceral criminalisation enforced by modern legal institutions (Arora, 2014; Havik et al., 2019). Through such varied appropriations of labour, and embodied knowledges and skills, not only are modern privileges concentrated in specific centres but the processes of compressing the pluriverse into modernity are also further entrenched (Escobar, 2010; Law, 2015; de la Cadena and Blaser, 2018; Ndlovu-Gatsheni, 2018; Arora and Stirling 2020).

3.3. Assertion of military supremacy

Against this background of pluriversal damage wrought through appropriations from and assimilation of colonised peoples and their descendants, it is often assumed that other-than-modern worlds have “died off” (Dunbar-Ortiz and Gilio-Whitaker, 2016), and that Indigenous sovereignty is non-existent in settler-colonial societies (Simpson, 2014). Based on this “logic of elimination” (Zaragocin, 2019: 375; Wolfe 2006), a certain modernising universality can take hold, which can depict Indigenous worlds as ‘primitive’ or ‘backward’ (Arora, 2019) – as situated ‘behind’ modernity in time. What can be overlooked in this colonial construction of temporal linearity, are five centuries of mass projection of military violence and of countervailing decolonial refusal that seeks to sustain other worlds and anticolonial resistance against rampant modernisation in settler states such as Mexico and the United States (EZLN, 1996; Churchill, 1997; LaDuke and Cruz, 2013; Dunbar-Ortiz and Gilio-Whitaker, 2016; Estes, 2018; Mamdani, 2020). Here, a backlash from colonial assertions of military and para-military forces is all too often found, reproduced in the ostensible name of ‘security’ or (national) ‘sovereignty’. While typically of lower intensity than supremacist violence inflicted during genocidal colonial conquests (Churchill, 1997), these new assertions of military coloniality are enacted within similar relational patterns so far as the continued destruction of the pluriverse is concerned.

Beyond powerful settler states, worldwide projection of violent force on a devastating and murderous scale are a distinctive aspect of colonial modernities (Nandy, 1989; SIPRI, 2016). While issues of colonial modern violence are sometimes discussed in history of technology (eg., Adas 2006; Satia, 2014), the implications of such violence are very rarely examined in most other fields concerned with innovation and sustainability. In innovation studies, for instance, it is generally left unacknowledged that military and security

applications are the most important field for public expenditure on research and development (Gummett, 1990; OECD, 2021). Likewise, little attention is given in studies on the governance of ‘sustainability transformations’ to entrenched multi-polar elite imaginations closely attached to military supremacy (Johnstone and Mcleish, 2020). Though war is invested in, prepared for, practised and perpetrated by colonial modern states more than any other single activity (Edgerton, 2006), it seems to be widely missed that war itself is the real “enemy” (Cleghorn, 1943). War as a constituting feature of modern societies is often strikingly absent from ethical and political scrutiny in sustainability studies.

Perhaps the single most acute example of the distinctive colonial role of military force projection in contemporary modernity, lies in the particular case of nuclear weapons infrastructures and surrounding cultures (Gerson, 2007; Abraham 2009). Here, a disposition to inflict unprecedented scales of mass death and globally-catastrophic radioactive devastation is explicitly justified in the name of nationally-defined categorical exceptionalisms (Schell, 1984). The point is underscored in recognising that this same capacity is explicitly rewarded at the apex of global institutions supposedly charged with defending a progressive world order – in the *de facto* constituting of permanent membership of the United Nations Security Council (UNSC) (Stirling and Johnstone, 2018). Efforts to maintain these military nuclear capabilities evidently exert substantive impacts on the character and orientation of energy transitions in many countries (Johnstone and Stirling, 2020a), but these imprints of colonial modernity remain sadly neglected in much conventional transitions research (Johnstone and Stirling, 2020b).

Also reflecting a colonial performativity of modern power, it is the status of a place at the global “top table” of the UNSC, that especially fascinates elite institutions in those nation-states that have historically assumed ‘superiority’ and appropriated privileges through imperial and settler conquests (Coughlin, 2016). So the UK, France, Russia, USA and China are all formally codified beneficiaries of extraordinary privileges in some of the most foundational structures in international law (Fry et al., 1990). Equally colonial in their force, are the unquestioned assertions of racialised ‘superiority’ and entitlement, routinely deployed to justify military violence against (formerly) colonised territories and peoples, also in the name of restricting the ‘proliferation’ of superior nuclear status to ‘unworthy cultures’ (Ritchie, 2009). Despite being central to the same international legal regime, the responsibilities of imperial ‘global powers’ to retreat from this naturalised violence against many former colonies (particularly in Sub-Saharan Africa), and postcolonial claims of sovereignty notwithstanding (Mbembe, 2003), have remained unfulfilled for more than half a century (Maerli and Lodgaard, 2007).

Violent assertions of racialised supremacy are also ubiquitous within alternative colonial modernities around the world (Grosfo-quel and Cervantes-Rodriguez, 2002). Long familiar to black and brown people living in colonial metropolises, for instance, routinely racist policing has only received mainstream attention in recent years under pressure from Black Lives Matter and other sister movements (Cherry, 2021; Nwakanma, 2022). With growing militarization driven by the concentrated geopolitical forces discussed above (Gonzalez et al., 2019), a similar pathology persists in stark forms across many formerly colonised regions like Nigeria (Nwakanma, 2022), intensifying in para-military action (Ahram, 2011), growing privatisation of organised violence by mercenaries and vigilantes (Scahill, 2007), as well as the knock-on extreme violence that this can sometimes engender between colonially stratified groups (Mamdani, 2001; Gupte et al., 2014).

Here, as long recognised in critical perspectives (Friedman, 2003), the modern postcolonial nation-state is at least as frequently a perpetrator of violent oppression as it is of any kind of defence (Mentinis, 2006; Mamdani 2020), often being complicit (for instance) in growing violence against Indigenous peoples seeking to resist devastating further encroachments on residual territories (Global-Witness, 2016). As a feature of postcolonial governmentality (Bowman, 2002), this trend is intensified by wider recent moves towards the securitization of formerly less militaristic areas of policy like climate mitigation and adaptation (Sahu, 2019), which are further reinforced in oppressive measures undertaken around the world in the name of combatting ‘terrorism’ (Chomsky, 2002; Njoku 2022), and further entrenched by a descending spiral of violent reactions against flows of migration driven by colonial projections of force (Ceyhan and Tsoukala, 2002; Mlambo, 2020). So the relational consequences of the constituting threats and realities of colonial modernity in cross-continental assertions of intense supremacist violence, turn full circle between the geopolitical and the domestic.

3.4. Enforcements of gendered domination

Patriarchy in many forms being central to structures and relations of power across diverse societies, means that violence is always gendered. In addition, it is women who are disproportionately burdened in caring for members of their family and wider communities affected by colonial modern violence, whether it is inflicted through military interventions or through toxic extraction of resources and lands. Equally, across very diverse societies in the South and North, a bulk of the burden for caring for ecologies damaged by colonial modernities, can also fall on women’s shoulders, as much scholarship on feminist environmental (in)justice has shown (Garvey 2011; Fakier and Cock, 2018).

Further, it is observed that the fear of cultural annihilation amongst some colonised communities, can create such conditions that bodies of women in the communities “are subject to scrutiny and control, not those of men” (Zaragocin, 2019: 387). In the case of the Epera of Colombia and Ecuador, for instance, women choosing to marry outside their community are singularly blamed for jeopardising cultural continuity (Zaragocin, 2019). Overall, patriarchal structures operating within the communities (Zaragocin, 2019), are seen as mediating the threats to cultural wellbeing which emerge from settler-colonial policies, laws and development plans. These plans and policies routinely promote local elite and transnational interests at the expense of Indigenous and black communities in many parts of Latin America (e.g., Escobar, 2010; Reyes, 2019).

Half a millennium of such colonialism means that patriarchal structures existing in other worlds of the pluriverse are impacted by hegemonic modernity. Patriarchies across diverse ways of living are observed as having undergone changes. It is these changes that Lugones (2016) approaches as ‘coloniality of gender’, of which we outline some critical aspects below.

First, this coloniality means that modern understandings of gender are enforced upon the diverse alternative ways in which colonised peoples historically approached sexualities and genders. Central to modern understandings are the male/female categorial binary, heterosexuality as the norm, and subordination of women to men (Lugones 2007; 2010). As argued by Oyèwùmí (1997) in the context of Yorùbáland in West Africa, even the category of ‘woman’ defined on the basis of anatomy is a colonial-modern invention. Using this biological invention, ‘appropriately’ modern social roles are determined for people grouped into each category, which presuppose “the existence of “woman” as a *social category* always understood to be powerless, disadvantaged, and controlled and defined by men” (Oyèwùmí, 1997: xiii, emphasis added).

While observing this biologically driven social domination, Oyèwùmí (1997) questions the universality of modern “patriarchy as a valid transcultural category” (Lugones 2007: 196). Finding that leadership roles were not gender-specific in precolonial Yorùbá society, Oyèwùmí highlights the collusion of Yorùbá men with modern colonial powers in the ‘inferiorisation’ of Yorùbá people categorised as women. Thus Oyèwùmí, along with Lugones, sees coloniality not just as an ‘inferiorisation’ based on racial, ethnic or religious categories, but also as the simultaneous subordination of people categorised as ‘women’. Central to the latter subordination was the modern re-classification of specific social roles as feminine or masculine in many colonised worlds.

Second, coloniality of gender has tended to approach the category ‘women’ (and ‘men’) as homogeneous, thereby eliding critical differences of race, caste, class, sexuality, ethnicity, and nationality (Lugones, 2007; Spivak, 1988). This assumed and enforced homogeneity means that a dominant sub-group within each category can be presented as the norm. Within a Eurocentric ‘global’ discourse then, white middle-class heterosexual women may become the norm for all who are categorised as women. Such a normative assumption can neglect the ways in which women with other intersecting identities, experience marginalisation and violence in alternative modern societies. To be sensitive to such non-additive differences and understand compounding oppressions associated with multiple gradients of power and privilege, Crenshaw (1991) proposed the concept of ‘political intersectionality’. This concept directs attention not just to the political and economic *inclusion* of oppressed groups but also to the importance of *transforming* structures of patriarchy and masculinity alongside other structures like racism and casteism (Arya, 2020; Choo and Ferree, 2010). Analyses using the concept of intersectionality have thus been crucial in political struggles for recognition and justice (e.g., Yuval-Davis, 2006; Cho et al., 2013; Atrey, 2018). Similar analyses can help challenge the reproduction of structural inequalities in sustainability transitions (Johnson et al., 2020).

Here, if we take seriously Oyèwùmí’s point about the colonial (re)configuration of the category ‘woman’ and of gendered power structures, then racist coloniality and modern forms of patriarchy are not just two *separate* categorial gradients of power that intersect and overlap with each other to give rise to issues of political intersectionality. When considered together relationally, while attempting to undo the ontological privileging of modern categories, entanglements between patriarchy and coloniality may be approached as constituting each other from within. This means that coloniality is relationally immanent to the “section” of patriarchy, and vice versa. Even the borders of each section or category are themselves emergent from the constituting relations. We propose to view this relational constitution of categories and identities as *infrasectionality*.

The notion *infrasectionality* is an attempt to combine insights from processual understandings of ‘anticategorical’ and ‘intra-categorical complexity’ developed in the literature on intersectionality (Choo and Ferree, 2010; McCall, 2005). For transitions studies, we argue that *infrasectionality* can be useful for grappling with the relational co-constitution of racist coloniality and patriarchy in the making of (eco)modern production-consumption systems that have harmed an unimaginable diversity of worlds on Earth. By helping to reveal how immanent to any recognisable structure of power are other interrelated structures, an *infrasectional* approach can help bridge longstanding social theoretical divides between structural and relational approaches, while being sensitive to the diversity of ways in which power is enacted across spatio-temporal settings. Equally crucially, *infrasectional* analyses can help foreground how ontologically sectioned modern cultures and ‘nature’ are constituted by controlling and extractive relations (as outlined in more detail below).

3.5. Extension of controlling imaginations

A vast literature on decolonisation of knowledge highlights the magnitude of the *epistemicide* associated with the last 500 years of European colonialism. This addresses the multiple ways in which possibilities for configuring meanings have been circumscribed, hollowed out, rigidly structured and standardised by associated patterns of coloniality (Grosfoguel, 2013; Ndlovu, 2014). Prominent here are the processes, through which instrumental imaginaries of control that are directly implicated in globalising colonial modernity, have become metastasised in other areas of techno-scientific production (Stirling, 2019a).

As discussed in the foregoing outlines of dimensions of coloniality, modernised categories of gender, race, caste, class, religion, ethnicity and nationality, play central roles in the development of knowledges and materials that underpin assumptions of comprehensive ‘superiority’ and assertions of military ‘supremacy’. A crucial part of such colonial-modern formations is the assumption that critical reflection involved in philosophical thought is a preserve of the European ‘Self’ only, which denies rational agency to ‘inferiorised Others’ (Dabashi, 2015). Deploying this ‘self-affirming objectification’ of Others (Coronil, 1996), not just people but also wider socio-material assemblages can be privileged as bearers of expertise in modernities (Weheliye, 2014). Privileged assemblages across governance and (knowledge) production then are granted the legitimacy to *imagine control* over:

- a) labour of racialised peoples, firstly through the violence of colonial enslavement and indenture (Quijano, 2000; Manjapra, 2020), and then through the closing down of societal change to those development pathways that subscribe to conventional modernisation (Escobar 2018; Arora et al., 2019), and through the extraction of value from low-waged gendered labour in global value chains (Barrientos et al., 2013; Patel and Moore 2017; Escobar, 2018; Arora et al., 2019; Ghosh et al., 2021);

- b) sustainability of other-than-modern worlds, by assuming that scientific rationality is only accessible to moderns (e.g., Mignolo, 2002), while localising Indigenous cultures as sites of esoteric wisdom or traditional (ecological) knowledge in global discourses around international development or the mitigation of climate change (Smith et al., 2003; Arora, 2019).

Modern imaginations of control follow from the familiar ontology of categorial separation of cultures from 'nature', and subjects from objects. Much in the same way as the model of a well-functioning machine, controlling imaginations envisage a one-way mapping of the singularised intentions of a 'superiorised' subject, fully and perfectly (with no collateral effects), onto the outcomes experienced by an 'inferiorised' object that is denied recognition for its own agency (Stirling, 2019b). Such imaginations of control are not limited to colonial relations with Indigenous worlds. They pervade diverse academic definitions in modern societies – under which individual life-courses, destinies of national polities, styles of rationality, political arenas, technological systems, modes of production, organisational forms, the whole of 'nature', the Earth's climate and environmental challenges and entire futures can be treated as objects of control (Stirling, 2019b). It is arguably a sign of coloniality attempting to obscure appropriations of privilege in modern worlds, that these academic definitions rarely acknowledge as constitutive, the historical and ongoing experiences of colonialism (Bhambra 2007; Stirling 2019a). In this lack of acknowledgement, such definitions underpinned by control are similar to the more circumscribed conceptualisations of systems, regimes and niches in sustainability transition studies.

Unfortunately, imaginations of control is not limited to the realm of words, through definitions and conceptualisations. Under colonialism and post-colonial developmentalism, controlling imaginations materially configure relational worlds. For instance, they can manifest in attempts to restrict and direct the *flows of socio-material things* that constitute colonised people's diverse worlds of living, doing and knowing (Arora et al., 2020). These renewable flows relate people with each other, and with earth-beings that encompass and connect lands, rivers, the sun, wind, climates, soils, plants and animals (de la Cadena, 2010). In such encounters with other worlds, real-world complexities, interconnections and intractabilities routinely defy the machine model of control based on objectification (Blaser, 2009), often leading to catastrophic 'unintended' collateral effects.

While the effects of controlling imaginations may be most violently felt in other-than-modern worlds, the imaginations themselves extend beyond borders to become intrinsic to modern societies with their concentrated privileges. As with the case of infrasectionality discussed above, imaginations of control can circulate to end up constituting modern worlds from within. In this way, controlling imaginations are made immanent to modern worlds and may be viewed as an *infrastructure* of modernity (Stirling, 2019a). They permeate into the design of technologies like climate geoengineering, genome editing, space exploration, artificial intelligence, international bordering and surveillance systems (Arora et al., 2020).

If we understand worlds as vibrant *patterns of socio-material relations* spanning people's relations with each other and with ecologies, while being mediated by technologies and infrastructures (Arora and Stirling, 2021), then *infrastructural* imaginations of control are performed in widely prevalent yet easily obscured ways across modern worlds. While they may coexist with diverse other ways of relating that include care and solidarity, gendered relations of control and its more solipsistic version – domination – are pervasively brought to the fore in colonial modern worlds (Arora et al., 2020; Arora and Stirling, 2021).

In contrast to the control-manifesting patterns of relations making up modern worlds, more widely flourishing in other worlds of the pluriverse may be diverse ways of relating such as coexistence, care, 'multinaturalism', hospitality, solidarity, mutualism, spirituality, conviviality, peace, hope, egalitarianism and cooperation (Arora and Stirling, 2021; Nyamnjoh, 2017; Viveiros De Castro, 1998). In the pluriverse there is no single way to describe any identifiable way of relating. While it is crucial to recognise such differences (between worlds), it is also important that no world of the pluriverse is mapped as a neatly bordered relational pattern that is 'purely different' from other worlds (Spivak, 1992). Neat bordering and pure difference are themselves symptomatic of categorial imaginations of control, particularly if the pluriverse is approached as made and sustained over thousands of years, through *inter-cultural* circulation and *infrastructural* constitution across different worlds beyond European colonial domination (Dussel, 2013; Stirling 2019a). It may be crucial for experiments, niches and emerging regimes in sustainability transitions to care for such decolonial relations between worlds (cf. Solano-Campos, 2013; Aman, 2015), which require the dismantling of coloniality that constitutes modernity and its inexorable quest through innovation for extraction from other worlds.

3.6. Expansion of toxic extraction

Colonial fictions, fantasies and fallacies of control are entangled with upscaled processes of toxic extraction in modern worlds. These processes are materialised through the deployment of technologies like hydroelectric dams, industrial agricultures, open-pit mining and tailing dams. They constitute some of the most acute devastations wrought by modernisation of Indigenous people's socio-material worlds of living and knowing (Gómez-Barris, 2017; Baviskar, 2019; Sempértegui, 2019). Beyond Indigenous worlds, considerable attention is now directed to the continuation of violent and toxic extractive processes within emerging sustainability transitions (e.g., Alonso-Fradejas, 2021; Marin and Goya, 2021; Sovacool 2021), largely due to exploding demand for minerals such as Lithium, Cobalt and Copper for shifting energy regimes. However, the bulk of the interest in toxic extraction has been due to the threats it poses, particularly through continued exploitation of fossil fuels (including shale gas fracking) and nuclear power, to sustainability in modern worlds that have been built on the back of such extraction (Mitchell, 2009; Acosta, 2013; Ye et al., 2019).

For worlds beyond the modern, the toxicity of mass mineral extraction and industrial plantations often begins with the large-scale plunder of their land, trees and water. This goes much further than what moderns call environmental destruction. Such plunder represents "terrible and vast reduction" of "entire world[s]," as noted in 1991 by Grand Chief Matthew Come of the Grand Council of the Crees (Hellegers, 2015: 1). As much as this is about ecocide, the "vast reduction" spans (material) cultures.

While the horrifying reduction of worlds is definitely a matter of scale in terms of diminishing quantities of water and (forested)

land available for cultural reproduction, it also implies drastic changes in the patterns of diverse relations that make up Indigenous worlds (Gómez-Barris, 2017; Zaragocin, 2019). Such changes are extended as toxicity is unleashed through modern projects for mining, agro-industrial plantations, hydropower and so on, which may be established on stolen lands and which use extracted water. Large-scale mines often dump effluents to pollute water bodies and soils (e.g., Norrgren et al., 2000; Campos et al., 2011), compounding the effects of industrial and municipal waste streams and dumping grounds (Chitra, 2021). Industrial plantations routinely use inputs that can poison workers, animals and insects (Levine, 2007). Such toxicities can make ways of relating like despair, disease, fear, and militant resistance (against extractive projects), significantly more prevalent across worlds (e.g., Zaragocin, 2019; Sempértegui, 2019). Overall, the manner in which the toxic trails of extractive projects may unfold (Hellegers, 2015), can differ across settings, but socio-ecological toxicity is a consistent and common *design aspect* of extractive processes in modernity (cf. Escobar, 2018), as widely underscored by the environmental justice movement and discourses (e.g., Agyeman et al., 2002; Pellow and Park, 2002; Taylor, 2014). It does not just violently impinge on lives and worlds of peoples ‘inferiorised’ by colonial modernity, but also serves to concentrate and sustain cultural privileges of all kinds (as discussed in the second dimension: Section 3.2).

As a design aspect, toxicity moves when modern extraction is expanded beyond Indigenous worlds, to agricultural smallholdings and artisanal mines worldwide, as part of ‘global’ industrialisation programmes like the Green Revolution (GR) (Kumar et al., 2017; Sharma, 2019). In addition to promoting toxic pesticides and synthetic fertilisers, the GR in many parts of the world has required irrigation infrastructures and technologies, which have often diverted rivers while extracting groundwater. It has also promoted the development of high-yielding varieties, and later genetically modified seeds, which treat living soils as mines from which calories can be extracted. The latter may be done in the name of poverty alleviation (Cullather, 2013; AGRA, 2013), while simultaneously creating the conditions for the production of poverty by power (Roy et al., 2016). Most recently, technological promotion has shifted focus to bio-digital agriculture that combines genome editing and synthetic biology with ‘precision farming’ relying on big data, drones and artificial intelligence (Arora and van Dyck, 2021). The moral justifications used for such agricultural innovations now often lie in ‘sustainable intensification’ and ‘adaptive resilience’, while socio-ecological toxicities associated with these latest avatars of industrial agriculture are again largely left out of the picture.

4. Discussion and conclusions: coloniality and transformations

“History, despite its wrenching pain, Cannot be unlived, but if faced With courage, need not be lived again.”

- Maya Angelou (1993)

In this final section of the paper, building on our conceptualisation of the six dimensions of colonial modernity, we revisit the concept of regimes in sustainability transitions. Following this, we briefly reflect on our positionality as authors of this paper that offers an ostensibly global conceptualisation of unimaginably diverse experiences of colonial modernity. Finally, we offer some concluding remarks about decolonial transformations of modern worlds for sustainability.

Regimes are conceptualised in many different ways in the vast literature on transitions (Köhler et al., 2019). Common to these conceptualisations is the argument that a regime is formed around a specific technological configuration, involving both material development and knowledge production in that setting (Rip and Kemp, 1998). Although co-evolving with social structures in modern societies – including cultural beliefs and values, rules of capitalist markets, entrenched corporate interests, dominance in industrial networks and chains, as well as routines of regulators and policymakers at different scales (e.g., Geels, 2002; Raven et al., 2012) – regimes are held to be specific to particular bounded ‘socio-material’ (institutional and technological) configurations (Stirling, 2019c).

Relying on theories of structuration (Giddens, 1984; Sorrell, 2018), transition scholars develop the regime concept in relation to rule-sets that orientate action in particular settings (e.g., Raven et al., 2012; Geels, 2010). For instance, technological ‘regime’ shifts in 19th and 20th century North America and Europe are overwhelmingly addressed in terms of particular industrial sectors and specific countries (Stirling, 2019c). These include the historical shifts from sailing ships to steamships (Geels, 2002), from horse-driven carriages to early automobiles (Geels, 2005), from oil lamps to electric bulbs (Fouquet and Pearson, 2012), and in Dutch horticulture, from ‘Westland greenhouses’ relying on natural light and labour-intensive inputs (e.g., manure and hose or bucket irrigation) to ‘Venlo greenhouses’ with artificial heating and electric pump-driven spray systems for irrigation (Berkers and Geels, 2011). Largely missing from the conceptual development of regimes are the spatially wider and temporally deeper power relations of colonial modernity which constitute the regimes in focus. Under approaches (especially like the Multi-Level Perspective), where rules are held to drive behaviour, the preoccupation with defining *dominant rules* can mean that plural and marginal voices are side-lined not only in the ‘objects’ of research, but also in subjective processes of analysis. This is especially true in the constituting of *regimes*, but also applies where *niches* are discussed in terms that do not specifically seek to address more hegemonically deep patterns of colonial exclusion. Where researchers are themselves privileged by these same hegemonic formations, much can be missed.

Without wishing to reify any of the six dimensions of coloniality as identified above, and indeed not to further reify the concept of the regime, we hope that our discussion in these terms helps to substantiate a broader point. Whether on the basis of the six dimensions (or some contrasting framework that it helps provoke), contemporary studies of ‘sociotechnical regimes’ might involve the opening up of interpretive possibilities to examine how the focal categorial formations of rules and shifts are deeply and pervasively constituted by wider relations of colonial modernity. This does not just imply attending to the contingent colonial modern formations in which regimes and their dominant rules and shifts are constituted, but also examining our own positionalities as researchers whose more or less privileged subjectivities are formed by the colonially structured relations across space and time. Here, despite the obvious normative orientations of the present authors, we would ourselves reflect that our own positionality as researchers is also itself (obviously) shaped and bounded by these same relational formations. So what is needed in the present provisional and conditional spirit, are aims

explicitly proposed to struggle together with the resulting challenges, not to claim that any singular transcendent analytic solution has been (or indeed can be) found.

Each of the six dimensions that we have outlined above, is therefore far from being complete in its conceptualisation for sustainability transition studies. The weave formed by these overlapping and entangled dimensions is surely not *the* definitive approach to colonial modernity, which can be applied across transition analyses. Many other approaches to coloniality in transitions are obviously possible (and needed). Indeed, such pluralisation is itself essential to (albeit far from sufficient in) struggles for decolonisation. Beyond this, our own conceptual proposals are also inevitably shaped by our positionality, as male academics working in a colonially privileged location (while one of us was born and raised with middle-class and caste privilege in a former British colony). Many of the studies we have learnt from, and cited above, are biased not just towards English language publications but also often towards scholars and publishers located in the North. While we have sought to consult diverse Southern, Black, and Indigenous scholarship on many issues, these efforts can clearly be better. In the present attempt, apart from the usual time and space limitations, we have been constrained by the legacies of our own past scholarships amidst wider colonial accumulations of epistemic privileges in the North (within which we are beneficially situated).

It is crucial to conclude this paper by underscoring the many long histories of antiracist and anticolonial resistance as well as decolonial refusals of modernity (aiming to sustain the pluriverse). Resistance was already prevalent in the 16th century, for instance amongst Maya people, when Yucatán's second Spanish bishop ordered the burning of "5000 Maya sacred objects and statues and over 2500 codices (hieroglyphic texts) that contained thousands of years of history, scientific data, and cultural legacy." (Thelen, 2008: 42). Resistance was widespread in the 18th centuries, as the maroons struggled for freedom from enslavement, across plantation economies of Haiti, Jamaica, Brazil and other parts of the Americas (Diouf, 2014; Brown 2020). Subsequent abolitionist waves pervaded entire settler-colonies and European empires. The 19th and 20th century also saw the growth of many nationalist and subaltern decolonisation movements, out of which emerged not just independent nation-states but also many important critiques of racist colonial modernity, from Du Bois (1903) and Gandhi (1909) to Césaire (1950), Fanon (1961) and Head (1974). The decolonisation agenda outlined by these critiques has surely helped make full equality a partial reality. This unfinished business not only in terms of racial justice and intersectional equality but critically also the thriving of a many worlds world, requires new approaches to confront colonial modernity – approaches that can effectively support the leadership provided by decolonial social movements.

With massive opportunities and hopes offered by sustainability transformations, the imperative of facing colonial pasts and presents in order to cultivate radical solidarities, rests critically with scholars and practitioners of sustainability. In nurturing transformations, how can we reflectively contribute to struggles against the massive and pervasive structures, forces and interests constituting colonial modernities? Through our efforts, how can we help make *struggles for the flourishing of the pluriverse* and for restorative justice, less dangerous and more productive for anticolonial and decolonial social movements like Rhodes Must Fall, Black Lives Matter, Alliance for Food Sovereignty in Africa, No Dakota Access Pipeline, Niyamgiri (India), and the Quilombo and Landless Worker mobilisations in Brazil? Do such contributions require analyses and conceptualisations of regimes and niches, landscapes and (protective) spaces, structures and rules, management and strategy, as well as innovations and experiments, to themselves undergo *diverse decolonial transformations*?

By proposing the six provisional and conditional dimensions of colonial modernity in this paper, we hope to have provided a basis for taking a step or two towards such transformations – that is, to unsettle (and so perhaps help remedy) – some of the ways in which colonial modernity inherent to existing and emerging worlds can inadvertently be reproduced in transition studies.

Declaration of Competing Interest

There are no competing financial or personal interests that have influenced this research.

Data availability

All data used in this research are widely publicly available.

References

- Abraham, I. (Ed.), 2009. *South Asian Cultures of the Bomb: Atomic publics and the State in India and Pakistan*. Indiana University Press, Bloomington.
- Acosta, A., 2013. Extractivism and neo extractivism: two sides of the same curse. *Beyond Development: Alternative Visions from Latin America*, pp. 61–86. <https://doi.org/10.1017/CBO9781107415324.004>.
- Acs, Z., Varga, A., 2002. Geography, endogenous growth and innovation. *Int. Reg. Sci. Rev.* 1, 132–148.
- Adas, M., 1989. *Machines As the Measure of Men*. Cornell University Press, Ithaca.
- Adas, M., 2006. *Dominance By design: Technological imperatives and America's civilizing Mission*. The Belknap Press of Harvard University Press, Cambridge, MA.
- AGRA, 2013. *Moving from Strength to Strength*. Nairobi, Kenya.
- Agrawal, A., 1995. Dismantling the divide between indigenous and scientific knowledge. *Dev. Change*.
- Aguirre, M., 2020. The Impact of COVID-19 is All Down to Inequality. *openDemocracy*, pp. 1–13.
- Agyeman, J., Bullard, R., Evans, B., 2002. *Just sustainabilities: Development in an Unequal World*. Earthscan, London.
- Ahram, A.I., 2011. *Proxy Warriors: the Rise and Fall of State-Sponsored Militias*. Stanford University Press, Stanford.
- Alonso-Fradejas, A., 2021. Leaving no one unscathed' in sustainability transitions: the life purging agro-extractivism of corporate renewables. *J. Rural Stud.* 81, 127–138. <https://doi.org/10.1016/j.jrurstud.2020.10.001>.
- Altman, M., 2009. A behavioral-institutional model of endogenous growth and induced technical change. *J. Econ. Issue.* 43, 685–714. <https://doi.org/10.2753/JEI0021-3624430306>.

- Aman, R., 2015. Why Interculturalidad is not Interculturality: colonial remains and paradoxes in translation between indigenous social movements and supranational bodies. *Cult. Stud.* 29, 205–228. <https://doi.org/10.1080/09502386.2014.899379>.
- Amars, L., Fridahl, M., Hagemann, M., Röser, F., Linnér, B.O., 2017. The transformational potential of Nationally Appropriate Mitigation Actions in Tanzania: assessing the concept's cultural legitimacy among stakeholders in the solar energy sector. *Local Environ.* 22, 86–105. <https://doi.org/10.1080/13549839.2016.1161607>.
- Amin, S., 1976. *Unequal development: An essay On the Social Transformations of Peripheral Capitalism*. Monthly Review Press, New York.
- Andolina, R., 2012. The values of water: development cultures and indigenous cultures in highland Ecuador. *Lat. Am. Res. Rev.* 47, 3–26.
- Angelou, M., 1993. *On the Pulse of Morning*. The New York Times.
- Arias, A., 2018. From indigenous literatures to native American and indigenous theorists: the makings of a grassroots decoloniality. *Lat. Am. Res. Rev.* 53 (3), 613–626.
- Arghiri, E., 1972. *Unequal exchange: A study of the Imperialism of Trade*. Monthly Review Press, New York.
- Arora, S., 2014. Gatherings of mobility and immobility. *Transfers* 4, 8–26. <https://doi.org/10.3167/trans.2014.040103>.
- Arora, S., 2019. Admitting uncertainty, transforming engagement: towards caring practices for sustainability beyond climate change. *Reg. Environ. Change* 19, 1571–1584. <https://doi.org/10.1007/s10113-019-01528-1>.
- Arora, S., Dyck, B., Van, 2021. Refusal as radical care? Moving beyond modern industrial agriculture. *Development*. <https://doi.org/10.1057/s41301-021-00310-3>.
- Arora, S., Romijn, H.A., Caniels, M.C.J., 2014. Governed by history: institutional analysis of a contested biofuel innovation system in Tanzania. *Indus. Corp. Change* 23, 573–607. <https://doi.org/10.1093/icc/dtt017>.
- Arora, S., Stirling, A., 2020. Don't Save 'the world' – Embrace a pluriverse! [WWW Document]. STEPS Centre Blog. URL: <https://steps-centre.org/blog/dont-save-the-world-embrace-a-pluriverse/>. accessed 10.28.20.
- Arora, S., Stirling, A., 2021. Degrowth and the pluriverse: Continued Coloniality Or Intercultural revolution? STEPS Centre Blog.
- Arora, S., van Dyck, B., Sharma, D., Stirling, A., 2020. Control, care and conviviality in the politics of technology for sustainability. *Sustainab.: Sci. Pract. Policy*. <https://doi.org/10.1080/15487733.2020.1816687>.
- Arora, S., Vijayabaskar, M., Sharma, D., Stirling, A., 2019. Sustainable development through diversifying pathways in India. *Econ. Politi. Week.* LIV 32–37.
- Arya, S., 2020. Theorising gender in South Asia: dalit feminist perspectives. *CASTE: A Glob. J. Soc. Excl.* 1, 11–24.
- Atrey, S., 2018. Women's human rights: from progress to transformation, an intersectional response to Martha Nussbaum. *Hum. Rights. Q.* 40, 859–904. <https://doi.org/10.1353/hrq.2018.0048>.
- Avelino, F., Rotmans, J., 2009. Power in transition: an interdisciplinary framework to study power in relation to structural change. *Eur. J. Soc. Theory* 12 (4), 543–569. <https://doi.org/10.1080/2158379X.2021.1875307>.
- Avelino, F., 2011. *Power in transition: Empowering discourses On Sustainability Transitions*. Erasmus University, Rotterdam.
- Avila, S., 2018. Environmental justice and the expanding geography of wind power conflicts. *Sustainab. Sci.* 13, 599–616.
- Awehali, B. (Ed.), 2007. *Tipping the Sacred Cow*. AK Press, Oakland.
- Baldwin, J., 2010. *As much truth as one can bear. The Cross of Redemption: Uncollected Writings*. Pantheon Books.
- Baptista, I., 2018. Space and energy transitions in sub-Saharan Africa: understated historical connections. *Energy Res. Soc. Sci.* 36, 30–35. <https://doi.org/10.1016/j.erss.2017.09.029>.
- Barrientos, S., Kothari, U., Phillips, N., 2013. Dynamics of unfree labour in the contemporary global economy. *J. Develop. Stud.* 49, 1037–1041. <https://doi.org/10.1080/00220388.2013.780043>.
- Baviskar, A., 2019. Nation's body, river's pulse: narratives of anti-dam politics in India. *Thes. Elev.* 150, 26–41. <https://doi.org/10.1177/0725513618822417>.
- Berkers, E., Geels, F.W., 2011. System innovation through stepwise reconfiguration: the case of technological transitions in Dutch greenhouse horticulture (1930–1980). *Technol. Anal. Strateg. Manag.* 23, 227–247. <https://doi.org/10.1080/09537325.2011.550392>.
- Berman, M., 1982. *All That Is solid Melts into air: The experience of Modernity*. Penguin Books, London.
- Bhabha, H.K., 1994. *The Location of Culture*. Routledge, London.
- Bhambra, G.K., 2007. *Rethinking modernity: Postcolonialism and the Sociological Imagination*. Palgrave Macmillan, Basingstoke.
- Bilgrami, A., 1998. Nehruvian modernity and its contradictions. *Econ. Polit. Wkly.* 33 (32), 2168–2172.
- Blaser, M., 2009. The Threat of the Yrmo: the political ontology of a sustainable hunting program. *Am. Anthropol.* 111, 10–20.
- Boahen, A.A. (Ed.), 1985. *General History of Africa - VII: Africa under Colonial Domination*. UNESCO and Heinemann, Paris.
- Bourdieu, P., 1990. *The Logic of Practice*. Stanford University Press, Redwood City.
- Bowman, K.S., 2002. *Militarization, Democracy, and Development: the Perils of Praetorianism in Latin America*. University of Pennsylvania Press, University Park.
- Brown, V., 2020. *Tacky's revolt: The story of an Atlantic slave War*. Harvard University Press, Cambridge, MA.
- Campos, M.B., de Azevedo, H., Nascimento, M.R.L., Roque, C.V., Rodgher, S., 2011. Environmental assessment of water from a uranium mine (Caldas, Minas Gerais State, Brazil) in a decommissioning operation. *Environ. Earth Sci.* 62, 857–863. <https://doi.org/10.1007/s12665-010-0572-9>.
- Cardoso, F., Faletto, E., 1979. *Dependency and Development in Latin America*. University of California Press, Berkeley, CA.
- Ceyhan, A., Tsoukala, A., 2002. The securitization of migration in Western societies: ambivalent discourses and policies. *Alternatives* 27, 21–39.
- Césaire, A., 1950. *Discourse On Colonialism*. New York University Press, New York.
- Cháirez-Garza, J.F., Gergan, M.D., Ranganathan, M., Vasudevan, P., 2022. Introduction to the special issue: rethinking difference in India through racialization. *Ethn. Racial Stud.* 45, 193–215. <https://doi.org/10.1080/01419870.2021.1977368>.
- Chakrabarty, D., 2002. *Habitations of Modernity*. The University of Chicago Press, Chicago.
- Chakrabarty, D., 2000. *Provincialising Europe: Postcolonial thought and Historical Difference*. Princeton University Press, Princeton, NJ.
- Cherry, M., 2021. *The Case for Rage: Why Anger is Essential to Anti-racist Struggle*. Oxford University Press, Oxford.
- Chitra, V., 2021. Waste's translations: estuaries, marine life, and the chemistry of Mumbai's dumping grounds. *Am. Ethnol.* 48, 337–356.
- Cho, S., Crenshaw, K.W., McCall, L., 2013. Intersectionality has emerged. *Sign.: J. Women Cult. Soc.* 38, 785–810.
- Chomsky, N., 2002. *Pirates an Emperors, Old and New: International Terrorism in the Real World*. Pluto Press, London.
- Choo, H., Ferree, M., 2010. Practicing intersectionality in sociological research: a critical analysis of inclusions, interactions, and institutions in the study of inequalities. *Sociol. Theory* 28, 129–149.
- Churchill, W., 1997. *A Little Matter of Genocide: Holocaust and Denial in the Americas 1492 to the Present*. City Lights, San Francisco.
- Churchill, W., 2002. *Struggle For the Land: Native North American resistance to genocide, Ecocide and Colonization*. City Lights, San Francisco.
- Cleghorn, S., 1943. *War is the enemy*. Fellowship, 9, 176.
- Coronil, F., 1996. Beyond Occidentalism: toward nonimperial geohistorical categories. *Cultur. Anthropol.* 11, 51–87.
- Coughlin, C., 2016. Freed from Its EU shackles, Britain can Reclaim Its Status As a Major World Power. *Daily Telegraph*.
- Crenshaw, K., 1991. Mapping the margins: intersectionality, identity politics, and violence against women of color. *Stanford Law Rev.* 43, 1241–1299.
- Crystal, D., 2000. *Language Death*. Cambridge University Press, Cambridge, UK.
- Cubillos, J., Quintero, H., Perea, J., 2022. Extractive logic of coloniality of nature: feeling-thinking through agroecology as a decolonial project. *Capital. Nat. Social.* <https://doi.org/10.1080/10455752.2022.2127416>.
- Cullather, N., 2013. *The Hungry world: America's Cold War battle Against Poverty in Asia*. Harvard University Press, Cambridge, MA.
- Dabashi, H., 2015. *Can Non-Europeans think?* Zed Books, London.
- de la Cadena, M., 2010. Indigenous cosmopolitics in the Andes: conceptual reflections beyond "politics. *Cultur. Anthropol.* 25 (2), 334–370.
- de la Cadena, M., Blaser, M., 2018. *A World of Many Worlds*. Duke University Press, Durham.
- de Sousa Santos, B., 2007. Beyond abyssal thinking: from global lines to ecologies of knowledges. *Rev. - Fernand Braudel Center Stud. Econ. Hist. Syst. Civiliz.* 30, 45–89.
- Delbourgo, J., Dew, N., 2006. *Science and Empire in the Atlantic world*. Routledge, New York.

- Deloria, P., Lomawaima, T., Brayboy, M., Trahan, M., Ghiglione, L., Medin, D., Blackhawk, N., 2018. Unfolding futures: indigenous ways of knowing for the Twenty-first century. *Daedalus* 147 (2), 6–17.
- Diouf, S.A., 2014. *Slavery's exiles: the Story of the American Maroons*. New York University Press, New York.
- Dirks, N., 2001. *Castes of mind: Colonialism and the Making of Modern India*. Princeton University Press, Princeton, NJ.
- Dorning, C., Hornborg, A., Abson, D.J., Wehrden, H.Von, Schaffartzik, A., Giljum, S., Engler, J., Feller, R.L., Hubacek, K., 2021. Global patterns of ecologically unequal exchange: implications for sustainability in the 21st century. *Ecol. Econ.* 179, 106824 <https://doi.org/10.1016/j.ecolecon.2020.106824>.
- Doyon, A., Boron, J., Williams, S., 2021. Unsettling transitions: representing Indigenous peoples and knowledge in transitions research. *Energy Res. Soc. Sci.* 81 <https://doi.org/10.1016/j.erss.2021.102255>.
- Du Bois, W.E., 1903. *The souls of black folk*. Project Gutenberg ebook.
- Dunbar-Ortiz, R., Gilio-Whitaker, D., 2016. "All the Real Indians died off": And 20 Other Myths About Native Americans. Beacon Press, Boston, MA.
- Dunlap, A., 2018. The 'solution' is now the 'problem': wind energy, colonisation and the "genocide-ecocide nexus" in the Isthmus of Tehuantepec, Oaxaca. *Int. J. Hum. Right.* ISSN 22, 550–573. <https://doi.org/10.1080/13642987.2017.1397633>.
- Dussel, E., 2000. Europe, modernity, and eurocentrism. *Nepantla: View. South* 1, 465–478.
- Dussel, E., 2013. Agenda for a South-South philosophical dialogue. *Hum. Arch. J. Sociol. Self Knowl.* 11.
- Edgerton, D., 2006. *Warfare State: Britain, 1920-1970*. Cambridge Univ Press, Cambridge.
- Ejército Zapatista de Liberación Nacional /Zapatista Army of National Liberation, E., 1996. Fourth Declaration of the Lacandona Jungle.
- Emirbayer, M., 1997. Manifesto for a relational sociology. *Am. J. Sociol.* 103 (2), 281–317.
- Escobar, A., 2005. An ecology of difference: a Latin American approach to sustainability. Presentation For a Panel on Ecological Threats and New Promises of Sustainability. Oxford University, 3-5 July.
- Escobar, A., 2010. Latin America at a crossroads: alternative modernizations, post-liberalism, or post-development? *Cultur. Stud.* <https://doi.org/10.1080/09502380903424208>.
- Escobar, A., 2018. *Designs For the Pluriverse: Radical Interdependence, Autonomy, and the Making of Worlds*. Duke University Press, Durham.
- Estes, N., 2018. *Our History Is the Future*. Verso, London.
- Fakier, K., Cock, J., 2018. Eco-feminist organizing in South Africa: reflections on the Feminist table. *Capital. Nat. Social.* 29, 40–57. <https://doi.org/10.1080/10455752.2017.1421980>.
- Fanon, F., 1961. *The Wretched of the Earth*. Grove, New York.
- Feola, G., 2019. Capitalism in sustainability transitions research: time for a critical turn? *Environ. Innov. Societ. Transit.* 0–1. <https://doi.org/10.1016/j.eist.2019.02.005>.
- Figueroa Helland, L., Lindgren, T., 2016. What goes around comes around: from the coloniality of power to the crisis of civilization. *J. World-Syst. Res.* 22, 430–462. <https://doi.org/10.5195/JWSR.1>.
- Foray, D. (Ed.), 2009. *The New Economics of Technology Policy*. Elgar, Cheltenham. <https://doi.org/10.4337/9781848449169>.
- Fouquet, R., Pearson, P.J.G., 2012. Past and prospective energy transitions: insights from history. *Energy Policy* 50, 1–7. <https://doi.org/10.1016/j.enpol.2012.08.014>.
- Friedman, J. (Ed.), 2003. *Globalization, the State, and Violence*. Altamira Press, Walnut Creek, CA.
- Fry, M.P., Keatinge, N.P., Rotblat, J. (Eds.), 1990. *Nuclear Non-Proliferation: and the Non-Proliferation Treaty*. Springer, Berlin.
- Gandhi, M.K., 1909. *Hind Swaraj and Other Writings*. Cambridge University Press, Cambridge, UK.
- Gaonkar, D., 2001. *Alternative Modernities*. Duke University Press, Durham, NC.
- Garvey, M., 2011. Toward "global feminist environmental justice. *Femin. Format.* 23 (2), 216–223.
- Geels, F., 2005. *Technological Transitions and System Innovations: a Co-Evolutionary and Socio-Technical Analysis*. Edward Elgar, Cheltenham, UK; Northampton, MA.
- Geels, F.W., 2002. Technological transitions as evolutionary reconfiguration processes: a multi-level perspective and a case-study. *Res. Policy* 31, 1257–1274. [https://doi.org/10.1016/S0048-7333\(02\)00062-8](https://doi.org/10.1016/S0048-7333(02)00062-8).
- Geels, F.W., 2010. Ontologies, socio-technical transitions (to sustainability), and the multi-level perspective. *Res. Policy* 39, 495–510. <https://doi.org/10.1016/j.respol.2010.01.022>.
- Gerson, J., 2007. *Empire and the Bomb: How the US Uses Nuclear Weapons to Dominate the World*. Pluto Press, London.
- Ghosh, B., Ramos-Mejía, M., Machado Carvalho, R., Yuana, S.L., Schiller, K., 2021. Decolonising transitions in the Global South: towards more epistemic diversity in transitions research. *Environ. Innov. Societ. Transit.* <https://doi.org/10.1016/j.eist.2021.10.029>.
- Ghosh, B., Schot, J., 2019. Towards a novel regime change framework: studying mobility transitions in public transport regimes in an Indian megacity. *Energy Res. Soc. Sci.* 51, 82–95. <https://doi.org/10.1016/j.erss.2018.12.001>.
- Giddens, A., 1984. *The Constitution of society: Outline of a Theory of Structuration*. Polity Press, Cambridge.
- Glissant, E., 2010. *Poetics of Relation*. The University of Michigan Press, Ann Arbor.
- Global Witness, 2016. *Defenders of the Earth: Global Killings of Land and Environmental Defenders in 2016*. London.
- Gómez-Barris, M., 2017. *The Extractive zone : Social Ecologies and Decolonial Perspectives*. Duke University Press, Durham, NC.
- Gonzalez, R.J., Gusterson, H., Houtman, G. (Eds.), 2019. *Militarization: a Reader*. Duke Univ, Durham.
- Grosfoguel, R., 2013. The structure of knowledge in Westernized universities: epistemic racism/sexism and the four genocides of the long 16th century. *Hum. Arch. J. Sociol. Self-Knowl.* 11, 73–90.
- Grosfoguel, R., Cervantes-Rodriguez, A.M (Eds.), 2002. *The Modern /Colonial / Capitalist World-System in the Twentieth Century: Global processes, Antisystemic Movements and the Geopolitics of Knowledge*. Greenwood Press, Westport CT.
- Gummett, P., 1990. Issues for STS raised by defence science and technology policy. *Soc. Stud. Sci.* 20, 541–558. <https://doi.org/10.1177/030631290020003007>.
- Gunder Frank, A., 1978. *World accumulation: 1492-1789*. Algora Publishing, New York.
- Gupte, J., Justino, P., Tranchant, J.-P., 2014. Households amid urban riots: the economic consequences of civil violence in India. *J. Confl. Resolut.* 58, 1445–1473. <https://doi.org/10.1177/0022002714547886>.
- Guthman, J., 2011. *Weighing in: obesity, Food justice, and the Limits of Capitalism*. University of California Press.
- Hadden, R.W., 1997. *Sociological Theory: An Introduction to the Classical Tradition*. Broadview Press, Ontario.
- Hall, C., Draper, N., McClelland, K., Donington, K., Lang, R., 2014. *Legacies of British slave-ownership: Colonial slavery and the Formation of Victorian Britain*. Cambridge University Press, Cambridge, UK.
- Hall, P.A., Soskice, D. (Eds.), 2001. *Varieties of Capitalism: the Institutional Foundations of Comparative Advantage*. Oxford Univ Press, Oxford.
- Hansen, U., Nygaard, I., Romijn, H., Wiecek, A., Kamp, L., Klerkx, L., 2018. Sustainability transitions in developing countries: stocktaking, new contributions and a research agenda. *Environ. Sci. Policy* 84, 198–203. <https://doi.org/10.1016/j.envsci.2017.11.009>.
- Haraway, D., 1991. *Simians, Cyborgs and Women*. Routledge, New York.
- Havik, P.J., Pinto Janeiro, H., Aires Oliveira, P., Pimentel, I., 2019. Empires and colonial incarceration in the Twentieth century. *J. Imper. Commonw. Hist.* 47, 201–212. <https://doi.org/10.1080/03086534.2019.1605696>.
- Head, L., 1974. *A Question of Power*. Penguin Books.
- Headrick, D.R., 2010. *Power Over peoples: Technology, environments, and Western imperialism, 1400 to the Present*. Princeton University Press, Princeton, NJ.
- Hellegers, D., 2015. From Poisson road to poison road mapping the toxic trail of windigo capital in linda hogan's solar storms. *Stud. Am. India. Literat.* 27, 1–28. <https://doi.org/10.5250/studamerindilite.27.2.0001>.
- Hickel, J., 2015. Enough of Aid – Let's Talk Reparations. *The Guardian*.
- Hickel, J., 2018. How Britain stole \$45 Trillion from India. *Al Jazeera*, 19 Dec.

- Hickel, J., Sullivan, D., Zoomkawala, H., 2021. Plunder in the post-colonial era : quantifying drain from the global south through unequal exchange, 1960 –2018 Plunder in the post-colonial era : quantifying drain from the. *New Politi. Econ.* 26, 1030–1047. <https://doi.org/10.1080/13563467.2021.1899153>.
- Hopkins, D., 2016. In: Brahm, F., Rosenhaft, E. (Eds.), *Slavery Hinterland: Transatlantic Slavery and Continental Europe, 1680-1850*. Boydell & Brewer, pp. 133–160. <https://doi.org/10.1017/9781782047032.007>.
- Hopkins, D., Kester, J., Meelen, T., Schwanen, T., 2020. Not more but different: a comment on the transitions research agenda. *Environ. Innov. Societ. Transit.* 34, 4–6. <https://doi.org/10.1016/j.eist.2019.11.008>.
- Jabary Salamanca, O., 2016. Assembling the fabric of life: when settler colonialism becomes development. *J. Palest. Stud.* 45, 64–80. <https://doi.org/10.1525/jps.2016.45.4.64>.
- Jahn, B., 2005. Barbarian thoughts: imperialism in the philosophy of John Stuart Mill. *Rev. Int. Stud.* 31 (3), 599–618.
- Jessop, B., 1996. Interpretive sociology and the dialectic of structure and agency. *Theory Cult. Soc.* 13 (1), 119–128.
- Johnson, O., Han, J., Knight, A., Mortensen, S., Aung, M., Boyland, M., Resurrección, B., 2020. Intersectionality and energy transitions: a review of gender, social equity and low-carbon energy. *Energy Res. Soc. Sci.* 70, 101774.
- Johnstone, P., Mcleish, C., 2020. World wars and the age of oil: exploring directionality in deep energy transitions. *Energy Res. Soc. Sci.* 69, 101732 <https://doi.org/10.1016/j.erss.2020.101732>.
- Johnstone, P., Stirling, A., 2020b. Comparing nuclear trajectories in Germany and the United Kingdom: From regimes to democracies in sociotechnical transitions and discontinuities. *Energy Research & Social Science* 59, 101245.
- Johnstone, P., Stirling, A., 2020a. Beyond and beneath megaprojects: exploring submerged drivers of nuclear infrastructures. *Journal of Mega Infrastructure & Sustainable Development* 2 (2), 220–241.
- Kapoor, I., 2008. *The Postcolonial Politics of Development*. Routledge, London.
- Kemp, R., 1994. Technology and the transition to environmental sustainability: the problem of technological regime shifts. *Futures* 26, 1023–1046. [https://doi.org/10.1016/0016-3287\(94\)90071-X](https://doi.org/10.1016/0016-3287(94)90071-X).
- Köhler, J., Geels, F.W., Kern, F., Markard, J., Onsongo, E., Wiecezorek, A., Alkemade, F., Avelino, F., Bergeck, A., Boons, F., Fünfschilling, L., Hess, D., Holtz, G., Hyysalo, S., Jenkins, K., Kivimaa, P., Martiskainen, M., McMeekin, A., Mühlemeier, M.S., Nykvist, B., Pel, B., Raven, R., Rohrachter, H., Sandén, B., Schot, J., Sovacool, B., Turnheim, B., Welch, D., Wells, P., 2019. An agenda for sustainability transitions research: state of the art and future directions. *Environ. Innov. Societ. Transit.* 31, 1–32. <https://doi.org/10.1016/j.eist.2019.01.004>.
- Kumar, P., Lorek, T., Olsson, T.C., Sackley, N., Schmalzer, S., Laveaga, G.S., 2017. Roundtable: new narratives of the green revolution. *Agric. Hist.* 91, 397–422. <https://doi.org/10.3098/ah.2017.091.3.397>.
- LaDuke, W., Cruz, S., 2013. *The Militarization of Indian Country*. MSU Press.
- Larbi, M., Kellett, J., Palazzo, E., 2021. Urban sustainability transitions in the Global South: a case study of Curitiba and Accra. *Urban Forum*. <https://doi.org/10.1007/s12132-021-09438-4>.
- Latour, B., 1999. *Factures/fractures: from the concept of network to the concept of attachment*. *Res: Anthropol. Aesthet.* 36, 20–31.
- Laterza, V., Sharp, J., 2017. Extraction and beyond: people’s economic responses to restructuring in southern and central Africa. *Rev. Afr. Pol. Econ.* 44, 173–188. <https://doi.org/10.1080/03056244.2017.1345540>.
- Latour, B., 1993. *We Have Never Been Modern*. Harvard University Press, Cambridge, MA.
- Law, J., 2015. What’s wrong with a one-world world? *Distinktion* 16, 126–139. <https://doi.org/10.1080/1600910X.2015.1020066>.
- Lawhon, M., Murphy, J.T., 2012. Socio-technical regimes and sustainability transitions: insights from political ecology. *Prog. Hum. Geogr.* 36, 354–378. <https://doi.org/10.1177/0309132511427960>.
- Leach, M., Scoones, I., Stirling, A., 2010. Dynamic Sustainabilities: Technology, Environment, Social Justice, Dynamic Sustainabilities: Technology, Environment, Social Justice. Earthscan, London. <https://doi.org/10.4324/9781849775069>.
- Lélé, S.M., 1991. Sustainable development: a critical review. *World Dev.* 19, 607–621. <https://doi.org/10.4324/9780429493744>.
- Lennon, M., 2021. Energy transitions in a time of intersecting precarities: from reductive environmentalism to antiracist praxis. *Energy Res. Soc. Sci.* 73, 101930 <https://doi.org/10.1016/j.erss.2021.101930>.
- Lennon, M., 2017. Energy research & social science decolonizing energy : black lives matter and technoscientific expertise amid solar transitions. *Energy Res. Soc. Sci.* 30, 18–27. <https://doi.org/10.1016/j.erss.2017.06.002>.
- Lentin, A., 2008. Europe and the silence about race. *Eur. J. Soc. Theory* 11, 487–503. <https://doi.org/10.1177/1368431008097008>.
- Levine, M.J., 2007. *Pesticides: A toxic Time Bomb in Our Midst*. Praeger Publishers, Westport CT.
- Lugones, M., 2007. Heterosexualism and the colonial /modern gender system. *Hypatia* 22, 186–209. <https://doi.org/10.1353/hyp.2006.0067>.
- Lugones, M., 2016. The Coloniality of Gender. The Palgrave Handbook of Gender and Development, pp. 13–33. https://doi.org/10.1007/978-1-137-38273-3_2.
- Maerli, M.B., Lodgaard, S. (Eds.), 2007. *Nuclear Proliferation and International Security*. Routledge, London.
- Mamdani, M., 2020. *Neither Settler Nor native: The making and Unmaking of Permanent Minorities*. The Belknap Press, Cambridge, MA.
- Mamdani, M., 2012. *Define and rule: Native as Political Identity*. Harvard University Press, Cambridge, MA.
- Mamdani, M., 2001. *When Victims Become killers: Colonialism, nativism, and the Genocide in Rwanda*. Princeton University Press, Princeton, NJ.
- Mamdani, M., 1996. *Citizen and subject: Contemporary Africa and the Legacy of Late Colonialism*. Princeton University Press, Princeton, NJ.
- Mbembe, A., 2003. *Necropolitics*. Public Cult. 15, 11–40.
- Manjappa, K., 2020. *Colonialism in Global Perspective*. Cambridge University Press, Cambridge, UK.
- Marín, A., Goya, D., 2021. Mining—The dark side of the energy transition. *Environ. Innov. Societ. Transit.* 41, 86–88. <https://doi.org/10.1016/j.eist.2021.09.011>.
- McCall, L., 2005. The complexity of intersectionality. *Signs J. Women Cult. Soc.* 30, 1771–1800.
- Meadowcroft, J., 2009. What about the politics? Sustainable development, transition management, and long term energy transitions. *Policy Sci.* 42, 323–340. <https://doi.org/10.1007/s11077-009-9097-z>.
- Mehta, L., Allouche, J., Nicol, A., Walnycki, A., 2014. Global environmental justice and the right to water: the case of peri-urban Cochabamba and Delhi. *Geoforum* 54, 158–166.
- Mentinis, M., 2006. *Zapatistas: the Chiapas revolt and What it Means for Radical Politics*. Pluto Press, London.
- Mignolo, W., 2002. The enduring enchantment: (Or the epistemic privilege of modernity and where to go from here). *South Atlant. Q.* 101, 927–954. <https://doi.org/10.1215/00382876-101-4-927>.
- Milanovic, B., 2012. *Global Income Inequality by the Numbers: in History and Now*. An Overview, World Bank Policy Research Working Paper, p. 6259.
- Milanovic, B., 2016. *Global Inequality: a New Approach For the Age of Globalization*. The Belknap Press of Harvard University Press, Cambridge, MA.
- Mitchell, T., 2009. Carbon democracy. *Econ. Soc.* 38, 399–432. <https://doi.org/10.1080/03085140903020598>.
- Mlambo, V., 2020. Externalization and securitization as policy responses to African migration to the European Union. *Afr. Hum. Mobil. Rev.* 6 (3), 94–109.
- Mookerjee, S., 2019. Renewable energy transition under multiple colonialisms: passive revolution, fascism redux and utopian praxes. *Cultur. Stud.* 33, 570–593. <https://doi.org/10.1080/09502386.2019.1585464>.
- Morrock, R., 1973. Heritage of strife: the effects of colonialist “divide and rule” strategy upon the colonized peoples. *Sci. Soc.* 37, 129–151.
- Mukherjee, A., 2010. Empire: how colonial India made modern Britain. *Econ. Polit. Wkly.* 45, 73–82.
- Muradian, R., Martinez-Alier, J., 2001. South-north material flows: history and environmental repercussions innovation. *Eur. J. Soc. Sci. Res.* 14, 171–187.
- Nandy, A., 1989. *Science, Hegemony and Violence: A requiem For Modernity*. Oxford University Press.
- Ndlovu, M., 2014. Why indigenous knowledges in the 21st century? A decolonial turn. *Yesterday Today* 11, 84–98.
- Ndlovu-Gatsheni, S.J., 2018. A world without others? Specter of difference and toxic identitarian politics. *Int. J. Criti. Divers. Stud.* 1, 80–96. <https://doi.org/10.13169/intcritdivstud.1.1.0080>.
- Newell, P., Phillips, J., 2016. Neoliberal energy transitions in the South: Kenyan experiences. *Geoforum* 74, 39–48. <https://doi.org/10.1016/j.geoforum.2016.05.009>.
- Njoku, E., 2022. The state and the securitization of civil society organizations in Nigeria. *Nonprofit. Volunt. Sect. Q* 51, 190–215.

- Nirmal, P., 2017. Disembodiment and deworlding: Taking decolonial Feminist Political Ecology to Ground in Attappady, Kerala. Clark University, Worcester, Massachusetts.
- Nirmal, P., Rocheleau, D., 2019. Decolonizing degrowth in the post-development convergence: questions, experiences, and proposals from two Indigenous territories. *Environ. Plann. E: Nat. Space* 2, 465–492. <https://doi.org/10.1177/2514848618819478>.
- Norrgrén, L., Pettersson, U., Örn, S., Bergqvist, P.-A., 2000. Environmental monitoring of the Kafue River, located in the Copperbelt, Zambia. *Arch. Environ. Contam. Toxicol.* 38, 334–341. <https://doi.org/10.1007/s002449910044>.
- Nwakanma, A.P., 2022. From black lives matter to EndSARS: women's sociopolitical power and the transnational movement for black lives. *Perspect. Polit.* <https://doi.org/10.1017/S1537592722000019>.
- Nyamnjoh, F.B., 2017. Incompleteness: frontier Africa and the currency of conviviality. *J. Asian Afr. Stud.* 52, 253–270. <https://doi.org/10.1177/0021909615580867>.
- Ocalan, A., 2017. *The Political Thought of Abdullah Ocalan; Kurdistan Women's Revolution; Democratic Confederalism*. Pluto Press, London.
- OECD, 2021. *Research and Development Statistics: R-D Expenditure By Sector of Performance and Type*. OECD Science, Technology and R&D Statistics (database), Paris.
- Oyewùmí, O., 1997. *The Invention of women: Making an African sense of Western gender Discourses*. University of Minnesota Press, Minneapolis, MN.
- Parrish, S., 2006. *American curiosity: Cultures of Natural History in the Colonial British Atlantic World*. The University of North Carolina Press.
- Parthasarathi, P., 2011. *Why Europe grew Rich and Asia did not: Global economic Divergence*. Cambridge University Press, Cambridge, pp. 1600–1850. <https://doi.org/10.1017/CBO9780511993398>.
- Patel, R., 2021. Agroecology is the solution to world hunger. *Sci. Am.* November.
- Patel, R., Moore, J.W., 2017. *A History of the World in Seven Cheap Things*. University of California Press.
- Patnaik, U., 2018. Revisiting the “drain”, or transfer from India to Britain in the context of global diffusion of capitalism. In: Chakrabarti, S., Patnaik, Utsa (Eds.), *Agrarian and Other Histories: Essays for Binay Bhushan Chaudhuri*. Tulika Books, pp. 277–317.
- Pel, B., Haxeltine, A., Avelino, F., Dumitru, A., Kemp, R., Bauler, T., Kunze, I., Dorland, J., Wittmayer, J., Jørgensen, M.S., 2020. Towards a theory of transformative social innovation: a relational framework and 12 propositions. *Res Policy* 49, 104080. <https://doi.org/10.1016/j.respol.2020.104080>.
- Pellow, D.N., Park, L.S.-H., 2002. *The Silicon Valley of Dreams: Environmental injustice, Immigrant workers, and the High-Tech Global Economy*. New York University Press, New York.
- Perkins, P., 2019. Climate justice, commons, and degrowth. *Ecol. Econ.* 160, 183–190. <https://doi.org/10.1016/j.ecolecon.2019.02.005>.
- Prebisch, R., 1950. The economic development of Latin America and its principal problems.
- Pyndiah, G., 2016. Decolonizing creole on the Mauritius islands. *Island Stud. J.* 11, 485–504.
- Quijano, A., 2000. Coloniality of power, ethnocentrism, and Latin America. *Nepantla* 1, 533–580.
- Quijano, A., 2007. Coloniality and modernity/rationality. *Cultur. Stud.* 21, 168–178. <https://doi.org/10.1080/09502380601164353>.
- Raj, K., 2013. Beyond postcolonialism ... and postpositivism: circulation and the global history of science. *ISIS* 104, 337–347. <https://doi.org/10.1086/670951>.
- Raven, R., Schot, J., Berkhout, F., 2012. Space and scale in socio-technical transitions. *Environ. Innov. Societ. Transit.* 4, 63–78. <https://doi.org/10.1016/j.eist.2012.08.001>.
- Reyes, C.E.H., 2019. Black women's struggles against extractivism, land dispossession, and marginalization in Colombia. *Lat. Am. Perspect.* 46, 217–234. <https://doi.org/10.1177/0094582X19828758>.
- Rip, A., Kemp, R., 1998. Technological change. In: Rayner, S., Malone, E.L. (Eds.), *Human Choice and Climate Change: An International Assessment*. Batelle Press, Columbus, pp. 327–399.
- Ritchie, N., 2009. *Nuclear Weapons Policy After the Cold War: Russians, “rogues” and Domestic Division*. Routledge, London.
- Ritzer, G. (Ed.), 2000. *Encyclopedia of Social Theory - Volume I & II*. New Delhi, India.
- Rodney, W., 1973. *How Europe underdeveloped Africa*. Tanzania Publishing House, Dar-es-Salaam.
- Romijn, H.A., Camiñé, M.C.J., 2011. The Jatropha biofuels sector in Tanzania 2005-2009: evolution towards sustainability? *Res. Policy* 40, 618–636. <https://doi.org/10.1016/j.respol.2011.01.005>.
- Roy, A., Negrón-Gonzales, G., Opoku-Agyemang, K., Talwalker, C., 2016. *Encountering poverty: Thinking and Acting in an Unequal World*. University of California Press, Oakland, CA.
- Sahu, A., 2019. The democratic securitization of climate change in India. *Asian Polit. Policy* 11, 438–460.
- Santana, C.H.V., Ferrario, M.N., 2022. Middle classes and the rise of authoritarian populist rulers: a comparison between contemporary Brazil and India. In: *Virtual Congress of the Latin American Studies Association (LASA)*, pp. 1–46.
- Satia, P., 2014. Drones: a history from the British Middle East. *Humanity* 5, 1–31. <https://doi.org/10.1353/hum.2014.0002>.
- Scahill, J., 2007. *Blackwater: the Rise of the World's Most Powerful Mercenary Army*. Nation Books, New York.
- Schell, J., 1984. *The Abolitions*. Knopf, New York.
- Schulte Nordholt, H., 2018. *Cultural Citizenship and Modernity in the Netherlands Indies*. Oxford Research Encyclopedia of Asian History. Oxford University Press, pp. 1–22.
- Scoones, I., Newell, P., Leach, M., 2015. *The Politics of Green Transformations*. Earthscan Routledge, London.
- Scott, J.C., 1998. *Seeing Like a state: How certain Schemes to Improve the Human Condition Have Failed*. Yale University Press, New Haven, CT.
- Scrace, T.J., 2003. Precarious production: globalisation and artisan labour in the Third World. *Third World Q.* 24, 449–461. <https://doi.org/10.1080/0143659032000084401>.
- Sempértegui, A., 2019. Indigenous women's activism, ecofeminism and extractivism: partial connections in the Ecuadorian Amazon. *Polit. Gen.* 17, 197–224.
- Sharma, D., 2019. *What is Revolutionary About the Green Revolution?* [WWW Document]. IDS Opinion.
- Sheller, M., 2015. Racialized mobility transitions in philadelphia: connecting urban sustainability and transport justice. *City Soc.* 27, 70–91. <https://doi.org/10.1111/ciso.12049>.
- Shove, E., Walker, G., 2007. CAUTION! Transitions ahead: politics, practice, and sustainable transition management. *Environ. Plan. A.* 39, 763–770. <https://doi.org/10.1068/a39310>.
- Simbao, R., 2017. Situating Africa: an alter-geopolitics of knowledge, or Chapungu rises. *Afr. Art.* 50 (2), 1–8.
- Simons, G.F., 2019. Two centuries of spreading language loss. In: *Proceedings of the Linguistic Society of America*, 4, p. 27. <https://doi.org/10.3765/plsa.v4i1.4532>.
- Simpson, A., 2014. *Mohawk interrupts: Political Life Across the Borders of Settler States*. Duke University Press, Durham, NC.
- SIPRI, 2016. *SIPRI Yearbook 2016 - Armaments, Disarmament and International Security: Summary*.
- Sivaramakrishnan, K., Agrawal, A., 2003. *Regional Modernities: The Cultural Politics of Development in India*. Stanford University Press.
- Skinner, D., 2006. Racialized futures: biologism and the changing politics of identity. *Soc. Stud. Sci.* 36, 459–488. <https://doi.org/10.1177/0306312706054859>.
- Smith, A., Raven, R., 2012. What is protective space? Reconsidering niches in transitions to sustainability. *Res. Policy* 41, 1025–1036. <https://doi.org/10.1016/j.respol.2011.12.012>.
- Smith, J.B., Klein, R.J.T., Huq, S. (Eds.), 2003. *Climate Change, Adaptive Capacity and Development*. Imperial College Press, London.
- Solano-Campos, A.T., 2013. Bringing Latin America's “Interculturalidad” into the Conversation. *J. Intercultur. Stud.* 34, 620–630. <https://doi.org/10.1080/07256868.2013.807231>.
- Sorrell, S., 2018. Explaining sociotechnical transitions: a critical realist perspective. *Res. Policy* 47, 1267–1282. <https://doi.org/10.1016/j.respol.2018.04.008>.
- Sovacool, B.K., 2021. When subterranean slavery supports sustainability transitions? Power, patriarchy, and child labor in artisanal Congolese cobalt mining. *Extract. Indus. Soc.* 8, 271–293.
- Sovacool, B.K., Lipson, M.M., Chard, R., 2019. Temporality, vulnerability, and energy justice in household low carbon innovations. *Energy Policy* 128, 495–504. <https://doi.org/10.1016/j.enpol.2019.01.010>.

- Sovacool, B.K., Hook, A., Martiskainen, M., Brock, A., Turnheim, B., 2020. The decarbonisation divide: contextualizing landscapes of low-carbon exploitation and toxicity in Africa. *Glob. Environ. Chang.* 60, 102028 <https://doi.org/10.1016/j.gloenvcha.2019.102028>.
- Spivak, G.C., 1988. Can the subaltern speak? In: Nelson, C., Grossberg, L. (Eds.), *Marxism and the Interpretation of Culture*. Macmillan Education, Basingstoke, pp. 271–313.
- Spivak, G.C., 1992. Teaching for the times. *An Aesthet. Educ. Era Globaliz.* 25, 3–22. <https://doi.org/10.2307/j.ctv1n1bsfh.10>.
- Stepan, N., 1982. *The Idea of Race in science: Great Britain 1800-1960*. Basingstoke, Macmillan.
- Steward, F., 2012. Transformative innovation policy to meet the challenge of climate change: sociotechnical networks aligned with consumption and end-use as new transition arenas for a low-carbon society or green economy. *Technol. Anal. Strateg. Manag.* 7325, 331–343. <https://doi.org/10.1080/09537325.2012.663959>.
- Stirling, A., 2019. How deep is incumbency? A 'configuring fields' approach to redistributing and reorienting power in socio-material change. *Energy Res. Soc. Sci.* 58, 101239 <https://doi.org/10.1016/j.erss.2019.101239>.
- Stirling, A., 2008. "Opening up" and "Closing down": power, participation, and pluralism in the social appraisal of technology. *Sci. Technol. Hum. Value.* 23, 262–294.
- Stirling, A., Johnstone, P., 2018. *A Global Picture of Industrial Interdependencies Between Civil and Military Nuclear Infrastructures*. World Nuclear Industry Status Report.
- Taylor, D., 2014. *Toxic communities: Environmental racism, Industrial pollution, and Residential Mobility*. New York University Press, New York.
- Thelen, C.A., 2008. Our ancestors danced like this: Maya youth respond to genocide through ancestral arts. In: Solinger, R., Fox, M., Irani, K. (Eds.), *Telling Stories to Change the World: Global Voices On the Power of Narrative to Build Community and Make Social Justice Claims*. Routledge, London, pp. 39–44.
- Tilley, H., 2010. Global histories, vernacular science, and African genealogies; Or, is the history of science ready for the world? *ISIS* 101, 110–119. <https://doi.org/10.1086/652692>.
- Tilley, L., Shilliam, R., 2018. Raced markets: an introduction. *New Polit. Econ.* 23, 534–543. <https://doi.org/10.1080/13563467.2017.1417366>.
- Trouillot, M., 2003. *Global transformations: Anthropology and the Modern World*. Palgrave Macmillan, New York.
- Upadhyay, N., 2020. Hindu Nation and its Queers: caste, Islamophobia, and De/coloniality in India. *Interventions* 22, 464–480. <https://doi.org/10.1080/1369801X.2020.1749709>.
- van Reybrouck, D., 2014. *Congo: the epic history of a people*. Ecco Press.
- Viveiros De Castro, E., 1998. *Cosmologies Perspectivism in Amazonia and elsewhere*. Masterclass Series 1. HAU Network of Ethnographic Theory, Manchester, pp. 45–167.
- Voß, J.-P., Smith, A., Grin, J., 2009. Designing long-term policy: rethinking transition management. *Policy Sci.* 42, 275–302.
- Walby, S., 1990. *Theorizing Patriarchy*.
- Wallerstein, I., 1974. The rise and future demise of the world capitalist system: concepts for comparative analysis. *Comp. Stud. Soc. Hist.* 16, 387–415.
- Weheliye, A.G., 2014. *Habeas Viscus: Racializing Assemblages, Biopolitics, and Black Feminist Theories of the Human*. Duke University Press, Durham, NC.
- Weiner, M.F., 2014. The Ideologically colonized metropole: dutch racism and racist denial. *Sociol. Compass* 8, 731–744. <https://doi.org/10.1111/soc4.12163>.
- Whitehead, A.N., 1925. *Science and the Modern World*. Macmillan, New York.
- Whitehead, A.N., 1978. *Process and Reality: An essay in Cosmology*. The Free Press, New York.
- Wieczorek, A.J., 2018. Sustainability transitions in developing countries: major insights and their implications for research and policy. *Environ. Sci. Policy* 84, 204–216. <https://doi.org/10.1016/j.envsci.2017.08.008>.
- Winship, C., Rosen, S., 1988. Introduction: sociological and Economic Approaches to the Analysis of Social Structure. *Am. J. Sociol.* 94, S1–S16.
- Wolfe, P., 2006. Settler colonialism and the elimination of the native. *J. Genoc. Res.* 8, 387–409. <https://doi.org/10.1080/14623520601056240>.
- Ye, J., van der Ploeg, J.D., Schneider, S., Shanin, T., 2019. The incursions of extractivism: moving from dispersed places to global capitalism. *J. Peasant. Stud.* 0, 1–29. <https://doi.org/10.1080/03066150.2018.1559834>.
- Yuval-Davis, N., 2006. Intersectionality and feminist politics. *Eur. J. Women. Studies* 13, 193–209. <https://doi.org/10.1177/1350506806065752>.
- Zaragocin, S., 2019. Gendered geographies of elimination: decolonial feminist geographies in Latin American settler contexts. *Antipode* 51, 373–392. <https://doi.org/10.1111/anti.12454>.