‘We don’t want to be colonialism 2.0’: emerging frontiers of climate finance for technology innovation

Downloaded from: https://research.chalmers.se, 2026-11-18 11:51 UTC

Citation for the original published paper (version of record):
Unsworth, S. (2026). ‘We don’t want to be colonialism 2.0’: emerging frontiers of climate finance for technology
innovation. Finance and Space, 2(1): 116-139. http://dx.doi.org/10.1080/2833115X.2025.2483766

N.B. When citing this work, cite the original published paper.

research.chalmers.se offers the possibility of retrieving research publications produced at Chalmers University of Technology. It covers all kind of research output: articles, dissertations, conference papers, reports etc. since 2004. research.chalmers.se is administrated and maintained by Chalmers Library

(article starts on next page)

Routledge
Taylor & Francis Group

Finance and Space

ISSN: 2833-115X (Online) Journal homepage: www.tandfonline.com/journals/rfas20

‘We don’t want to be colonialism 2.0’: emerging frontiers of climate finance for technology innovation

Sam Unsworth

To cite this article: Sam Unsworth (2025) ‘We don’t want to be colonialism 2.0’: emerging frontiers of climate finance for technology innovation, Finance and Space, 2:1, 116-139, DOI: 10.1080/2833115X.2025.2483766

To link to this article: https://doi.org/10.1080/2833115X.2025.2483766

© 2025 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group

Published online: 06 May 2025.

Submit your article to this journal

Article views: 1755

View related articles

View Crossmark data

Citing articles: 2 View citing articles

Full Terms & Conditions of access and use can be found at
https://www.tandfonline.com/action/journalInformation?journalCode=rfas20

FINANCE AND SPACE
2025, VOL. 2, NO. 1, 116–139
https://doi.org/10.1080/2833115X.2025.2483766

OPEN ACCESS Check for updates

‘We don’t want to be colonialism 2.0’: emerging frontiers of climate finance for technology innovation

Sam Unsworth

ABSTRACT

In this study of a venture capital intermediary investing in ‘climate technology’ startups for Africa, this intermediary’s spatial configuration of financing is framed by its employees and networks as a pivot away from configurations considered extractive and colonialist. Primarily European capital providers seek out recipients which are envisioned to be proximal to ‘local’ contexts in Africa. Downstream actors therefore position themselves as locally embedded to land capital. However this local scale is constructed as spatially elastic, such that startups can also deliver expected returns by scaling digital climate technologies across continents from hub locations. Within this spatial pivot and emerging frontier of climate finance, places within Africa are envisioned to innovate the components for a globalist future of digitalised modernity. A broader enactment of this configuration may foster transcontinental distributional benefits for African countries. This configuration nonetheless implies two possibilities: (1) that concentrating innovation in certain African ‘hub’ locations excludes actors who lack the flexibility, capital and other privileges to access these places; and (2) that possibilities of places innovating components for many futures, rather than one dominant future, are limited. In its current form, this frontier enables venture capital to expand to new geographies and sites of accumulation in the name of climate finance.

KEYWORDS
Innovation; Africa; climate finance; modernity; geography

JEL O33; P16; Q55; M14; R5; Q01
HISTORY Received 15 May 2024; accepted 13 March 2025

1. INTRODUCTION

Climate finance is synonymous with efforts to mitigate or adapt to climate change. The politics of climate change therefore play out in arenas of climate finance. Different actors view it as transformational (Carfora & Scandurra, 2019; World Economic Forum, 2023), ineffective (Kraus, 2024), vulnerability-inducing (Omokuti & O’Sullivan, 2023; Eriksen et al., 2021), colonialist (Sial, 2024) or as double-counted development finance (Le-Lannou, 2024; Roberts & Weikmans, 2017). Climate finance flows across borders and can be contextualised within contested histories of indigeneity, colonialism, fossil fuel capitalism, development assistance and international negotiations (Scott Cato, 2022).

CONTACT Sam Unsworth unsworth@chalmers.se
Division of Environmental Systems Analysis, Chalmers University of Technology, Göteborg, Sweden

© 2025 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group
This is an Open Access article distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited. The terms on which this article has been published allow the posting of the Accepted Manuscript in a repository by the author(s) or with their consent.

Many contentious aspects of climate finance consequently highlight differences in historic emissions responsibility, capital availability and climate risk exposure. Perspectives regarding necessary volumes and modalities of climate finance vary widely, as well as the places and actors it should flow from and to and kinds of activities it should support. Alongside this ongoing debate, climate finance has become an industry linking actors, institutions and places. Capital envisioned as climate finance – estimated to total USD 1.3 trillion in 2021/22 (Climate Policy Initiative, 2023) – is disbursed by upstream actors and sought by downstream actors.

Critical scholars have observed that the dominant logic shaping the disbursement of climate finance at present is one of green growth and ecological modernism. This logic emphasises financialising nature (Bracking, 2019) and expanding neoliberalism, capitalism and profit-driven technologies to tackle climate change (Anantharajah, 2021, 2024; Hilbrandt & Grafe, 2022; Long, 2021). These scholars emphasise how institutions such as the Green Climate Fund and the World Bank direct climate finance in support of techno-capitalist visions in which 'Climate threats are continuously monitored and anticipated to provide opportunities for innovative investors to conjure up and profit from tailor-made solutions' (Hilbrandt & Grafe, 2022). Sites of emptiness and underdevelopment make way for imaginaries of rationality and modernity which calculate, tame and exploit the future (Hilbrandt & Grafe, 2022). Within this logic, technological innovation should be supported by climate finance (Owen et al., 2021; Zhang et al., 2022). This association between climate finance and technological innovation aligns with the appetite of financial markets for rapid scaling and thus returns-delivering technology-oriented ('tech') start-ups, creating a burgeoning industry.[1]

Framing climate finance as a transnational industry raises questions about the consequences of this capital system's spatial configuration. How does climate finance play out between places, how do actors co-produce and respond to current and emerging logics of disbursal, and what is produced or made possible by this? This research sheds light on these questions through a case study of venture capital flows to and from an investment intermediary focused on climate technology innovation for African countries. Headquartered in Northern Europe, the intermediary has East African offices funding investments across Africa. This intermediary is subsequently referred to in this article as CF (Climate Finance) Investments, a fabricated name, to respect its anonymity.

This case study analyses how upstream climate finance is disbursed to downstream entrepreneurs working with 'climate technologies' through CF Investments, an intermediary investment company that takes an equity stake in these startups. The upstream capital provided to CF Investments to disburse is more 'patient' than is typical in financial markets, since it tolerates somewhat slower growth rates and higher instances of failure across CF Investments' portfolio as a whole. Nonetheless, CF Investments position themselves as equity investors within the venture capital community, expecting scalability and returns. While questions regarding the necessary volume and modalities of climate finance could be asked of this case, here the analytical lens is instead focused on how the actors involved co-produce and navigate visions associated with this form of venture capital climate finance.

This case study has wider implications. CF Investments represents one possible sociotechnical and spatial configuration of climate finance. This configuration can be situated within a broader landscape of differing climate finance modalities, shown in Figure 1 below. Several respondents interviewed envision CF Investments to be part of an emerging frontier of climate finance oriented around a spatially adjusted and locally embedded venture capital investment model, responding to climate and development finance modalities seen to be problematic and colonialist (i.e., concessional debt and grants administered by distant actors). Nonetheless, concerns have been raised that private climate financing through venture capital and equity instruments may ultimately increase the dependence of developing economies upon the Global North (Kalinowski, 2024; Sial, 2024). Furthermore, while the multilateral climate finance

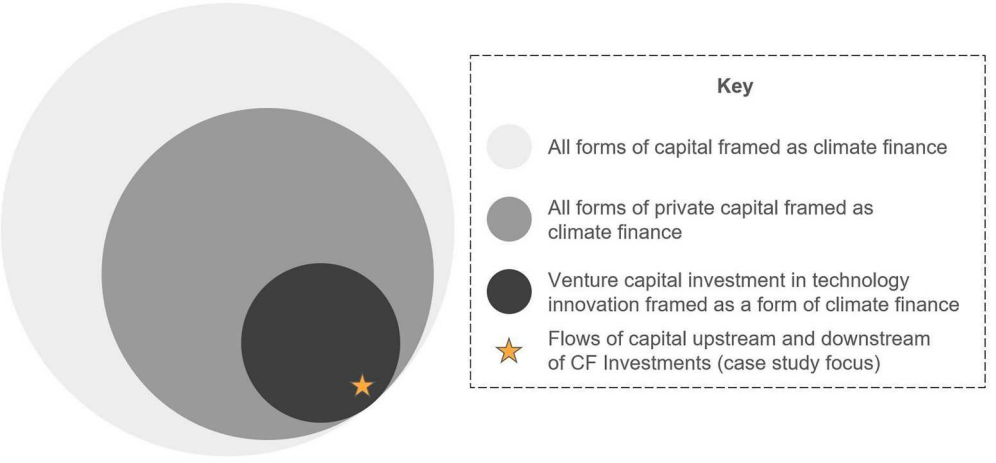

Figure 1. Situating CF Investments' capital flows in the broader landscape of capital framed as climate finance, noting that precise definitions and volumes of capital remain contested. Size of bubble is illustrative rather than to scale.
Source: Author.

landscape valorises claims to involve actors considered 'local', internationally funded climate change adaptation interventions have been critiqued for not properly including vulnerable groups in practice (Omukuti, 2020; Eriksen et al., 2021). Noting the possibility that disbursement models such as this become more dominant in the climate finance industry, it is therefore valuable to study how the claims of context-sensitive venture capital made by CF Investments unfold in practice.

This research is situated within critical research on the geographies of money and finance (Christophers, 2014; Harvey, 2001; van Meeteren & Bassens, 2024), as well as critical analyses of innovation and sustainability transitions (Arora & Stirling, 2023; Mavhunga, 2017; Tarvainen, 2022). Within geographies of money and finance, scholars have applied a spatial lens to finance to observe how finance constitutes a domain to which access – and its associated benefits – is mediated by organisations and technologies concentrated in certain places above others (Wójcik et al., 2024). The components of these financial systems are loaded with values and assumptions about the future and set expectations for how material change happens (Beckert, 2016). A small but growing field of research seeks to apply these critical spatial perspectives to climate finance (Bridge et al., 2020; Bryant & Webber, 2024).

Two literature gaps are addressed by this research. The first relates to spatial dimensions of finance seeking to tackle climate change. Literature on climate finance has been characterised as having a disproportionately large focus on questions such as required volumes of finance, modalities, targets and urgency, as opposed to the political economy of climate finance or the futures it produces (Bryant & Webber, 2024). Relatedly, van Meeteren and Bassens (2024) call for research which unpacks how modalities and logics of finance shape investment flows into places, and what results from this. This research seeks to contribute towards the literature on climate finance from these hitherto under researched perspectives. The second gap relates to the character of financial flows from upstream to downstream. Omukuti (2024) cautions that climate finance to lower income countries tends to be delivered through opaque structures involving intermediaries. Relatedly, scholars of financial geography have shown how intermediary actors deploy techniques to draw capital from the 'global' scale to their specific localities (Searle, 2018). I trace finance from upstream providers to downstream investees to demonstrate how climate finance unfolds spatially.

2. CLIMATE FINANCE, TECHNOLOGY INNOVATION AND VENTURE CAPITAL

Global capital systems face demands for them to support climate change mitigation and adaptation. The 2015 UN Paris Climate Agreement aims to mobilise USD 100 billion annually, a fraction of what may be needed (Peake & Ekins, 2017). Elite actors – including governments, academics, Bretton Woods Institutions and major banks – have launched various commitments, funds and financing platforms. These initiatives highlight an 'investment gap' between available and urgently required capital (Khoday, 2019; NDC Partnership, 2023; Songwe et al., 2022; World Economic Forum, 2022). For example, Climate Policy Initiative estimates Africa needs USD 277 billion between 2020 and 2030 but receives only USD 30 billion annually (Meattle et al., 2022). Research often fits this framing, focusing on how and from where to mobilise capital (Hafner et al., 2020; Peake & Ekins, 2017). Financial modalities, technical structures, and derisking to ensure rapid climate finance disbursement become central (Bhandary et al., 2021; Haag et al., 2024).

Critics label this discourse the 'gap talk framework', arguing it fixates on finance volumes, modalities and targets and obscures the politics in climate finance (Bryant & Webber, 2024). Further critiques argue 'climate finance' is simply re-categorised and therefore double-counted development finance (Le-Lannou, 2024; Roberts & Weikmans, 2017). Other scholars, whilst broadly fitting within the 'gap talk framework', shed light on these aforementioned complexities by also focusing on the quality of climate finance disbursement. These scholars emphasise normative principles such as inclusion and justice (Omukuti, 2024; Panda, 2023) as well as contextual sensitivity (Omukuti et al., 2022), particularly for climate vulnerable or lower income nations (Betzold & Weiler, 2017).

Technology innovation is often framed as a critical demand for climate finance (Black et al., 2023). Concurrently, returns-seeking climate finance is described as key by influential bodies such as the Organisation for Economic Co-operation and Development (OECD) and International Monetary Fund (IMF). The IMF calls for 90% of the climate finance required by emerging and developing economies to come from the private sector by 2030, compared with 40% at present (Black et al., 2023). This connects to their claims that private climate finance will help lower income countries to 'leapfrog' developed economies economically by leveraging the benefits of climate-friendly innovations. Similarly, the OECD has called for public sector actors to mobilise private finance, such as by de-risking projects or lending concessional finance to the private sector, with a particular focus on sub-Saharan African countries (OECD, 2023).

This preference for innovation and private sector involvement brings venture capital (VC) actors into climate finance. Direct investment into companies in the form of private equity investments is recognised as an integral private climate finance modality, alongside other mechanisms such as loans, guarantees or credit lines (OECD, 2023). Private equity investors have long provided capital to early-stage technology-oriented firms – seeking the exponential growth associated with successful ventures (Florida & Kenney, 1988; Florida & Smith, 1990: Ni et al., 2014). With the growth of environmental concerns, there has been increasing discussion of 'clean tech' (Gaddy et al., 2016; Hargadon & Kenney, 2011), 'green tech' (Kraemer-Eis et al., 2021) and more recently 'climate tech' (PricewaterhouseCoopers, 2023) innovation as investment categories for VC equity financing. While scholars have indicated concerns about how well VC demands fit with the achievement of sustainability objectives (Gaddy et al., 2016; Hargadon & Kenney, 2011), climate tech is seen as a booming investment domain and the African continent highlighted as a destination for VC tech investment (Partech, 2022). While capital flows into Africa are growing, climate technology investment

flows stood at less than USD 1 billion in 2023, in comparison with more than USD 40 billion worldwide (PricewaterhouseCoopers, 2023). In the 'gap talk framework', venture capital investment into climate tech innovation constitutes a pillar of much-needed climate finance for African countries.

3. FRONTIERS OF TECHNO CAPITALIST EXPANSION AND RISKS OF NEOCOLONIALISM

Scholars of political ecology and economic geography explain how global capital markets search for new domains to generate returns (Dorn, 2022; Haag et al., 2024; Tarvainen, 2022). Franz and McNelly (2024) explain how capital has 'the structural need to always expand into new frontiers. Frontiers are actively produced within the social sphere of capitalism through endless rounds of enclosures and privatisations'. Frontier-seeking capital has a long history, with mutual funds used by the British Empire to mobilise metropolitan savings to projects across the colonies under the 'Foreign and Colonial Investment Trust' (Braun & Christophers, 2024). Green segments of capital markets are currently amongst the most exciting prospects for asset and returns-seeking financiers (Brodie, 2024; Dunlap & Fairhead, 2014; Franco & Borras, 2019; Haag et al., 2024; Prudham, 2009).

Scholars including corporate ethnographers observe how green capital has become a neoliberal governance tool in what Gabor (2021) describes as 'the Wall Street Consensus'. Within this logic, impact-focused investments are the preferred governance instrument to promote sustainable development (Green, 2024). Capital, derisking and financialisation become the depoliticised solutions to the world's problems (Dorn, 2022; Franz & McNelly, 2024), whilst growing the assets of investors often based in higher income countries (Gabor, 2021). This helps to avoid the acknowledgement of more profound structural problems (Archer, 2024b; Dorn, 2022; Green, 2024) whilst imbuing investors with power to govern their investees (Archer, 2024b: Braun & Christophers, 2024). In the Global South, this has manifested in digital technological innovations such as mobile money (Frimpong Boamah & Murshid, 2019) or pay-as-you-go energy access (Baker, 2023; Perros et al., 2024). This 'financialising' and indebting of users who previously existed outside global capital circuits makes them vehicles for accumulation. This process thus opens up new sustainability-related markets and legitimises the neoliberalisation of natures (Archer, 2024a; Dorn, 2022; Dunlap & Fairhead, 2014); thus policies and finance to tackle climate change become means to the ends of market expansion.

Franz and McNelly (2024) refers to these change processes as the hegemonic green transition: meaning a socio-technical transition led by capital from one system to another that preserves the underlying structures of capitalism (see also Dunlap, 2023). Some scholars note tension amongst proponents of this narrative who must combine 'an underlying commitment to maintaining (and indeed profiting from) the status quo with an uneasy feeling that things desperately need to change' (Jesse Goldstein, quoted in Archer, 2024b).

For several scholars, the advance of capital towards new frontiers of accumulation can lead to green colonialism, through extractivist practices and impacts. A central concern is the potential for investments to result in the 'green grabbing' of land (Dunlap, 2023; Franco & Borras, 2019; Haag et al., 2024; Hunsberger et al., 2017; Müller, 2024) or the enclosure and extraction of digital commons (Tarvainen, 2022). Land conflicts and dispossession in places across the world may result from speculative business practices connected to the green economy such as the development of renewable energy projects (Alkhalili et al., 2023), the planting of forests for carbon finance projects or mining metals for transition technologies (Dunlap & Fairhead, 2014). Examples from the Western Sahara and Israel/Palestine demonstrate how infrastructures and

technologies associated with the green economy are used to extend government control (Alkhalili et al., 2023; Allan et al., 2022).

Further concerns relate to the unequal distribution of the frontiers' spoils, with capital-controlling elites (Allan et al., 2022; Mirumachi et al., 2020) and the green technology entrepreneurs pushing products to them expected to benefit most (Deberdt & Le Billon, 2024). Mirumachi et al. (2020) observe that land is often taken *from* actors least able to rebuke asset acquisition or seek alternative livelihoods, more broadly contributing towards the exclusion of marginalised communities from participation and benefits.

Dorn (2022) warns against assuming simplistic North–South dichotomies of neocolonial exploitation, and Müller (2024) relatedly cautions that an exclusive focus on overt violence and extraction can overlook more discursive or symbolic injustices. Nonetheless, Dorn (2022) notes that a materialist neocolonial lens can disturb myths perpetuated by hegemonic transition narratives that green economy-related activities are inherently better for everybody. Taken together, these concerns over green colonialism coalesce in the concept of 'climate necropolitics' which describes how some populations are rendered sacrificial so more privileged others – and the planet – might live (DeBoom, 2020; adapted from Mbembé & Meintjes, 2003). This sacrifice may be in the form of social, cultural, ecological or economic losses or missed opportunities, or it may be literal in instances of violent extractivism and exploitation.

4. MODERNITY/COLONIALITY IN CLIMATE FINANCE AND INNOVATION

Modernity and coloniality are more amorphous concepts than the material violence of colonialism described above. Oliveira (2021) explains how modernity is a deeply rooted way of knowing and being which emphasises the value of advancing society through a universal understanding of reason, science, progress and technology and a homogenising vision of a 'modern' future. Coloniality both enables and results from modernity, forming 'modernity/coloniality' (Oliveira, 2021; Quijano, 2007). Modernity's hierarchies organise space, time, bodies, knowledge and labour unequally, with colonialism one such manifestation. Logics of modernity/coloniality can thus drive inequalities long after formal colonial structures are dismantled (Oliveira, 2021; Quijano, 2007).

Visions of modernity in innovation and finance are spatially differentiated (Chateau et al., 2021; van Lente, 2021). Innovation can connote divergent locations, actors and directionalities of systems change (Arora & Stirling, 2023; Unsworth et al., 2023). Imaginaries of digital technologies such as Artificial Intelligence (AI) and Internet of Things (IoT) as 'fourth industrial revolution' (4IR) technologies have been described as enacting essentialist futures (Smith & Fressoli, 2021) which erase differences between places (Vicente & Dias-Trindade, 2021). Innovation capabilities are similarly arranged by spatial hierarchies (Jammulamadaka, 2018), with places in Africa envisioned more as recipients than generators of technological innovation (Mavhunga, 2017). Scholars explain how innovation-oriented capital tends to search for propositions embodying modernist visions of the future, with a preference for 'disruptions' and new 'beginnings' rooted in Eurocentric innovation logics stemming from Joseph Schumpeter (Pfotenhauer & Jasanoff, 2017; Tarvainen, 2022). In this understanding, the global hubs of the innovation economy such as Silicon Valley in the US and Silicon Wadi in Israel/Palestine becomes the world's hierarchically preferred version of the 'new', complete with start-up heroes and sustainable technologies expanding to new frontiers. This frontier expansion evokes (whilst not acknowledging) the settler colonialism which has unfolded in both locations (Tarvainen, 2022).

Scholars note how dominant transition narratives and investments advance techno-optimist solutions which export and encode western ideals of progress around the world

(Dorn, 2022; Müller, 2024). Nonetheless, modernist ideals stem from actors across geographies and can take on contextually specific forms (Dorn, 2022; Oliveira, 2021). They may stem from official national government visions in lower income country contexts (Alkhalili et al., 2023; Allan et al., 2022; Unsworth et al., 2025) as well as from investors based in higher or lower income countries, with Haag et al. (2024) for example describing how external investor-backed renewable energy projects in Senegal advance overly simplistic narratives of development and optimism related to education, market access and IT connectivity.

Economic geographers note that defining locations as peripheral (e.g., hub and spoke economic models) can stigmatise them. These places may be seen as backward, slow or traditional relative to the perceived progress of the core, implying they ought to emulate these places (Willett, 2020). In the context of climate change, scholars have noted how mitigation and adaptation activities seen to be legitimate come to be those 'official' efforts by government, NGOs or companies which align with globalist green economy narratives. Alternative (often pre-existing and contextually situated) knowledges, practices and possibilities are rendered less valuable, invisible or even destroyed, and the places associated with these alternatives considered idle or vacant and ready to be filled (Allan et al., 2022; Franco & Borras, 2019; Müller, 2024). Relatedly, Anantharajah (2021) explains how processes of 'readiness' for receiving climate finance require lower income countries to close the regulatory gap between them and higher income countries, which in practice requires them to follow higher income conventions of finance implicitly taken to be preferable to alternatives. Language of 'new frontiers' in green economy discourses are similarly assigned to places in order to zone and designate them for exploitation (Müller, 2024). These narratives spatially configure the hierarchical components of modernity.

5. MATERIALS AND METHODS USED FOR THE CASE STUDY

The research design emerged from dialogue between the author and CF Investments' Africa Regional Director in Rwanda in 2022. The individual expressed interest in exploring how CF Investments and its networks envision the African innovation ecosystem for climate technology, focusing on both upstream capital providers and downstream recipients. This aligned with the author's research interest in finance flows between places and scales.

Data collection primarily constituted semi-structured interviews with CF Investments employees and their upstream and downstream partners. These interviews focused on the following:

- Activities which respondents were involved in with CF Investments related to 'climate technology' innovation and places in Africa.
- Processes of change related to climate technology and places in Africa which the respondent wanted to see happen.
- The system of actors related to climate technology innovation and places in Africa which the respondent saw themselves as part of, and their role within it.
- How this system interacts with end user contexts.
- What the respondent believes actually changes as a result of finance flows managed by CF Investments which are focused on 'climate technologies' and places in Africa, and how the finance flows affect what different actors do.

The Africa Regional Director collaborated with the author to identify target interviewees spanning finance flows related to climate technology innovation and Africa upstream and downstream of CF Investments. Ultimately, 20 interviews were conducted with 23 individuals

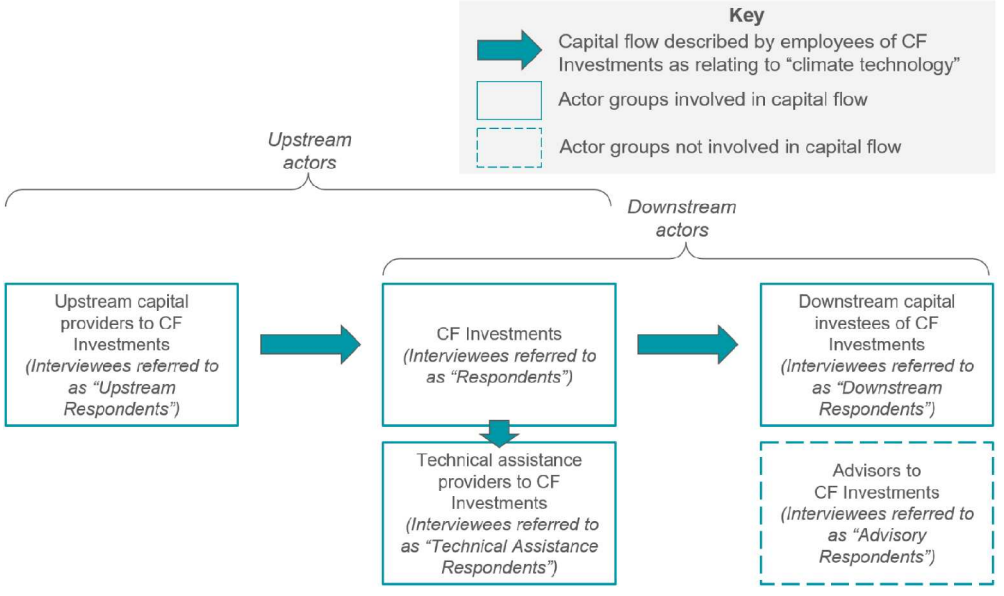

Figure 2. Research design for case study and actor groups within scope of empirical analysis. Source: Author.

representing 12 organisations, from a target list of 36 individuals from 19 organisations. Respondents included technical and management staff at mid to senior levels, with all downstream interviewees being startup founders. Interviews took place via Zoom between October and December 2023 and were conducted by the author. Interviews were between 30 min and 120 min long. This research design is represented in Figure 2.

The geographic scope of this research spans the African continent, reflecting CF Investments' Africa-wide mandate. Other geographies, priorities and investment categories are excluded. The interview data was coded manually using Nvivo, identifying themes that are discussed in subsequent sections. During coding, the author responded to a call from the journal Finance and Space for a Special Issue on Green Capital Landing, having noted that the data contained several relevant insights regarding how downstream actors land climate finance. This subsequently shaped the analysis to foreground how CF Investments and its partners both disburse and land climate finance.

In addition to interviews, the study incorporated a review of CF Investments' dealflow and investment pipeline data, publicly available materials and relevant literature to contextualise findings. The author also produced an internal report for CF Investments to support internal reflection and operational improvement. With all interviewees' consent, interview data was anonymised. Following the conclusion of this internal report, the data was subsequently used to develop this independent research article without oversight from CF Investments.

The following sections present the findings from the case study. In these sections, respondents are classified as employees of CF Investments ('Respondents'), upstream investors ('Upstream Respondents'), downstream investees ('Downstream Respondents'), technical assistance providers to CF Investments ('Technical Assistance Respondents'), or independent advisors to CF Investments ('Advisory Respondents'). Further details on this classification system can be found in Figure 2 and Table 1.

Table 1. Summary and classification of actor groups, organisations and individuals interviewed.

Actor group	Description	How interviewed respondents within this actor group are referred to in this article	Respondents interviewed
Internal staff of CF Investments	Staff employed by CF Investments. Respondents are a combination of employees working exclusively part of the Africa team and employed by the Rwanda office, and employees that are part of the global team and employed by the European office.	Respondents 1, 2, 3, 4, 5, 6 and 7	One organisation, seven people
Technical assistance providers to CF Investments	Staff employed by organisations which support CF Investments in delivering its accelerator programmes and investments, primarily through scouting and training services. Multinational organisations with respondent staff based in African countries.	Technical assistance respondents 8 (two person interview), 9 and 10	Two organisations, four people
Upstream capital providers to CF Investments	Staff of organisations which invest capital into CF Investments for climate technology innovation. Interviewees all based in Europe, but investors in Africa also approached unsuccessfully for interview.	Upstream respondents 11 (two person interview), 12, 13 and 14	Three organisations, five people
Downstream capital investees of CF Investments	Founders of companies which CF Investments has invested in, whose primary markets are within Africa.	Downstream respondents 15 (two person interview), 16, 17, 18 and 19	Five organisations, six people
Advisors to CF Investments	Individual who is a key advisor to CF Investments.	Advisory respondent 20	One organisation, one person

Source: Author.

6. ANALYSING CLIMATE FINANCE USING THE CASE STUDY OF CF INVESTMENTS

CF Investments was founded in 2016 by a European technology investor. Their headquarters are in Northern Europe. They have established a Rwanda office which manages their Africa-focused investments in collaboration with their European office. This office is located within an innovation hub established by a European technology innovation foundation. CF Investments

describes itself as an impact-oriented venture capital (VC) investor in technology companies. This case study focuses on their investments within their 'Africa' domain.

CF Investments accelerates technology startups by providing technical assistance to support scaling. Additionally, CF Investments invests in startups via a venture fund taking early stage, returns-generating equity stakes. CF Investments describe themselves as building climate change resilience, mitigation and social inclusion within the African food system, by investing in and supporting innovative startups operating in:

- Sustainable food production;
- Transformative and inclusive services;
- Efficient supply chains and infrastructure.

CF Investments raises finance from upstream investors seeking climate-relevant investments. These investors provide the capital for CF Investments' venture fund and accelerator programme seeking out 'climate technologies' for Africa. These capital providers are a mix of private VC investors, public development finance institutions and a non-governmental organisation (NGO). Whilst their upstream investors are primarily based in Europe, CF Investments also possesses two upstream investors in sub-Saharan Africa. Upstream investors in CF Investments provide them with a mix of returns-seeking patient equity capital and grant finance for technical assistance activities.

At the time of study, CF Investments had equity in more than 10 companies operating primarily within Africa, with these and others also participating in the Accelerator programme. Investments are concentrated primarily in companies operating in Nigerian, Kenyan or Ghanaian markets but with ambitious plans for scale up within the continent. Most are Africa-headquartered with local founders, though some have European/US offices and founders. These companies usually have additional upstream investors. CF Investments takes an equity stake in these startups, using capital from its upstream investors. Investment terms vary, but decisions balance returns and impact and result in CF Investments taking a percentage equity stake.

Alongside this, CF Investments contracts organisations to provide paid technical assistance (e.g., scouting and training delivery) in the Accelerator and Pre-Accelerator programmes. The latter is paid for using grants from upstream capital providers. CF Investments' investees form a portfolio of companies which together are envisioned to contribute towards climate change mitigation and resilience in African food systems through innovation. At the time of study, the following products, platforms and services were being developed or offered by downstream investees:

- Technology platforms providing a digital and automated marketplace for buying and selling of products and services for agriculture, aquaculture and food sector actors at varying scales.
- Technology platforms enabling agriculture and food sectoral actors to digitally access financial products and services including savings and insurance products.
- Technology platforms to provide soil and crop health monitoring services to improve yields and reduce nitrogen and carbon emissions.
- Technology products and services to facilitate improved sectoral value chain management (e.g., digitalising records, accessing buyers or finance).
- Technology platforms to provide healthcare services for smallholder farmers.
- Technology-enabled regenerative agroforestry products (via carbon credits).
- Technology-enabled, protein-rich and resource efficient food products.

Most investees are business-to-business (B2B), selling digital products/services to businesses (e.g., supply chain actors or farmer cooperatives) in closer proximity to end users (e.g., subsistence

farmers). Investment impacts are ultimately expected to reach end users. According to their investment logic, these business customers and end users pay for products, platforms and services offered by CF Investments' investees. These payments generate revenues which grow the value of the companies and preferably secure a profitable exit for CF Investments and its investors. Additionally, CF Investments may fund early-stage testing and refining of concessionally priced products/services. Though at different stages, all interviewed investees reported a growing customer base using their technologies.

CF Investments sees Africa's challenges as a profit-generating climate tech investment opportunity. Africa's fast-growing, underserved population is a new frontier for upstream investors. CF Investments highlights how the rapid scaling of VC-supported technologies aligns with the 'extreme urgency' of climate change, an approach emphasised by Respondents 3 and 5, who describe ideal innovations as 'leveraging the sustainability of the [VC] model to ensure the changes are fast'. Respondents explain how CF Investments mitigate climate impacts and boost resilience to threats like crop failures. Respondent 7 and Technical Assistance Respondent 10 note that while climate change is often seen as global, for people living under $5 a day, economic improvement is a more immediate concern; justifying a focus on revenue generation. As Respondent 7 explains, 'If we are able to increase income levels, then people have the capacity to hold that conversation [about climate change]'. Furthermore, CF Investments and its partners connect climate technology to broader visions of African economic transformation. Respondents 3 and 4 and Downstream Respondents 15 and 19 highlight its role fostering jobs and technological 'leapfrogging'. Respondents 1, 6 and 7, alongside Downstream Respondents 17 and 19, frame climate technology as a way to reallocate capital from higher income countries towards Africa. Respondents 5 and 7 as well as Downstream Respondent 18 draw upon VC logics of scaling to envision Africa becoming a future global exporter of climate innovations. This vision of technology-enabled prosperity crystallises in Respondent 5 explaining how 'Climate technology can mean technology in Africa, built by Africans, and for Africa, making the life of Africans easy'.

7. CF INVESTMENTS: AN ALTERNATIVE SPATIAL CONFIGURATION FOR CLIMATE FINANCE?

Respondents from CF Investments and its upstream investors describe how finance, actors and technologies are spatially configured to disburse capital. Many respondents consider typical spatial configurations of finance in Africa to be problematic and envision CF Investments to be responding to and moving beyond these configurations. I refer to this problematic configuration as configuration 1.0, summarised in Table 2. Whilst different respondents place emphasis on different aspects of this archetype, together it is viewed as an extractive and (for some respondents) colonialist enterprise. This is primarily because upstream investors and intermediaries, as well as the developers and distributers of technology solutions tend to be located predominantly outside the African continent. This is noted by Respondents 2 and 6, with Respondent 10 observing that most capital directed towards climate technologies is following this longstanding North–South direction. In this configuration 1.0, these external actors extract value (noting investment returns tend to flow out of the continent); distribute externally developed technologies connected to exogenous knowledge systems which do not match local contexts; or simply render the continent financially invisible to anything other than donor finance (Respondent 2) by preferring to invest profit seeking capital in other places perceived as less risky (Respondents 4 and 7). Relatedly, Respondent 2 indicates that African capital providers invest in real estate or government bonds rather than the real economy. Upstream Respondent 13 consequently characterises an 'industry' within Africa of downstream technology-oriented actors battling over scarce capital offered by external actors.

Table 2. Envisioned spatial configurations of finance flows oriented towards climate technologies for end users in Africa, based on respondents from CF Investments and its upstream investors in the interview sample.

	How respondents envision and describe actor roles in the flow of finance from upstream to downstream			
Spatial configurations envisioned by respondents	**Upstream capital providers for climate technology**	**Intermediaries such as CF Investments landing and disbursing capital for climate technology**	**Downstream actors landing capital to innovate or distribute climate technology**	**End users and sectoral systems expected to benefit from climate technology**
1.0: Spatial configurations described by respondents as extractive and colonialist. CF Investments is seen as a progressive reaction to these configurations.	Located exclusively in financial centres external to Sub-Saharan Africa, reflecting the realities of global capital concentrations. Predominantly donor finance, with limited commercial capital volumes resulting from high risk perception of Africa.	Key decision-making capabilities of these actors located in countries external to Sub-Saharan Africa.	Predominantly NGOs or other non-commercial actors, with key decision-making capabilities located primarily in countries external to Sub-Saharan Africa. Subsequently utilise knowledge and technology primarily developed externally from Africa.	Based in countries across Africa. Innovations tend to scale to these countries from outside Africa, rather than from these countries to elsewhere. Innovations are disconnected from economic and social priorities of end users but perpetuated by donor finance.
2.0: Spatial configuration of CF Investments described by respondents. This is envisioned as an emerging frontier and preferable direction for climate finance.	Located in a mix of countries both external to and within Sub-Saharan Africa, reflecting realities of global concentrations of capital alongside desire to redirect finance towards African economy. Blended mix of commercial and concessional finance, with volumes of capital growing as capital providers increasingly trust the configuration.	Key decision-making capabilities of intermediaries located within African countries, utilising physical infrastructure envisioned to be a part of emerging African innovation ecosystem (e.g., innovation hubs, startup houses). Intermediaries play key role bridging 'local' context and international capital markets.	Predominantly commercial startups, located in - or highly familiar with African countries. Investments in innovations which utilise and integrate knowledge and technology developed from both higher and lower income countries; bridges global frontier technologies and end users in context-sensitive way.	Based in countries across Africa and beyond. Business models enable rapid-scale up from certain African countries to others and even beyond Africa. Closely aligned with economic and social priorities of end users, reflected by willingness of users to pay for solutions.

Source: Author.

Technical Assistance Respondent 8 subsequently explains how climate finance intended to benefit Africa often flows to financial intermediaries, technology developers or distributors who are also located outside this geography. Related to this, Upstream Respondents 12 and 13 note the problematic historical context of externally developed technologies being privileged above those anchored to local contexts within Africa, connected to the inappropriately large role played by exogenous actors and knowledges. Respondents 2 and 5 discuss how these problematic spatial configurations perpetuate activities which do not fit with the demands of end users. Respondent 2 explains, for example, that external NGOs 'just keep funding. It's not really benefiting the locals, but they are generous moral donors that just keep throwing money'.

CF Investments and its upstream investors seek to differentiate themselves from this problematic configuration 1.0 by presenting themselves as a spatial pivot and new frontier for climate finance, which I refer to as configuration 2.0. This configuration is framed by respondents as moving beyond these overtly extractive and colonialist aspects, primarily through a more spatially diverse set of upstream capital providers and intermediaries which have trickle down effects to end users downstream. Whilst the majority of CF Investments' upstream investors are still located outside Africa, Respondents 2 and 4 as well as Upstream Respondent 12 emphasise the role played by CF Investments' 'local' African capital providers alongside finance providers who are external to Africa. These African capital providers are envisioned as anchors alongside international climate finance partners, possessing a comparatively greater understanding of issues facing African end users, a longer term commitment to the continental innovation ecosystem and a shared vision of African economic emergence. Another aspect of configuration 2.0 considered by Upstream Respondent 14 – a European NGO – to be preferable is their role as a returns-seeking upstream investor; as opposed to the role more typically associated with NGOs of financial intermediary or technology distributor. Nonetheless, this group of upstream capital providers together place emphasis on expected speeds of scaling and financial return alongside 'impact' and consider this focus on returns to be central to the greater sustainability of this model. Respondent 7 explains how CF Investments has a fiduciary duty to meet upstream expectations, albeit with greater flexibility than purely commercial VC investors.

The existence of CF Investments' office within Africa, with significant autonomy from the European office through the investment process, is cited as a central differentiator in configuration 2.0. Technical Assistance Respondent 8 explains how the presence of 'an African team based in Africa, working on the African context' means that 'They're not necessarily supporting European solutions to scale in the African context'. Respondents 2, 4 and 5 along with Upstream Respondent 14 all consequently speak positively about the high levels of trust which upstream capital providers place in CF Investments to invest their capital across the continent; alongside the trust which CF Investments places in its downstream investees. As mentioned above, Upstream Respondent 14 positively regards this spatial configuration as supplanting the role of NGOs as intermediaries or implementers. This trend is noted by Downstream Respondent 18 who acknowledges how technology startups have displaced NGOs as aspirational career pathways.

With regard to the innovation and distribution of climate technologies, CF Investments' spatial configuration 2.0 is framed as a response to the historic distribution of contextually inappropriate technologies designed elsewhere. In the words of Upstream Respondent 3, there is 'now slowly the awakening that this is not okay', driving a pivot towards solutions 'developed and informed by the local context' or, for Respondent 4, carefully adapted to it.

Upstream capital providers see this spatial pivot towards seeking out climate technology innovators and distributors based within Africa as part of a broader set of corrective actions. Upstream Respondent 13 explains how this is part of an effort 'within our global federation to localise as much as possible, to get rid of all the neocolonial features of our organisation'; similarly,

Upstream Respondent 11 explains 'the whole organisation is battling with this. We're trying. We were reorganised two years ago to be based on the SDGs, which has its strengths, but I think the major drawback is the lack of geographical local context'. These concerns motivate CF Investments' spatial configuration, with Respondent 1 reflecting 'We don't want to be colonialism 2.0'. The willingness of downstream customers to pay for investees' products and services is seen by Respondent 6 and Advisory Respondent 20 as indicative of their quality. As Respondent 5 explains; 'with startups, locals pay for things that benefit them'. In summary, spatial configuration 2.0 is envisioned to overturn the extractive and colonial character of typical capital flows, instead locating a much greater share of the upstream financial and technological innovation value chain *within* Africa and subsequently delivering real benefits which are desired by actors in these places.

8. HOW DOWNSTREAM ACTORS NAVIGATE THIS EMERGING SPATIAL CONFIGURATION TO LAND CAPITAL

Upstream capital providers emphasise the progressive and positive aspects of spatial configuration 2.0 (Figure 2), which raises questions regarding what it engenders downstream. CF Investments navigates upstream investor expectations, whilst downstream investees navigate both CF Investments and its technical assistance providers. Both CF Investments and its investees therefore deploy several techniques to land capital. Together, these shed light on emerging political economies of climate capital.

A first technique is asserting legitimacy in 'local' contexts. CF Investments and its investees position themselves as legitimate within contexts framed as 'local' in order to land capital from upstream investors concerned about context sensitivity. Downstream Respondents 15, 17 and 18 attract investment by connecting upstream investors to smallholder farmers. Relatedly, Downstream Respondents 16 and 19 frame themselves as being business savvy with Respondent 5 explaining how a 'core characteristic for [their investees] is that you see they really understand the space', citing the necessity of founders being able to navigate the many 'unofficial bosses' and 'chairmen' who govern access to markets. Respondent 5 – as an investor – demonstrates why it is advantageous for investees to frame themselves as 'locally' embedded, articulating their view that 'Local founders with experience on the ground will perform better than European founders with crazy tech expertise, but no actual experience of what's happening', going on to reflect that 'if founders are able to actually leverage indigenous knowledge with regards to tackling climate change and then scale it, I guess those are the people that are probably going to be the winners within the Africa climate tech space'. Similar claims to greater contextual embeddedness relative to their investors are also made by CF Investments employees such as Respondents 1 and 7. They emphasise both the autonomy of the 'local' office making investment decisions *within* Africa, as well as their landing of 'local' upstream capital, as each building CF Investments' legitimacy at the 'local' scale. Respondents 4 and 7 both indicate that this spatial configuration has been successful in landing capital, with Respondent 4 explaining that 'foreign money is becoming a bit more comfortable investing on the continent. And that's mostly driven by the fact that they're starting to understand that the only way to get that done is to hire competent local teams'. Legitimacy is built by meeting upstream investors' desires for local embeddedness.

A second technique is asserting legitimacy in global professional networks. CF Investments and its investees explain how they leverage their professional networks worldwide to gain legitimacy in the eyes of upstream investors who remain primarily external to Africa. Downstream Respondents 16, 18 and 19 all draw attention to their international networks outside Africa which they leverage in different ways, such as by learning and receiving investment from them. Downstream Respondent 19 for example explains:

> Outside Nigeria there is a way and manner of doing things so that the world of business and finance understands. And if you don't have that way and manner, then you are not seen as a credible person to back [financially]. That way and manner is what I learned at Yale.

Staff of CF Investments and its advisors similarly describe how they utilise their transnational networks to land capital from upstream. Respondent 6 highlights how CF Investments networking with top African universities (Kenya, Nigeria, South Africa, Rwanda, Mauritius) attracts investees and boosts credibility with upstream investors. Technical Assistance Respondents 8 and 10 echo this by emphasising how they leverage their global network of offices, academia, NGOs and international development partners. Respondent 6 describes organising networks and events to attract external capital to the African ecosystem, including current investors and potential future investors studying at elite institutions like Stanford University.

A third technique is using digital technologies aligned with global trends and investor preferences. Staff of CF Investments and its downstream investees seek to position themselves as cognisant of – and legitimate in relation to – global technology trends. Digital technologies such as AI and IoT are of particular relevance. Respondent 2 indicates how CF Investments – and by extension their investees – work primarily with B2B digital software solutions, despite Respondent 7 indicating CF Investments could in theory invest in much-needed hardware solutions. Respondents 1 and 7 explains how B2B digital technologies are preferable since their growth potential aligns with global VC expectations of rapid scale up. Relatedly, Downstream Respondents 15 and 18 both describe how their digital platforms rely on hosting services from internationally headquartered software providers, with Downstream Respondent 18 lamenting the exorbitant ongoing cost of subscription for these services. Respondents such as Respondent 3, Technical Assistance Respondent 10 and Downstream Respondents 16 and 18 frame the climate technologies offered by CF Investments' investees as influenced by places seen to be leading in digital technologies, enacting a digitalised and global vision of modernity. As Respondent 3 explains,

> On the startup front, the United States and Europe are leading the movement and Africa is catching up. Most of our founders are learning about startups from what they see there. They want to make their solutions as classy as what they see there.

Downstream Respondent 16 relatedly explains how their investors trust them since they:

> have a global picture of [technology development]; because there's no need of reinventing the wheel. Once somebody has done something, you just need to adapt it and move on, if it fits within your ecosystem. Only a fool should lock their mind to a locality.

Downstream Respondent 15, as well as Respondents 3 and 5 all indicate how well-networked diaspora entrepreneurs are uniquely placed to build successful businesses based on seeking out and adapting technologies which they have seen working elsewhere. Furthermore, climate change itself is an investor preference which downstream actors navigate to land capital. Designating ventures as 'climate technology' serves an instrumental purpose, tapping into its current popularity as a market segment. Respondent 3 observes, 'The investment landscape comes to you and says, 'we care about climate' […] after that, we [CF Investments] go and look for startups'. This flexibility encourages entrepreneurs to align their projects with this category, sometimes opportunistically, as noted by Respondents 1, 9, and 11.

The fourth and final technique to land capital is to locate activities in places which fit with VC demands for acceleration and scale up. Both the employees of CF Investments and its downstream investees make decisions regarding the location of their investments and activities to

respond to the upstream landscape. Respondent 1, along with Technical Assistance Respondents 8 and 10 all utilise CF Investments' identity as a neutral returns-seeking investor to explain why they tend to invest in certain countries more than others. Technical Assistance Respondent 9 identifies Nigeria, Kenya, Rwanda and South Africa as key locations, explaining:

> It's going to be [investing in] countries where you don't face a headache starting a business. You can start a business and run it pretty quickly and cheaply, with expertise that you can access and a lot of funding already crowded in.

Identifying Nigeria, Kenya, Rwanda and South Africa as key locations. Technical Assistance Respondents 8 and 9 relatedly frame CF Investments' decision to headquarter its African presence in Rwanda – as opposed to in its European offices or elsewhere in Africa – as helping them to land capital, noting the country's growing stature in innovation.

Advisory Respondent 20 critiques the European-funded innovation hub in Rwanda where CF Investments hosts its offices and Accelerator programme as 'designed for a global audience […] beautiful for all the Europeans or internationals that go there and are like "oh, amazing. I'm in Africa"'; whilst excluding entrepreneurs whose daily lives do not fit with this globally oriented innovation space, giving the example of older women with familial responsibilities. A consequence of CF Investments concentrating their activities in Rwanda is that CF Investments' investees, like other actors seeking capital, benefit from being physically present in (or able to reach) this location. Respondents such as Downstream Respondents 16, 18 and 19 subsequently invest significant time and effort physically attending these sessions and networking, noting that investment decisions are often made by the capital provider during or at the end of a support programme. Respondent 2, as well as Advisory Respondent 20 and Upstream Respondent 13 all indicate that the broader growth of the incubator and accelerator programme industry – concentrated in African cities seen as centres of innovation such as Kigali – creates a perverse incentive for investees to focus on landing capital from successive support programmes rather than by generating customer revenues as is desired.

Potential to scale rapidly out of one of these hub locations into other African economies is consequently of critical importance for investees, with Downstream Respondents 15 and 18 explaining their plans to scale rapidly out of Kenya, and Downstream Respondent 17 characterising their operational footprint as led by commodity markets and investor preferences. Technical Assistance Respondent 9 uses the example of cooking to illustrate how an investee could scale a climate technology business internationally:

> In Africa, Indonesia, India: It's [cooking with] three stones and fire. If you were to have a clean tech startup that is solving that problem, and you start in a country that enables you to take advantage of its nimbleness and cheap labour to test your Minimum Viable Product … chances are you can copy paste that solution pretty much everywhere that problem is.

9. DISCUSSION

Within this case, upstream capital providers present themselves as an emerging frontier of climate finance. This frontier is envisioned to respond to problematic past investment trends by reallocating capital from Europe and the USA towards investees working with climate technology in and for African countries. Beyond climate benefits, climate technology investment is envisioned to play a key role in African economic and technological emergence, framed as an exercise of catching up with or leapfrogging higher income countries. However this emerging frontier also brings sub-Saharan Africa into range for venture capitalists. Downstream actors respond

to the spatial pivot within this landscape by deploying a set of techniques to position themselves to land venture capital. CF Investments occupy a role both landing capital while also coproducing the upstream landscape for their investees. In this section, I discuss some of the tensions and implications of this emerging frontier of capital.

There is a clear tension between these capital landing techniques. Downstream investees must appear legitimate locally while maintaining global networks and proposing ventures which can rapidly scale from a select number of African countries to many others. The definition of 'local' across Africa's transnational scale is therefore unclear. This implies that the 'local' scale, whilst no doubt often referring to specific locations, is a flexible concept constructed by downstream investees to appeal to upstream investors – still primarily outside Africa – seeking investees who appear embedded. The 'local' becomes spatially elastic, stretching across countries as investees scale while remaining attached to an imagined end user context. Envisioned from an external investor perspective, it is indeed valid that an entrepreneur based in Kenya, Nigeria or South Africa for example may have a greater likelihood of familiarity with the daily lives of people across the continent than somebody based in Europe. Lucrative claims to local embeddedness by entrepreneurs may nonetheless obscure barriers to other actors actively participating in innovation if they are based in places framed by this spatial configuration as receiving innovation. Within this structure of rapid scaling out of a select number of hub countries, actors based outside these places have limited opportunities to participate beyond adopting solutions that reach them via scaling.

This re-siting of innovation from outside Africa to certain places within Africa builds on the critique of Mavhunga (2017) that Africa is seen more as recipient than generator of innovation. In this emerging frontier, a select number of African places and actors associated with a digitalised vision of modernity become the generators of innovations for the rest of the continent, who remain recipients. The other techniques valuable for landing capital – such as possessing strong global networks and flexibility, as well as feeling comfortable using innovation infrastructure designed for an audience of international investors – further shrink the pool of actors who might land capital within this configuration. Upstream Respondent 13, Downstream Respondent 17 and Advisory Respondent 20 all reflect over the elite characteristics of those currently landing capital. Upstream Respondent 13, as a European investor, describes the downstream investees they have met in Africa through CF Investments as 'bright, well-educated, really privileged people. We share the same background. I see no difference between them and myself'. Downstream Respondent 17, after highlighting their attendance of an elite Nigerian private school and Yale University as being critical to them building the national and international networks required to be a successful entrepreneur, explains 'there's a lot of talent that we're missing in the lower economic groups who tend to be in technical schools. They're not in the university system where most of the accelerators tend to recruit from'. This spatial pivot allows venture climate capital to successfully navigate spatial critiques and allegations of coloniality whilst otherwise keeping the model broadly similar.

Does this make this frontier of venture capital investment, exemplified by CF Investments, 'old wine in new bottles'? This is perhaps a reductive analysis. This spatial pivot as a wider industry shift will likely have a positive distributional effect on a transcontinental basis, with more capital available for actors working with climate-related technologies *within* Africa. Whilst not delivering fundamental changes to the capital system, configuration 2.0 nonetheless pivots where capital concentrates. Several respondents seem aware of this, echoing observations that actors in modernist innovation economies may sense the tension between their emphasis on disruptive innovation whilst keeping capitalist systems intact (Jesse Goldstein, quoted in Archer, 2024b). Respondent 1 reflects 'will venture capital save the world? Probably not, you know. There's probably more systemic changes that are needed. But if you are working with technology and investment, then definitely impact investing is the way to go'. Respondent 7 openly expresses

concerns about VC as utilising a problematic global capital system which generates inequality, whilst still indicating that reallocating capital towards Africa *through* the model is worth doing.

What is clear is that this emerging spatial configuration – combining 'climate technology' with 'local context' and a rapid scale up logic, forms a pathway through which venture capital expands to new geographies. Several respondents acknowledge that previously, venture capital struggled to access most African countries. Through b2b digital climate technologies and rapid scale up logics which downstream investees bring to match upstream demands, this configuration utilises intermediaries and investees within Africa to gain the confidence of investors, in doing so connecting end users to new sites of accumulation in either the Global North or amongst elites in the Global South (Baker, 2022; Harvey, 2001; Frimpong Boamah & Murshid, 2019; Perros et al., 2024). Certain places become cores in this spatial logic (Willett, 2020) – the capital cities of Rwanda, Kenya, Nigeria and South Africa – relative to peripheries elsewhere on the continent. These core locations become generative of sociotechnical change, funnelling global climate capital into Africa through their rapidly growing financial and innovation systems and commitment to modernist visions of green growth. This spatially adjusts but nonetheless reproduces hierarchical relations of modernity, in which certain individuals extract value from frontier spaces and landscapes considered to be previously empty or invisible (Deberdt & Le Billon, 2024; Franco & Borras, 2019; Tarvainen, 2022). The emerging 'frontier' in this case becomes the places and communities of people in these peripheral locations who become newly accessible to entrepreneurs who can access global capital.

Can this case and emerging frontier of climate finance be understood as another enclosure and subsequent site of extraction created by the expansion of capital (Franz & McNelly, 2024)? Whilst this study is not an exhaustive examination of the on-the-ground effects of capital, the evidence presented does not describe the kinds of overtly neocolonial conflicts and land grabs observed by scholars elsewhere (Dunlap, 2023; Dunlap & Fairhead, 2014). Nonetheless, viewed through the lens of Quijano (2007) and Oliveira (2021)'s entwined concepts of modernity and coloniality, this analysis more readily sheds light on the allure of modernity imbued in certain climate finance modalities. It demonstrates an appealingly depoliticised and solution-oriented narrative of change – a hallmark of modernist logics (Oliveira, 2021) – which obscures a focus on more profound societal challenges unsolvable by well-targeted capital investments (Green, 2024). Furthermore, as in Silicon Valley's silencing of its settler colonial past, this narrative risks silencing the complex histories of the many places within this configuration by instead connecting them to a universal 'modern' history of science and innovation emphasising technological catch up (Tarvainen, 2022). By envisioning cores and peripheries *within* Africa in connection to global capital systems, this configuration of climate finance disbursement spatially reproduces the hierarchical components of modernity (Willett, 2020). On a grounded level, this raises questions as to how emerging African centres of the innovation economy such as Kigali and Lagos situate their pre-colonial and colonial histories in their localised innovation narratives, and how these places adapt to or diverge from homogenising modernist future visions (Hunsberger et al., 2017).

10. CONCLUSION

This research has implications for critical geographies of finance and innovation. Imaginaries of global digitalised modernity are reproduced by this emerging frontier of climate finance, and the techniques to land venture capital within it. The manifest vision in this specific case is that places within Africa can host innovation of the components for a future of digitalised modernity. Broader enactment of this vision may lead to distributional effects which favour Africa on a transcontinental basis and may support its economic rise. However, this vision obscures two key concerns associated with contemporary discussions of sustainability transformations and systems change. First, the possibility that concentrating innovation in certain African 'hub' locations

connected to global venture capital excludes actors who lack the necessary flexibility, capital and other privileges to operate within these places. And second, that possibilities of places innovating the components for many worlds and futures (i.e., 'embracing the pluriverse'), rather than for an essentialist digitalised future, are limited (Arora & Stirling, 2023; Escobar, 2011). Noting the concerns from several upstream respondents about avoiding neocolonialism and the claims that this emerging frontier avoids extractive behaviours, a deeper engagement with the concepts of modernity and coloniality could be fruitful, particularly by finance providers based in higher income countries.

This research is a single case study; the visions and capital landing techniques may to some extent be unique to the circumstances of the case. Further research into capital landing techniques in other empirical contexts is welcomed to advance this theorisation. A further aspect of the research design is that the analysis cannot causally attribute actors landing capital as being the result of the techniques described. Rather, this is an analysis of how actors that have successfully landed capital describe themselves as navigating this landscape, and how their knowledge of available capital and its expectations conditions how they act. Further research is welcomed exploring these precise mechanisms of capital landing through other methods and to test other examples which indicate that the 'local' scale may be envisioned as spatially elastic and potentially transnational, and who benefits or is disadvantaged when the 'local' is envisioned by distant investors.

ACKNOWLEDGEMENTS

I would like to acknowledge all of those I interviewed for the time they kindly took to speak with me, with particular thanks to the staff of CF Investments for facilitating my access to both people for interviews and materials. I am deeply grateful. I would also like to thank Helene Ahlborg and Sofie Hellberg for their participation in discussions which helped shape the article, and to the reviewers for their thoughtful engagement with the manuscript.

DATA AVAILABILITY STATEMENT

Anonymised data is available upon request. Interview data is not openly available to respect anonymity of the case study participants.

DISCLOSURE STATEMENT

No potential conflict of interest was reported by the author(s).

ETHICS STATEMENT

All research participants consented to participate in the study and for their interview to be used as data for an academic research article. Participants consented via a form describing the research focus and how the data would be used and managed, which was shared with participants in advance and agreed prior to interview.

FUNDING

The author gratefully acknowledges that this project was funded by the Chalmers Gender Initiative for Excellence (Genie), along with funding for the interview process provided by the Research and Innovation Systems for Africa (RISA) Fund, a multi-country project funded by the UK through the Foreign, Commonwealth and Development Office.

NOTE

1. While this framing is dominant, some scholars question the tendency to focus upon novel technological solutions and call instead for greater focus on the defunding and removal of problematic technologies (Davidson, 2019).

ORCID

Sam Unsworth http://orcid.org/0000-0003-1589-0248

REFERENCES

Alkhalili, N., Dajani, M., & Mahmoud, Y. (2023). The enduring coloniality of ecological modernization: Wind energy development in occupied Western Sahara and the occupied Syrian Golan Heights. *Political Geography*, *103*, 102871. https://doi.org/10.1016/j.polgeo.2023.102871

Allan, J., Lemaadel, M., & Lakhal, H. (2022). Oppressive energopolitics in Africa's last colony: Energy, subjectivities, and resistance. *Antipode*, *54*, 44–63. https://doi.org/10.1111/anti.12765

Anantharajah, K. (2021). Racial formation, coloniality, and climate finance organizations: Implications for emergent data projects in the Pacific. *Big Data & Society*, *8*, 20539517211027600. https://doi.org/10.1177/20539517211027600

Anantharajah, K. (2024). Scratches on the wall: Racial capitalism, climate finance and Pacific Islands. *Journal of Global Ethics*, *20*, 215–231. https://doi.org/10.1080/17449626.2024.2382281

Archer, M. (2024a). *Unsustainable: Measurement, reporting, and the limits of corporate sustainability*. NYU Press.

Archer, M. (2024b). Governing through ESG and the green spirit of asset manager capitalism. *Environment & Planning A*, *56*, 662–678. https://doi.org/10.1177/0308518X231156611

Arora, S., & Stirling, A. (2023). Colonial modernity and sustainability transitions: A conceptualisation in six dimensions. *Environmental Innovation and Societal Transitions*, *48*, 100733. https://doi.org/10.1016/j.eist.2023.100733

Baker, L. (2022). New frontiers of electricity capital: Energy access in sub-Saharan Africa. *New Political Economy*, *0*(0), 1–17. https://doi.org/10.1080/13563467.2022.2084524

Baker, L. (2023). New frontiers of electricity capital: Energy access in sub-Saharan Africa. *New Political Economy*, *28*, 206–222. https://doi.org/10.1080/13563467.2022.2084524

Beckert, J. (2016). *Imagined futures: Fictional expectations and capitalist dynamics*. Harvard University Press.

Betzold, C., & Weiler, F. (2017). Allocation of aid for adaptation to climate change: Do vulnerable countries receive more support? *International Environmental Agreements*, *17*, 17–36. https://doi.org/10.1007/s10784-016-9343-8

Bhandary, R. R., Gallagher, K. S., & Zhang, F. (2021). Climate finance policy in practice: A review of the evidence. *Climate Policy*, *21*, 529–545. https://doi.org/10.1080/14693062.2020.1871313

Black, S., Jaumotte, F., & Ananthakrishnan, P. (2023). *World needs more policy ambition, private funds, and innovation to meet climate goals* [www document]. IMF. Retrieved April 26, 2024, from https://www.imf.org/en/Blogs/Articles/2023/11/27/world-needs-more-policy-ambition-private-funds-and-innovation-to-meet-climate-goals

Bracking, S. (2019). Financialisation, climate finance, and the calculative challenges of managing environmental change. *Antipode*, *51*, 709–729. https://doi.org/10.1111/anti.12510

Braun, B., & Christophers, B. (2024). Asset manager capitalism: An introduction to its political economy and economic geography. *Environment & Planning A*, *56*, 546–557. https://doi.org/10.1177/0308518X241227743

Bridge, G., Bulkeley, H., Langley, P., & van Veelen, B. (2020). Pluralizing and problematizing carbon finance. *Progress in Human Geography*, *44*, 724–742. https://doi.org/10.1177/0309132519856260

Brodie, P. (2024). Smarter, greener extractivism: Digital infrastructures and the harnessing of new resources. *Information, Communication & Society*, 1–20. https://doi.org/10.1080/1369118X.2024.2341013

Bryant, G., & Webber, S. (2024). *Climate finance: Taking a position on climate futures*. Agenda Publishing Limited.

Carfora, A., & Scandurra, G. (2019). The impact of climate funds on economic growth and their role in substituting fossil energy sources. *Energy Policy*, *129*, 182–192. https://doi.org/10.1016/j.enpol.2019.02.023

Chateau, Z., Devine-Wright, P., & Wills, J. (2021). Integrating sociotechnical and spatial imaginaries in researching energy futures. *Energy Research & Social Science*, *80*, 102207. https://doi.org/10.1016/j.erss.2021.102207

Christophers, B. (2014). Geographies of finance I: Historical geographies of the crisis-ridden present. *Progress in Human Geography*, *38*(2), 285–293. https://doi.org/10.1177/0309132513479091

Climate Policy Initiative. (2023). *Global landscape of climate finance 2023 - CPI* [WWW Document]. Retrieved May 3, 2024, from https://www.climatepolicyinitiative.org/publication/global-landscape-of-climate-finance-2023/

Davidson, D. J. (2019). Exnovating for a renewable energy transition. *Nature Energy*, *4*(4), 254–256. https://doi.org/10.1038/s41560-019-0369-3

Deberdt, R., & Le Billon, P. (2024). Green transition's necropolitics: Inequalities, climate extractivism, and carbon classes. *Antipode*, *56*(4), 1264–1288. https://doi.org/10.1111/anti.13032

DeBoom, M. J. (2020). Climate necropolitics: Ecological civilization and the distributive geographies of extractive violence in the anthropocene. *Annals of the American Association of Geographers*, *111*(3), 900–912. https://doi.org/10.1080/24694452.2020.1843995

Dorn, F. M. (2022). Green colonialism in Latin America? Towards a new research agenda for the global energy transition. *European Review of Latin American and Caribbean Studies*, *114*, 137–146. https://doi.org/10.32992/erlacs.10939

Dunlap, A. (2023). The green economy as counterinsurgency, or the ontological power affirming permanent ecological catastrophe. *Environmental Science & Policy*, *139*, 39–50. https://doi.org/10.1016/j.envsci.2022.10.008

Dunlap, A., & Fairhead, J. (2014). The militarisation and marketisation of nature: An alternative lens to 'climate-conflict'. *Geopolitics*, *19*(4), 937–961. https://doi.org/10.1080/14650045.2014.964864

Eriksen, S., Schipper, E. L. F., Scoville-Simonds, M., Vincent, K., Adam, H. N., Brooks, N., Harding, B., Khatri, D., Lenaerts, L., Liverman, D., Mills-Novoa, M., Mosberg, M., Movik, S., Muok, B., Nightingale, A., Ojha, H., Sygna, L., Taylor, M., Vogel, C., & West, J. J. (2021). Adaptation interventions and their effect on vulnerability in developing countries: Help, hindrance or irrelevance? *World Development*, *141*, 105383. https://doi.org/10.1016/j.worlddev.2020.105383

Escobar, A. (2011). Sustainability: Design for the pluriverse. *Development*, *54*(2), 137–140. https://doi.org/10.1057/dev.2011.28

Florida, R., & Kenney, M. (1988). Venture capital and high technology entrepreneurship. *Journal of Business Venturing*, *3*(4), 301–319. https://doi.org/10.1016/0883-9026(88)90011-0

Florida, R., & Smith, D. F. (1990). Venture capital, innovation, and economic developmemt. *Economic Development Quarterly*, *4*, 345–360. https://doi.org/10.1177/089124249000400405

Franco, J. C., & Borras, S. M. (2019). Grey areas in green grabbing: Subtle and indirect interconnections between climate change politics and land grabs and their implications for research. *Land Use Policy*, *84*, 192–199. https://doi.org/10.1016/j.landusepol.2019.03.013

Franz, T., & McNelly, A. (2024). The "finance-extraction-transitions nexus": Geographies of the green transition in the 21st century. *Antipode*, *56*(4), 1289–1307. https://doi.org/10.1111/anti.13049

Frimpong Boamah, E., & Murshid, N. S. (2019). "Techno-market fix"? Decoding wealth through mobile money in the Global South. *Geoforum*, *106*, 253–262. https://doi.org/10.1016/j.geoforum.2019.08.012

Gabor, D. (2021). The wall street consensus. *Development and Change*, *52*(3), 429–459. https://doi.org/10.1111/dech.12645

Gaddy, B., Sivaram, V., & O'Sullivan, F. (2016). *Venture capital and cleantech: The wrong model for clean energy innovation*. MIT Energy Initiative Working Paper. MIT.

Green, W. N. (2024). The anti-politics of impact investment: Financial self-regulation, market competition and over-indebtedness in Cambodia. *Environment & Planning A*, *56*(6), 1668–1685. https://doi.org/10.1177/0308518X241239797

Haag, S., Tunn, J., Kalt, T., Müller, F., & Simon, J. (2024). *Who profits from the green energy rush? Derisking and power relations in Africa's renewable energy finance*. The Transnational Institute.

Hafner, S., Jones, A., Anger-Kraavi, A., & Pohl, J. (2020). Closing the green finance gap – A systems perspective. *Environmental Innovation and Societal Transitions*, *34*, 26–60. https://doi.org/10.1016/j.eist.2019.11.007

Hargadon, A., & Kenney, M. (2011). *Venture capital and clean technology: Opportunities and difficulties*. Berkeley Working Paper Series.

Harvey, D. (2001). *Spaces of capital: Towards a critical geography*. Edinburgh University Press.

Hilbrandt, H., & Grafe, F.-J. (2022). Urban visions of global climate finance: Dispossessive mechanisms of futuring in the making of groy. *International Journal of Urban and Regional Research*, *46*(5), 896–905. https://doi.org/10.1111/1468-2427.13106

Hunsberger, C., Corbera, E., Borras, S. M., Jr., Franco, J. C., Woods, K., Work, C., de la Rosa, R., Eang, V., Herre, R., Kham, S. S., Park, C., Sokheng, S., Spoor, M., Thein, S., Aung, K. T., Thuon, R., & Vaddhanaphuti, C. (2017). Climate change mitigation, land grabbing and conflict: Towards a landscape-based and collaborative action research agenda. *Canadian Journal of Development Studies/Revue canadienne d'études du développement*, *38*(3), 305–324. https://doi.org/10.1080/02255189.2016.1250617

Jammulamadaka, N. (2018). The contradiction of Indian innovation: An epistemological explanation. *Qualitative Research in Organizations and Management: An International Journal*, *14*(2), 194–216. https://doi.org/10.1108/QROM-04-2018-1632

Kalinowski, T. (2024). The Green Climate Fund and private sector climate finance in the Global South. *Climate Policy*, *24*(3), 281–296. https://doi.org/10.1080/14693062.2023.2276857

Khoday, K. (2019). *Closing the green finance gap* [www document]. UNDP. Retrieved April 25, 2024, from https://www.undp.org/blog/closing-green-finance-gap

Kraemer-Eis, H., Botsari, A., Gvetadze, S., Lang, F., & Torfs, W. (2021). *The importance of private equity and venture capital financing for greentech companies in Europe*. Société Universitaire Européenne de Recherches Financières (SUERF).

Kraus, J. (2024). *Five maddening facts about climate finance*. African Arguments. Retrieved May 3, 2024, from https://africanarguments.org/2024/01/five-maddening-facts-about-climate-finance/

Le-Lannou, A. (2024). *The World Bank and climate finance: Success story or a new era of green 'structural adjustment'?* [Www Document]. Bretton Woods Project. Retrieved May 3, 2024, from https://www.brettonwoodsproject.org/2024/04/the-world-bank-and-climate-finance-success-story-or-a-new-era-of-green-structural-adjustment/

Long, J. (2021). Crisis capitalism and climate finance: The framing, monetizing, and orchestration of resilience-amidst-crisis. *Politics and Governance*, *9*(2), 51–63. https://doi.org/10.17645/pag.v9i2.3739

Mavhunga, C. C. (2017). Introduction: What do science, technology, and innovation mean from Africa. In C. C. Mavhunga (Ed.), *What do science, technology, and innovation mean from Africa?* (pp. 1–28). Massachusetts Institute of Technology.

Mbembé, J.-A., & Meintjes, L. (2003). Necropolitics. *Public Culture*, *15*(1), 11–40. https://doi.org/10.1215/08992363-15-1-11

Meattle, C., Padmanabhi, R., Fernandes, P. d. A., Balm, A., Chiriac, D., & Tonkonogy, B. (2022). *Landscape of climate finance in Africa*. Climate Polcy Initiative.

Mirumachi, N., Sawas, A., & Workman, M. (2020). Unveiling the security concerns of low carbon development: Climate security analysis of the undesirable and unintended effects of mitigation and adaptation. *Climate and Development*, *12*(2), 97–109. https://doi.org/10.1080/17565529.2019.1604310

Müller, F. (2024). Energy colonialism. *Journal of Political Ecology*, *31*(1), 701–717. https://doi.org/10.2458/jpe.5659

NDC Partnership. (2023). *Closing the climate finance gap*. [www document]. Retrieved April 25, 2024, from https://ndcpartnership.org/news/closing-climate-finance-gap

Ni, H., Luan, T., Cao, Y., & Finlay, D. C. (2014). Can venture capital trigger innovation? New evidence from China. *International Journal of Technology Management*, *65*(1-4), 189–214. https://doi.org/10.1504/IJTM.2014.060957

OECD. (2023). *Scaling up the mobilisation of private finance for climate action in developing countries: Challenges and opportunities for international providers*.

Oliveira, V. M. D. (2021). *Hospicing modernity: Parting with harmful ways of living*. North Atlantic Books.

Omukuti, J. (2020). Challenging the obsession with local level institutions in country ownership of climate change adaptation. *Land Use Policy*, *94*, 104525. https://doi.org/10.1016/j.landusepol.2020.104525

Omukuti, J. (2024). The need for a climate-resilient development-aligned framing of innovative climate finance. *Current Opinion in Environmental Sustainability*, *66*, 101400. https://doi.org/10.1016/j.cosust.2023.101400

Omukuti, J., Barrett, S., White, P. C. L., Marchant, R., & Averchenkova, A. (2022). The green climate fund and its shortcomings in local delivery of adaptation finance. *Climate Policy*, *22*(9-10), 1225–1240. https://doi.org/10.1080/14693062.2022.2093152

Owen, R., Brennan, G., Lyon, F., & Harrer, T. (2021). Financing cleantech SME innovation: Setting an agenda. *IEEE Transactions on Engineering Management*, *68*(4), 1168–1172. https://doi.org/10.1109/TEM.2020.3005702

Panda, A. (2023). Transformative finance for climate-resilient development. *Current Opinion in Environmental Sustainability*, *64*, 101327. https://doi.org/10.1016/j.cosust.2023.101327

Partech. (2022). *2022 Africa tech venture capital report* [www document]. Partech. Retrieved April 26, 2024, from https://partechpartners.com/africa-reports/2022-africa-tech-venture-capital-report

Peake, S., & Ekins, P. (2017). Exploring the financial and investment implications of the Paris Agreement. *Climate Policy*, *17*(7), 832–852. https://doi.org/10.1080/14693062.2016.1258633

Perros, T., Unsworth, S., Ali, M., Bisaga, I., & Tomei, J. (2024). Towards responsible and fair pay-as-you-go energy access in sub-Saharan Africa. *Nature Energy*, *9*(5), 520–525. https://doi.org/10.1038/s41560-024-01490-1

Pfotenhauer, S., & Jasanoff, S. (2017). Traveling imaginaries: The "practice turn" in innovation policy and the global circulation of innovation models. In D. Tyfield, R. Lave, S. Randalls, and C. Thorpe (Eds.), *The Routledge handbook of the political economy of science* (pp. 416–428). Routledge.

PricewaterhouseCoopers. (2023). *State of Climate Tech 2023: Investment analysis* [www Document]. PwC. Retrieved April 26, 2024, from https://www.pwc.com/gx/en/issues/esg/state-of-climate-tech-2023-investment.html

Prudham, S. (2009). Pimping climate change: Richard Branson, global warming, and the performance of green capitalism. *Environment & Planning A*, *41*(7), 1594–1613. https://doi.org/10.1068/a4071

Quijano, A. (2007). Coloniality and modernity/rationality. *Cultural Studies*, *21*(2-3), 168–178. https://doi.org/10.1080/09502380601164353

Roberts, J. T., & Weikmans, R. (2017). Postface: Fragmentation, failing trust and enduring tensions over what counts as climate finance. *International Environmental Agreements: Politics. Law and Economics*, *17*, 129–137.

Scott Cato, M. (2022). The chequered history of climate finance. In M. Scott Cato (Ed.), *Sustainable finance: Using the power of money to change the world* (pp. 39–59). Springer International Publishing. https://doi.org/10.1007/978-3-030-91578-0_3

Searle, L. G. (2018). The contradictions of mediation: Intermediaries and the financialization of urban production. *Economy and Society*, *47*(4), 524–546. https://doi.org/10.1080/03085147.2018.1538638

Sial, F. (2024). *Blended finance can perpetuate climate colonialism* [www document]. Climate Home News. Retrieved May 3, 2024, from https://www.climatechangenews.com/2024/02/15/blended-finance-can-perpetuate-climate-colonialism/

Smith, A., & Fressoli, M. (2021). Post-automation. *Futures*, *132*, 102778. https://doi.org/10.1016/j.futures.2021.102778

Songwe, V., Stern, N., & Bhattacharya, A. (2022). *Finance for climate action: Scaling up investment for climate and development*. Report of the Independent High-Level Expert Group on Climate Finance.

Tarvainen, A. (2022). The modern/colonial hell of innovation economy: Future as a return to colonial mythologies. *Globalizations*, 1–23. https://doi.org/10.1080/14747731.2022.2048460

Unsworth, S., Ahlborg, H., & Hellberg, S. (2023). Agency, directionality, location and the geographic situatedness of knowledge making: The politics of framing in innovation research on energy. *Environmental Innovation and Societal Transitions*, *49*, 100780. https://doi.org/10.1016/j.eist.2023.100780

Unsworth, S., Ahlborg, H., & Hellberg, S. (2025). "We don't have time": How imaginaries of urgent energy system change marginalise locally driven pathways. *Energy Research & Social Science*, *120*, 103888. https://doi.org/10.1016/j.erss.2024.103888

van Lente, H. (2021). Imaginaries of innovation. In B. Godin, G. Gaglio, and D. Vinck (Eds.), *Handbook on alternative theories of innovation* (pp. 23–36). Edward Elgar Publishing.

van Meeteren, M., & Bassens, D. (2024). Financial geography has come of age: Making space for intradisciplinary dialogue. *Finance and Space*, *1*(1), 27–34. https://doi.org/10.1080/2833115X.2023.2258046

Vicente, P. N., & Dias-Trindade, S. (2021). Reframing sociotechnical imaginaries: The case of the Fourth Industrial Revolution. *Public Understanding of Science*, *30*(6), 708–723. https://doi.org/10.1177/09636625211013513

Willett, J. (2020). Challenging peripheralising discourses: Using evolutionary economic geography and, complex systems theory to connect new regional knowledges within the periphery. *Journal of Rural Studies*, *73*, 87–96. https://doi.org/10.1016/j.jrurstud.2019.11.016

Wójcik, D., Bassens, D., Knox-Hayes, J., & Lai, K. P. Y. (2024). Revolution, evolution, progress: Finance & space manifesto. *Finance and Space*, *1*(1), 1–12. https://doi.org/10.1080/2833115X.2023.2275952

World Economic Forum. (2022). *Closing the investment gap: Policies to accelerate transition finance*.

World Economic Forum. (2023). *Be inspired by these climate finance community-based success stories* [www document]. Retrieved May 3, 2024, from https://www.weforum.org/agenda/2023/11/inspired-climate-finance-community-based-success-stories/

Zhang, K. Q., Chen, H. H., Tang, L. Z., & Qiao, S. (2022). Green finance, innovation and the energy-environment-climate nexus. *Frontiers in Environmental Science*, *10*, 1–13. https://doi.org/10.3389/fenvs.2022.879681