

Entrepreneurship as Pharmakon: Carbon Removal Technology and the Challenges of Legitimation

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Introduction

Collective efforts aimed at curbing a portending climate catastrophe can be roughly divided into two major camps: those trying to reduce carbon emissions (the reduction camp), and those trying to remove the carbon already in the atmosphere (the removal camp, or CDR¹). To meet targets set by the Intergovernmental Panel on Climate Change (IPCC) and therefore to avoid catastrophe, we need efforts from both camps and beyond, as the IPCC has emphasised in its latest (2022) report. The relationship between the two camps, however, has not always been cordial. While both pursue the same overall goal of sustainability, some radical activists from the reduction camp oppose the CDR technology, trying to suppress its progress, going so far as to forcibly shut down CDR research facilities (The Economist, August 2021).

These radical activists argue, with strong conviction, that our main task should be reducing emissions. We should achieve this, furthermore, by implementing wide and far reaching systemic reforms that can overhaul the entire modern capitalist economy, rendering it more sustainable but also more equitable (Klein 2015, Hickel 2019). A technological solution to climate change, according to this camp, is not only a pipe dream. It also creates moral hazard, giving "Big Oil" a free pass while diverting resources away from what really matters. CDR technology, therefore, should be treated with skepticism and even hostility—according to this camp.

The CDR camp disputes these claims. By and large, members of the CDR camp identify as staunch environmentalists themselves, expressing support for all efforts aimed at reducing emissions. They argue, however, that reducing emissions is not enough. They argue that it is virtually impossible to achieve our environmental goals without removing giga-tons of carbon from the atmosphere every year. Developing and utilising CDR technologies, such as direct air capture (DAC), is therefore a necessity, whether we like it or not (ETC Report 2022²).

¹ CDR stands for Carbon Dioxide Removal.

² <https://www.energy-transitions.org/new-report-mind-the-gap-cdr>

The conflict between the two camps, as one might observe, revolves around at least two primary themes: the role of CDR technology in climate action, and the legitimacy of this emerging class of technology in the larger sociopolitical context. Exploring the latter theme, legitimacy, is the subject of this paper.

I explore this theme empirically in the context of an "open hardware" online community that engages in CDR research and development while at the same time engaging in advocacy action, trying to gain government support for CDR projects in some states in the US and a number of countries around the world. It also functions as a hub that connects CDR startups and advocates everywhere, monitoring the pulse of the whole industry as it emerges.

Notably, this community is an informal partial-organisation that is made up entirely of volunteers.

Focusing on this community and some of its affiliates, I am beginning a prolonged project of digital ethnography, intending to examine the legitimisation strategies employed by the advocates of CDR. I am going to contribute to the literature by extending theory on **regional legitimisation**, building on prior research especially Kibler et al. (2014), Vestrum et al. (2017), and Patzelt & Shepherd (2011).

Regional legitimisation is a core component of the CDR legitimisation process because CDR facilities that capture carbon directly from the air are large and expensive facilities that are installed in specific localities. These facilities have both positive and negative externalities and, as such, their construction requires the approval and the cooperation of local communities. Interacting with these local communities and gaining their approval entail specific legitimisation strategies that have not been properly identified before. This is because CDR, as a controversial class of emerging technologies, has given rise to a complex new set of ethical issues that pose complex new challenges to legitimisation.

Relevance of Erstwhile Sustainable Ventures

It is important to keep in mind that while CDR is part of the larger category of sustainable environmentalism, its legitimisation does not follow in the footsteps of previous sustainable ventures—such as the renewable energy industry. Sure enough, the renewable industry entrepreneurs have had to engage in collective political action to promote their cause (Pinkse & Groot, 2015). By and large, however, they

have had to compete against the forces of the market, aiming for cost efficiency above everything else (MacKinnon et al., 2021).

CDR, by contrast, has to grapple with the forces of the market as well as the ideological pushback coming from the environmental movement itself.

This means the legitimacy gained by the renewable industry in the past has not been automatically transferred to CDR. There has been no "legitimacy spillover". Quite the contrary. After having gained its own tentative legitimacy, the renewable industry has actually become part of a new status quo that CDR has to fight now.

This phenomenon is consistent, at least partly, with the model that Kuratko et al. (2017) put forward—regarding the paradox of new venture legitimation. These authors demonstrate that when an entirely novel technology or venture emerges from within an incumbent entrepreneurial ecosystem, it faces a strong legitimation challenge from the incumbent ecosystem itself. Paradoxically, it faces less challenge from the larger domain outside the incumbent ecosystem.

The novel CDR technology, as this model would predict, does indeed face great challenge from within the sustainability ecosystem itself. Whether it faces less challenge from the world outside this ecosystem is not clear yet.

What is clear is that the sustainability ecosystem is currently part of the status quo that CDR has to persuade in order to gain its own legitimacy. This is not a matter of mere cost efficiency anymore. It's a matter of reckoning with a complex set of new ethical and sociopolitical intricacies specific to this emerging field.

In conclusion, the legitimation trajectory of prior sustainability industries cannot be a direct roadmap for CDR.

Theoretical Underpinnings

I shall begin my theoretical analysis by pointing out that the two opposing sides in our story, the fanatical activists from the emissions reduction camp and the advocates from the CDR camp, have very different relationships to technology: one camp sees it as threat and the other sees it as opportunity.

This dual relationship to technology is not a new phenomenon. It is in fact very old, going back at least a few millennia. In order to better

formulate it, I draw on the work of the French philosopher of technology, Bernard Stiegler, who employs the concept of **pharmakon** in reference to technology (Stiegler 2013, 2018). Pharmakon, a term whose etymology as a philosophical term dates back to ancient Greece, indicates something, anything, that can function as both poison and cure——literally or figuratively.

Bernard Stiegler's classic example for this is "writing" (Stiegler, 2013). Plato, reflecting Socrates in Phaedrus, expressed aversion to writing because writing facilitated the creation of "artificial memory", impeding our ability for engaging in original thought in dialogue with others. Stiegler, inspired by his renowned teacher Jacques Derrida, makes the case that the externalised artificial memory created by writing is in fact necessary for engaging in original thought. Writing, which is an ancient technology, is therefore a pharmakon. It can have the poisonous effect Plato warned about, and it can contain the very cure to that poison.

Stiegler uses the term pharmakon to refer to technology in general. For most any technology can indeed be both a source of destruction, increasing entropy and death, and a facilitator of life-affirming creative negentropy. It can be both poison and cure.

Based on Stiegler's approach, I propose that transitioning from entropic to negentropic technology (transitioning from bad pharmakon to good pharmakon) can be seen as the conceptual basis of legitimation. Given the crucial role entrepreneurship can play in this transition, I also extend the concept to entrepreneurship itself, therefore proposing "entrepreneurship as pharmakon" as a new construct.

Dean & McMullen (2007) actually offer a concrete example of this. Since human-driven environmental degradation is partly a result of market failure, and since market failures can provide opportunities for entrepreneurial exploitation, Dean & McMullen (2007) argue that "environmentally relevant market failures represent opportunities for achieving profitability while simultaneously reducing environmentally degrading economic behaviors."

This is a conceptualisation of entrepreneurship as good pharmakon (or negentropic pharmakon).

York et al. (2016) also find that "environmental entrepreneurs are motivated by identities based in both commercial and ecological logics", meaning, in Stieglerian jargon, they see entrepreneurship as an instrument of negentropy——or good pharmakon.

As it happens, CDR entrepreneurs and advocates do indeed see their endeavour in the same way. They see CDR as good pharmakon. What's interesting is that the rest of the environmental ecosystem doesn't. In

other words, the environmental entrepreneurs that Dean & McMullen (2007) and York et al. (2016) refer to above operate within a context that has already gained a degree of legitimacy. Advocates of CDR, by contrast, do not enjoy such privilege. They have to reckon with the old environmental paradigm as the new status quo.

In Stieglerian terms, the old paradigm sees CDR as entropic (bad) pharmakon while CDR considers itself negentropic (good) pharmakon. To legitimate itself, CDR needs to transform its image from the former to the latter—especially at the regional level.

Regional manifestation of the conflict between the two camps in our story is of utmost significance. Research on regional legitimation, however, is scant. Kibler et al. (2014) is one of the very few serious undertakings in this particular context. I intend to expand on this work, incorporating it into the "pharmacological" analysis presented above, so I can extend its explanatory power to the nuanced case of CDR legitimation.

I shall do this by drawing on my empirical findings—as these findings begin to produce inductive resolutions.

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