



# In search of plan(et) B: Irrational rationality, capitalist realism, and space colonization

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## ABSTRACT

We apply the concepts “irrational rationality,” a term condensing the Frankfurt School’s assessment of the contradictions of capitalist rationalization, and Fisher’s (2008) notion of “capitalist realism,” the termination of the ability to imagine alternatives to capitalism, to sociologically analyze the case for space colonization as a means to preserve the human species from a catastrophic ecological future. Along with failing to make a convincing instrumental case for space colonization as an effective means to preserve the species, justifications for space colonization are irrationally rational because they employ the same logic and inversion of means and ends that oversaw the degradation of Earth. Capitalist realism underpins the contemporary case for space colonization as the continuation of capitalism is not only taken for granted, but, further, capitalist priorities are used as justification. The case for space colonization is untenable when social alternatives to capitalism, the driver of the ecological crisis, are considered.

## 1. Introduction

During an interview in 2018, the now-former Amazon CEO Jeff Bezos made the following comment: “The only way that I can see to deploy this much financial resource is by converting my Amazon winnings into space travel!” (quoted in Nolan, 2021). On July 20th, 2021, the second richest man on Earth exchanged a fraction of his “winnings” to leave Earth for an 11-minute trip aboard a rocket designed by his company, Blue Origin (Wattles, 2021). Bezos’ trip is a brief spectacle in a growing “billionaire space race” (Whittington, 2021) between “space barons” who have the longer-term goal of colonizing space (Davenport, 2018). Coupled with new developments in space technology, the prospects of commercial space travel, and related trends, the billionaire space race further substantiates the need for what Peters (2017) calls a “sociology of outer space” to examine questions ranging from the development of space technology and space law to the militarization of space and privatization of space travel. Our focus here is on the sociological dimensions of justifications for space colonization. More specifically, we are interested in the political-economic conditions that give *context* to proposals of space colonization – on Mars, the Moon, or space stations - as a method of species survival in response to climate change’s projected harms, and what these proposals illuminate about contemporary ideology.

Past work on the sociological dimensions of space colonization tend to focus on identifying potential problems of social organization that space colonies may experience and how to address them (e.g., Heppenheimer, 1979, ch. 9; Ashkenazi, 1992) and what impact space exploration has on society and vice versa (e.g., Dick & Launius, 2007). In contrast, we are interested in what proposals for

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space colonization say about ideology and social organization here on Earth. Our primary contribution to futures studies is drawing on and developing two concepts that help illuminate the social conditions that influence the ideological web through which post-climate collapse futures are envisioned: *irrational rationality* and *capitalist realism*. “Irrational rationality” is a term that refers to the tendency of instrumental or means-ends rationality to reflect, encourage, and justify irrational social conditions, a paradox described by the Frankfurt School and others. “Capitalist realism” is a term developed by Mark Fisher (2008) to elucidate the ideology and real condition of a post-postmodern world in which the idea that there is no alternative to capitalism has become a taken-for-granted pseudo-natural fact. Both concepts elucidate the social formation that presupposes and constitutes the case for space colonization as a climate change response.

To clarify, our goal is not to pejoratively call those who argue in favor of space colonization irrational ideologues. Instead, we are interested in the irrational social parameters in which space colonization proposals develop as well as what the case for space colonization clarifies about ideology in contemporary capitalist societies. Our argument, in a nutshell, is that space colonization as a species-survival strategy only “makes sense” or attains relative validity in a particular taken-for-granted social context in which humans and nature are wholly subordinated to a necessarily expanding economic system, to which there seems to be no viable alternative. If this were not the case, a more rational alternative to space colonization would be pursued (e.g., an Earth-bound society that produces and consumes fewer unnecessary goods and services).

Despite this qualifier, we acknowledge that, when developing the arguments below, our imagined interlocutor was, at times, an Elon Musk-type figure, one with a technocratic, asociological, and exceedingly techno-optimistic outlook. This typification will probably not accurately portray most readers, however. In contrast, some of those reading this article may be in favor of, or sympathetic toward, increasing research on, and resources for, space colonization, yet simultaneously disapprove of the social forces that we argue perniciously create the conditions for space colonization efforts. For example, one can simultaneously oppose capitalism - or at least frown on extreme inequality - and argue in favor of space colonization. We have three points that we invite this latter audience to consider while reading: (1) the argument that space colonization is an ineffective, inefficient, and potentially unjust method for species preservation in response to a worsening ecological crisis; (2) the argument that the push for space colonization draws resources and attention away from potentially more effective, efficient, and just methods to address the ecological crisis; and (3) an invitation to pay more attention to how the current social order shapes the case for space colonization. Point (3) is important because those groups who are currently in power will ultimately make the most consequential decisions about space colonization, assuming that society does not fundamentally change before these decisions are made. Yet even if society does fundamentally change, and space colonization efforts are embedded in more desirable social conditions, we think that points (1) and (2) will remain valid.

In what follows, we first summarize recent justifications for space colonization. Following, we conceptualize the notion of irrational rationality and capitalist realism. We then argue that recent cases for space colonization are constituted by irrational social conditions that invert means and ends and, further, the case for space colonization as a survival strategy implicitly assumes that there is no alternative to capitalism and functions as a fantasy of escape from a real contradiction between climate stability and capitalism.

## 2. The back-up plan(et): why space colonization?

We begin by describing some of the most advanced space colonization projects. There are multiple proposals being seriously considered, invested in, and developed for space colonization, including those led by billionaires Musk and Bezos. In contrast to the environmentalists claiming “there is no planet B,” these individuals and organizations see things differently.

Musk and his company SpaceX aim to make humans a multiplanetary species (SpaceX, 2020). Musk envisions starships carrying cargo to Mars in up to 1000 trips per year. These starships could carry around 100,000 people every 26 months when the Earth and Mars are best aligned for the 6-month journey. The vision is a Martian city with over a million people. Musk envisions abundant jobs, solar powered hydroponic farms, direct democracy, and fewer laws. He describes the self-sustaining city as having an “outdoorsy, fun atmosphere” with a glass dome so people can walk around without a space suit. SpaceX is planning to send an unmanned rocket to Mars with cargo by 2022 and a rocket with cargo and crew in 2024. Musk has stated that by 2050, he will send a million people to Mars (Locke, 2020). Musk has also stated that such colonies will be necessary to save the seeds of human civilization in the face of “another dark age” or planetary apocalypse (Carson, 2018).

Bezos is also moving forward with plans for space colonization via Blue Origin. Bezos imagines multiple space colonies orbiting Earth holding over a trillion people. Based on author Gerard O’Neill’s 1970s book, Bezos aims to create O’Neill’s vision of orbiting cylindrical space stations between the Moon and Earth. As described by Foer (2019), the space stations would be colonized with soil and biodiversity from Earth, allowing up to trillions of people to live in flourishing societies. Blue Origin plans to first land on the moon, bring in cargo loads, and create a lunar settlement to extract resources. Both Blue Origin and SpaceX received government contracts in 2020 to work on lunar landers for a 2024 mission to the Moon (Scheetz, 2020). In addition to fulfilling a life-long dream, creating space colonies for Bezos represents a way to address humanity’s growing energy and resource demands, stating that if we have to stop growing, “that will be a very bad future,” and that “[w]e have to go to Space to save Earth” (quoted in Foer, 2019).

Justifications for space colonization are historically and culturally diverse, including the utopian Russian cosmists who hoped to achieve human immortality through space travel (Groys, 2018). Here we focus on contemporary justifications of space colonization as a survival strategy in the face of climate change and other crises making the Earth increasingly “inhospitable” and even, someday, perhaps “uninhabitable” (Wallace-Wells, 2020). The idea is that humans must find ways to live off-Earth, as our planet is becoming increasingly difficult to live on and may become impossible to live on as we face escalating existential threats. Indeed, scientists are increasingly stating that climate change and biodiversity loss represent threats to our survival as a species (IPBES, 2019; Lenton et al., 2019; Ripple, Wolf, Newsome, Barnard, & Moomaw, 2019; Steffen et al., 2018). While some may disregard this warning as

exaggerated, for many people – including future-thinking billionaires – this is a real threat and requires that we respond and plan accordingly. Here we look at justifications for space colonization as an approach to protect people from increasingly inhospitable conditions on Earth.

The idea of creating a back-up plan(et) (Piper, 2018) through space colonization is not new, as scientists and public intellectuals including Carl Sagan and Stephen Hawking have been quoted stating we need space colonization as a way to protect humans and bring civilization back in the case of a catastrophic event on Earth. While this event could be an asteroid, it could also be human caused, from nuclear war to climate and ecological breakdown. Due to the need to protect the human species, it is argued that “[w]e have an obligation to colonize outer space” (Munevar, 2019: 38), in the form of colonies on Mars, the Moon, or space stations. Space colonization projects are increasingly framed as necessary to protect humans from existential threats on Earth and as morally obligatory to save the species. The moral argument is summarized well here:

[w]e have an obligation to ensure the long-term survival of our species. We ought, then, to expand beyond Earth, because once humans are established elsewhere in the heavens, our species will no longer be vulnerable to catastrophes on Earth. (Stoner, 2017)

This supports what Abney (2019) calls the “interstellar doomsday argument”: if something is going to destroy Earth, we must move off-planet. Thus, engaging in space colonization represents a morally obligatory risk mitigation strategy: not putting all your eggs (humans) in one basket (Earth).

The existential threats we face could be “natural” risks, like an asteroid or supernova, but more pressing are the existential threats caused by humans. These “[a]nthropogenic existential risks. . . are man-made in that they are the direct or indirect consequence of the technological progress of our civilization” (Kovic, 2020: 2). Here we focus on the case for space colonization in response to human-caused ecological risks.<sup>1</sup> Scientists are increasingly warning that due to human activities causing climate change and biodiversity loss we face existential threats; again, our current course puts our species at risk (see above). As explained by Levchenko, Xu, Mazouffre, Keidar, and Bazaka (2019: 2), as “our ever growing environmental footprint threatens the survival of the human race on Earth. . . Colonization of other planets could potentially increase the probability of our survival.” Green (2019: 37) argues that it is imperative to save our species and to pursue space colonization as a means to do so, explaining that the fact that “we are our own worst threat does complicate the matter, but not enough to warrant a morose resignation towards thinking we deserve our own demise.”

Already, space colonization efforts are well underway. In the US, we see the federal government supporting Musk’s SpaceX and Bezos’ Blue Origin through subsidies and contracts (Billings, 2019; Scheetz, 2020). Some claim that these efforts are now unstoppable – that space colonization is inevitable. Others argue that the resources and attention should instead be used to address problems on Earth (e.g., poverty, health, food distribution) as well as the drivers of escalating existential threats – namely the climate and ecological crisis. As space colonization projects move forward, many scholars, scientists, and citizens debate the morality of these efforts with contrasting arguments: (1) that we are morally obligated to proceed, or (2) that it would be immoral to proceed when recourses could be used to address problems and threats on Earth (see *Futures* special issue in 2019: vol. 110). To fully understand space colonization as a response to existential threats, we also need to understand additional motivations that may also be pushing projects forward.

Beyond a focus on human survival, others have pointed to other underlying and sometimes implicit motivations supporting the case for space colonization, a combination of conquest, competition, wealth accumulation, and ego. As described by Stoner (2017: 5), colonizing space represents a key step to “fulfil our pioneering nature.” Conquest, domination, and resource exploitation motivated much of the colonization of “new worlds” on Earth. We see similar motivations to build cities on the Moon and Mars with industries to extract resources and accumulate wealth. With current space projects, we also see motivations that include “gaining political and economic leadership” (Schwartz, 2019: 56). Firms are already competing to see who will receive government contracts and who will be the first to take key steps toward building a space colony. Desires for achievement and superiority also drive space colonization. As Bas Londrom has stated, “If humanity can send humans to Mars, is there anything we cannot do?” (MarsforMany.com, cited in Stoner, 2017). Musk explains that staying on Earth is not a “bright future” and that “the thing that is super important in the grand scale of history is, are we on a path to becoming a multi-planet species or not” (Marino, 2019: 15). Especially in the US, there is an ongoing culture of individualism, competition, conquest, and living free of limitations that together fuels a new “manifest destiny” for space (Billings, 2019: 46). Traphagan (2019: 48f) believes an “Abrahamic” worldview, where humanity is special and needs to be persevered, undergirds the case for space colonization. DeVito (2019:54) explains that one force pushing space colonization is “the egos of some people.” Beyond individuals, human ego motivates space colonization through justifications that humans will “make the universe a better place” (Green, 2019: 37). Yet, how can we make the universe a better place when we cannot address the problems here on Earth?

In what follows, we continue past work to explore the human dimensions of space colonization by analyzing justifications for space colonization and embedding the case for space colonization in a specific social and historical context. Examining the case for space colonization in historical context shines light on the social conditions that lend relative validity to the idea that leaving Earth to save the species is more realistic than changing the social conditions that threaten to make the Earth uninhabitable. Two concepts are helpful here: irrational rationality and capitalist realism.

<sup>1</sup> Thus, we only briefly examine arguments that space colonization is the most viable method for surviving asteroid collisions and related threats.

### 3. Irrational rationality and capitalist realism

Here, we conceptualize irrational rationality and capitalist realism, which are then used to sociologically examine justifications for space colonization as a life-saving strategy and response to climate change. The first concept is drawn from the critical theory of the Frankfurt School and the second from Mark Fisher's *Capitalist Realism* (2008).

#### 3.1. Irrational rationality

The term "irrational rationality"<sup>2</sup> is meant to refer to a reduction of the scope and practice of rationality to self-preservation through means-ends calculation that paradoxically inverts means and ends. The conceptualization of irrational rationality draws heavily from the first-generation Frankfurt School, especially Max Horkheimer. Unlike many prior sociologists and philosophers during the "crisis of reason" from the mid-nineteenth century through the First World War who encouraged a romantic return to "life," the emotions, passions, etc. against reason (see Jay, 2016: ch. 4), the Frankfurt School's analysis of the irrational dimensions of contemporary rationality was meant to make reason more rational. Thus, the value-loaded concept "irrational rationality" should not be misunderstood as a romantic denunciation of rationality as such, but, instead, continuing the Frankfurt School's intention: an immanent critique of reason meant to encourage rationality to live up to its own promises.

The Frankfurt School argues that reason has been "reduced to its pragmatic significance" (Horkheimer, 1978: 28) and stripped of its emancipatory dimensions, such as using "existing objects as well as the active inner strivings and ideas of man to construct standards for the future" (Horkheimer, 1972: 148; see Jay, 2016: ch. 5). For example, Horkheimer (1947: 143, 150) comments how - in the industrial-capitalist world, where any thought that is not of immediate use to industry or powerful organizations is "considered vain or superfluous" - even workers, who were supposed to be the "gravediggers" of capitalism, have closed their minds "to dreams of a basically different world" (cf. Marcuse, 1964). Instead of past "objective" forms of reason, which are primarily concerned with rationally formulating ends that are in harmony with a given totality (capable of answering substantive questions), reason is now stripped down to its "subjective," "instrumental," or "technological" form that "proves to be the ability to calculate probabilities and thereby to co-ordinate the right means with a given end" (Horkheimer, 1947: 5).

The problem, according to the Frankfurt School, is not that rationality has vanished. In fact, rational calculation is prevalent: reason is

indispensable in the modern technique of war as it has always been in the conduct of business. ... It is a pragmatic instrument oriented to expediency, cold and sober. ... When even the dictators of today appeal to reason, they mean that they possess the most tanks. They were rational enough to build them; others should be rational enough to yield to them. (Horkheimer, 1978: 28)

Instead, the problem is that reason, due to its instrumentalization and formalization, has slipped into irrationality when it can no longer set ends beyond self-preservation using its own powers. The inability of reason to justify the ends of action leads to a number of interrelated contradictions, including the inversion of means and ends and the undermining of the organizing aim of instrumental reason: species survival. These ironies of instrumental reason are discussed in turn.

One irony of instrumental (means-ends) rationality in the modern period, identified by Simmel, Weber, Husserl, and others, is its inversion of means and ends. Means, especially technology and economic activity, have been elevated to ends, and means, such as life-flourishing and humanity, have been reduced to means. In other words, production and technological development are valued for their own sake while life and humanity are conceived of as tools to grow the economy and develop technology (e.g., the Trump administration's political response to the Covid-19 pandemic). The inversion of means and ends is not a "natural" or autonomous development intrinsic to the nature of reason or technology: "[h]uman toil and research and invention is a response to the challenge of necessity" (Horkheimer, 1947: 153). The inversion of means and ends is a byproduct of a society in which capital and technology really do dominate the lives of humans. The elevation of technology and production for the sake of production—"the deification of industrial activity" (Horkheimer, 1947: 152)—are closely bound due to industrialism, where technological development is a sign of economic "health." In these conditions, "people make toil, research, and invention into idols. Such an ideology tends to supplant the humanistic foundation of the very civilization it seeks to glorify" (Horkheimer, 1947: 153).

In addition to the elevation of technology and the economy to ends and reduction of humanity and life to means, another more general dimension of the inversion of means and ends is the service of human life to meet survival needs instead of creating a society that allows humanity to flourish after survival needs are met. The reduction of reason to self-preservation can only be understood in the context of a society that, despite massive gains in productivity and the fact that we have the technical capacity to meet all basic survival needs today, maintains conditions—capitalist relations of production structured around the profit motive—in which the vast majority of humans are living to survive rather than surviving to live. Survival still "depends on adaptation to a constantly changing and inherently unpredictable economic system," which conditions a calculating form of rationality (Cook, 2008: 7). In these conditions, the

<sup>2</sup> The concept of "irrational rationality" should not be confused with Caplan's (2000) notion of "rational irrationality," where rationality is reduced to "unbiased" expectations (i.e., beliefs about the world consistent with the beliefs of economists) and where "irrational" beliefs, such as supporting public education (Caplan, 2018), are "goods" that one trades for wealth, increasingly so when the "price" for "irrational" behavior is low (e.g., voting). This conception of rationality as purely self-interested utilitarian calculation is precisely what the Frankfurt School saw as a historical outcome of reason that had freed itself from moral and aesthetic dimensions, dimensions qualitatively different from the logic that goes into choosing between buying corn dogs or hot dogs.

only rational aim is subjective interest in self-preservation “for its own sake” (Horkheimer, 1947: 94). The question of *why* we should live, despite the question’s ultimate importance in past forms of reason, is a nonsensical question within the framework of pure instrumental reason and, if it is asked at all, the answer is reduced to opinion.

Given the reduction of reason to self-preservation, the most pronounced contradiction of the inversion of means and ends is the undermining of species survival. The Frankfurt School argues that the quest to master nature had dovetailed with the blind domination of nature and other humans. When the advancement of rationality is unreflective and merely “the exploitation of nature transferred to men and continuing to work in them,” it undermines the only aim of instrumental reason, “the growing ability of the human species to preserve itself” (Adorno, 2006: 16). Adorno (1973: 66) helpfully describes the interplay of environmental mastery and the “revenge of nature”: “[t]here is a universal feeling, a universal fear, that our progress in controlling nature may increasingly help to weave the very calamity it is supposed to protect us from.” In other words, “utilitarian pseudo-progress” (Adorno, 1984: 95) undermines the possibility of realizing the promises of progress and, instead, threatens to end in a catastrophe. The cold calculation of self-preserving reason undermines human preservation. Below, we examine justifications for space colonization as a climate change response and life-saving strategy, illustrating how such strategies tend to elevate the economy and technological progress to ends and while failing to reflect on how the underlying rationality for space colonization is of the same kind that led us to our current predicament of looking for a new planet.

### 3.2. Capitalist realism

Capitalist realism is a concept introduced to describe the “widespread sense that not only is capitalism the only viable political and economic system, but also that it is now impossible even to *imagine* a coherent alternative to it,” an “invisible barrier constraining thought and action” (Fisher, 2008: 2, 16) embodied in the slogan that it is “easier to imagine the end of the world than to imagine the end of capitalism” (Jameson, 2003: 73). Capitalist realism is an anti-ideology ideology of lowered expectations, one that implicitly justifies capitalism negatively and indirectly: “capitalism may not be perfect,” the typically unstated legitimization goes, “but it is the only possible socio-economic system that protects us from terror and totalitarianism of past political projects.” Post-Fordist worker-consumers are assured that it is far better to be a disengaged cynical spectator than, what is assumed to be the only alternative, a fanatic dogmatist.

Capitalist realism is distinct from postmodernism—when the latter term is understood as an objective cultural condition birthed by consumer capitalism, rather than a viable theory—because: (1) a more ubiquitous and profound “cultural and political sterility” has hardened as there are now no “really existing” political alternatives (i.e., state “socialism”) (Fisher, 2008: 7); (2) modernist cultural forms are no longer confronted and commodified as they were in postmodernism, but, instead, modernism is irrevocably lost; and, most importantly, (3) capitalism has already absorbed everything “external.” There are no longer any outside opposing forces to absorb: “[c]apitalism seamlessly occupies the horizons of the thinkable” (Fisher, 2008: 9). There is no longer an interplay between alternative oppositional potentials and their incorporation into capitalism via commodification. Instead, there is a “precorporation” of subversion: “the pre-emptive formatting and shaping of desires, aspirations, and hopes by capitalist culture” (Fisher, 2008: 10).

Social conditions today, Fisher (2008: 16ff) reasons, cannot be challenged through moral critique because capitalism now swiftly offers immediate solutions, many false solutions to be sure, for its alleged moral shortcomings (e.g., humanitarian rock concerts to address poverty). The only potentially successful ideology critique of capitalist realism is “if it is shown to be in some way inconsistent or untenable; if, that is to say, capitalism’s ostensible ‘realism’ turns out to be nothing of the sort” by confronting the pseudo-natural reality of capitalism with the *Real*, “a traumatic void that can only be glimpsed in the fractures and inconsistencies in the field of apparent reality” (Fisher, 2008: 16, 18). Looming environmental catastrophe is a key example. On the one hand, capitalist realism assumes that any environmental problem can be solved through capitalist processes (e.g., green consumerism) and always assumes that resources are infinite. On the other hand, the real consequences of a prospect of environmental catastrophe for capitalism are “too traumatic to be assimilated into the system” (Fisher, 2008: 18) precisely because environmental problems like climate change are endemic to the basic processes of capitalism, namely its need for constant growth (see also Foster, Clark, & York, 2010; Stuart, Gunderson, & Petersen, 2020). In this paper, we argue that the case for space colonization as a survival strategy is best understood in the context of capitalist realism. Paraphrasing Jameson, the notion of capitalist realism can help illuminate why it is easier to imagine McDonald’s on Mars than to imagine the end of capitalism.

## 4. The case for space colonization: irrational rationality and capitalist realism

We now apply the concepts of irrational rationality and capitalist realism to sociologically examine the case for space colonization as a means to save humanity from escalating existential threats on Earth. By “sociologically examine,” we mean seeking to understand justifications for space colonization in specific historical conditions. For example, the social conditions that drive climate change also condition the case for space colonization as a post-catastrophe survival strategy.

We first explore the rationality of justifications for moving off-planet, and if space colonization is indeed more likely to save human lives than other approaches to solving social problems on Earth. We then illustrate how justifications for space colonization prioritize increasing profits and economic growth (cf. Jackson, 2021) and, more broadly, the case for space colonization does not consider Earth-bound social alternatives to capitalism.

#### 4.1. The irrational rationality of space colonization

While there are incredible challenges that could potentially limit visions of space colonization, our focus is to examine if space colonization is rational in terms of preserving the human species from the escalating existential threats on Earth. From what we know, does space colonization represent an effective and efficient way to protect the human species? How rational are the justifications for space colonization to save the human species on their own instrumental grounds? We argue the following: (1) that alternatives to Earth are obviously far more inhospitable for human life than Earth and, thus, preserving Earth is more instrumentally rational; (2) if the goal of space colonization is to preserve the human species, then it is more instrumentally rational to save many more lives on Earth than create space colonies for a small population who can afford the ticket; and, most importantly, (3) there is reason to predict that humans would take an irrational rational logic with them to space, the same rationality that oversaw the destruction of Earth and brought them off-planet in the first place. The point is to develop an immanent critique of the instrumental case for space colonization to show the extent to which this form of logic is still unreasonable, even judged by its own means-oriented criteria.

While space colonization is justified to avoid risks and threats on Earth, there will be new risks and threats in space – some that are even more severe. Kovic (2020) discusses some of these risks and in certain scenarios the risks of space travel and colonization greatly outweigh the risks of staying on Earth and the benefits of colonizing space. Kovic (2020): 3) explains,

[i]n general, there are two ways in which space colonization-related risks might affect the long-term future of humankind. First, humankind might become more susceptible to existing (existential) risks. Second, space colonization itself might create new (existential) risks that could result in highly undesirable or even catastrophic outcomes.

Kovic (2020) in the end argues that prioritizing space colonization as a survival strategy overlooks or ignores the high probability of existential threats and risks in space. The rapid creation of new technologies for space living may also create unexpected consequences and risks that could undermine or threaten space colonization. For example, on Mars, hostile conditions including dust storms, sub-freezing night time temperatures, and lack of water or carbon-dioxide to grow plants (Szocik, Wójtowicz, Rappaport, & Corbally, 2020) could result in death, starvation, cannibalism and extremely stressful survival decisions causing “astronomical amounts” of suffering (Torres, 2018: 75).

In addition, the space colonies currently proposed still would not protect humans from large-scale stellar events like supernovae or an expansion of the sun. As explained by Stoner (2017) in the context of a Mars colony, the same risks as well as new risks make the colony very dangerous and protective measures would be immensely expensive in a cost-benefit analysis:

[i]f the goal is species survival, and given that the Martian environment is much less survivable than even a post-strike Earth would be, then there is no remotely realistic budget point at which the marginal dollar would be more effectively spent on Mars colonization than on protecting Earth and the creatures and civilizations that evolved to live within its shelters.

Stoner (2017) goes on to argue that the analysis for the operations of projects like those of SpaceX, “only appears rational because they have carefully loaded the comparison scenarios in a way that guarantees a pro-colonization conclusion.” While space colonization may be a better preservation strategy than doing nothing, there are many more options that are less risky and more likely to preserve a greater number of human lives.

Another commonly overlooked aspect of space colonization as a species survival strategy is the fact that not everyone will be able to go, and many of Earth’s commoners and poor will likely be left on Earth. Only a portion of the human population would be able to live off-planet, perhaps only the economic elite. It is not unreasonable to assume that, if there are large inequalities in power and wealth, that the most wealthy will be in power and that these elites will decide to be the “lucky” few space settlers. It is not possible for Mars, for example, to provide a safe habitat for all humans on Earth. Thus, a possible scenario is economic elites leaving behind the vast majority of humans on an inhospitable Earth. As Billings (2019: 45) questions,

“how many poverty-stricken Bangladeshis, how many sub-Saharan Africans, how many permanently displaced Syrian refugees, how many disabled and unemployable workers could come up with \$200,000 – or \$2,000,000 for that matter – to move to another planet and start a new life. What are the ethics of giving the rich yet another advantage over the poor? What are the ethics of ignoring the need to check the rapid pace of climate change on our own planet?”

Under capitalism, any solution to crises on Earth focused on moving off-planet will likely exclude the masses and the poor. Are these lives not worth saving? Are there other strategies that would save more lives?

Saving the most present and future human lives would require addressing the threats on Earth, including climate change, biodiversity loss, poverty, disease, and famine. As stated by Kovic (2020: 6), “[g]iven these acute problems, pursuing space colonization today could be a misguided use of limited resources.” He poses the following question: If the goal is to save as many lives and to maximize overall wellbeing, then why focus on an alternative that only benefits a very small population, while the vast majority struggle to survive or perish? Others argue that much more than human lives need to be saved to live successfully off-planet; we need a diversity of other organisms and a measurable portion of the Earth’s biodiversity (Johnson, 2019). Given the rate of existential threats like climate change, how much time is there to develop this technology and transport all people and enough other organisms off-planet? If the goal is species survival, the time (and the immense resources required) could be spent in more effective ways to benefit all people and species. However, these alternatives are unseen or considered impossible in the context of capitalist realism (see preceding section).

Lastly, the current social order dominating human-human and human-material relations (capitalism) is likely to result in negative outcomes and problems even off-planet. For example, mining and development on Mars would very likely be environmentally destructive as colonization is unlikely to have a light impact on the planet (Stoner, 2017). We would bring these relations and the

associated problems with us. As Marino (2019: 15) explains,

[i]n Musk's view we need a back-up planet. But he doesn't acknowledge that we ourselves are the cause of this dire situation. And therein lies the problem and the reason we, as a species, have no business trying to colonize another planet. Musk's reason for wanting to colonize Mars is to save ourselves from ourselves and it is self-evident that this alone recommends we should not be going anywhere.

There is no reason to assume that we have learned our lesson on Earth and will create a new civilization with better outcomes, when the same system and drivers (namely, capital accumulation) continue to dominate the social order.

Billings (2019) reminds us that while one may wish to "start fresh" in a new colony, humans will take the drivers of crises and collapse with them. These drivers and forms of logic are precisely why humans find themselves discussing the possibility of moving off-planet in the first place. This fact should inspire collective reflection and deliberative discussions on the purpose of life and alternative ways of organizing social relations to achieve this purpose. However, for irrational rationality, the latter substantive questions answered through communicative action are an irrelevant waste of time - at best, "mere opinion." In contrast, the ostensibly "practical" and "realistic" technological rationality responds by designing ever-more sophisticated technics for the irrationally rational purpose of rushing off to space to continue the instrumental crusade of blind domination. This is the elevation of means to ends, the irony of contemporary instrumental reason diagnosed by the Frankfurt School. Rather than serving a better world, technological development and production today are ends to be pursued for their own sake. That is, because we can no longer set aims through reasonable criteria, we pursue aims, such as economic growth and technological development, that are set by a semi-autonomous economic system. For the Frankfurt School, these are irrational conditions because technology and economic activity should be instruments to serve humanity, rather than humanity serving technology and economic activity.

In summary, the associated risks, inequities, and costs do not support the argument that space colonization is an effective and efficient strategy to preserve the species from existential threats on Earth. The polemical point here is to highlight how the heights of instrumental rationality—hi-tech plans to colonize space to ensure species survival—are irrational because the case for space colonization: (1) fails to make a convincing instrumental case on its own grounds (i.e., space colonization is not an efficient and effective means to safeguard the species) and, (2) by elevating means (namely economic activity) to ends, exhibits the same kind of logic that caused the Earth-bound problems that space colonization is responding to. The inversion of means and ends is examined further in the context of capitalist realism.

#### 4.2. Capitalist realism underpins the contemporary case for space colonization

This section continues the sociological examination of the case for space colonization by drawing on Fisher's (2008) concept of capitalist realism. The social context of capitalist realism helps illuminate the case for space colonization in three ways:

- (1) Capitalist goals inform contemporary justifications for space colonization and, more fundamentally, the assumption that capitalism will carry on in the long-term is unquestioned.
- (2) The future fantasy of space colonization deters attention from more effective and just solutions to the ecological crisis.
- (3) The case for space colonization is only viable if there are no alternatives to capitalism. In other words, when social alternatives to capitalism are considered, space colonization as a climate change strategy is unjustifiable.

We discuss each point in turn.

That capitalism as a system is taken-for-granted in the case for space colonization, and capitalist priorities inform motives to colonize space, is not surprising when space colonization is framed as a solution to future ecological collapse. The only climate change solution strategies being widely adopted or seriously considered in policy circles and international organizations are solutions in line with capitalist goals. Project Drawdown (2021), for example, claims to offer the most comprehensive set of solutions to minimize global warming. Their mission is simple: "stopping catastrophic climate change — as quickly, safely, and equitably as possible." Yet, all their solutions must meet five specific criteria, the second one being: "Is it economically viable? In other words, is there a business case?" (quoted in DiCaprio 2019). Only solutions that fit this "win-win" model are supported. Those that might be more effective but will not result in profits are discarded.

Project Drawdown is only one example of the norm: solutions to the ecological crisis that reproduce rather than challenge the current social order (e.g., Foster et al., 2010; Stuart et al., 2020a). In a paradigm where all solutions must adapt to capitalism, we find justification for space colonization if other technological strategies are not enough to save humanity. Indeed, although rationalized by aspirations to save humanity, those who actually have control over the plans for space colonization seem to be focused more on maintaining the current system and chasing profit. Not only could a space colony unintentionally recreate the same social conditions that lead to its formation (see preceding section), but there is evidence that this may be precisely why space colonies would be formed in the first place. For example, Bezos envisions the Moon as the future "manufacturing sector of the universe" (Liberto, 2019). Or take the case of keeping a Martian colony warm: fossil fuels extracted on Earth could be burned in space transport and at colony sites, increasing fossil fuel profits. Relatedly, there are plans to mine Mars and the Moon for minerals to increase wealth accumulation. In addition, the companies working on space colonization projects are private companies with "pecuniary reasons" for their projects beyond saving (some of) humanity (Kovic, 2020: 5). As affluence represents a primary driver of the existential threats humans face (Wiedmann, Lenzen, & Keyßer, 2020), it is not surprising that the primary supporters of space exploration are billionaires trying to flee problems of the system that lined their pockets.

The case for space colonization is not only a social-reproduction strategy in the sense that, if successful, it could maintain the current system and even allow those profiting from the current system to continue to benefit as Earth faces increasing threats. It is also a social-reproduction strategy because it deters attention from social alternatives that have the potential to address the ecological crisis. Like other “false solutions” to climate change that deter attention and resources from the need for systemic change to reduce emissions (Stuart, Gunderson, & Petersen, 2020b), hopes of escaping Earth’s problems through a future home on a space colony weakens the case for solving Earth’s problems. Why not trash the planet if a Golden Ticket to live in an “outdoorsy, fun atmosphere” on Mars awaits? In other words, the case for space colonization is another silver bullet narrative that delays concrete action and maintains the current system. Fisher would add here that the case for space colonization further allows ideology to escape from the contradiction that ecological collapse is built into the basic processes of capitalism. This reality is “too traumatic to be assimilated into the system” (Fisher, 2008: 18) and space colonization is a comforting futuristic fantasy to flee this trauma.

Our claim that the case for space colonization is blind to social alternatives is illustrated by the extreme techniques necessary to make Mars colonization a real possibility, especially biotechnological alterations of the human body. As explained by Szocik et al. (2020), because the Martian environment is exceptionally harsh and different than Earth, we may need to change the human genome and characteristics to be more suitable for colonization. Mars has less gravity but much more radiation, which could inhibit maintaining human civilizations on Mars. Protective gear would be necessary, but sterility could still result. Szocik et al. (2020) also explain that living in isolated conditions is psychologically stressful and the human psyche may not be able to stand up to the pressures. Therefore, we may need a “radical modification and interference with ‘human nature,’ psychology, and anatomy” to cope with these new conditions and we also may need to modify ethical and moral standards (Szocik et al., 2020: 10). With all of the modification that may be necessary, Szocik et al. (2020: 12) asks, “Is there a sufficiently strong reason to go to space which justifies the enhancement of future astronauts?”

In other words, it is easier to imagine the modification of the human genome to live on Mars than to imagine the end of capitalism. Such proposals are considered because changing the system continues to be an unattractive solution and to many, a “non-starter.” Kovic (2020: 5) explains that given the potential economic gains of technological development, space colonization “could be perceived as the more attractive option.” Green (2019: 37) makes this argument clear:

considering the relative difficulties of establishing world peace and regulating the development of all dangerous technologies, settling on Mars may actually be relatively easy. It certainly has fewer political difficulties, though the technical ones remain immense.

Green (2019: 37), therefore, concludes that space colonization is the “relatively-easiest solution to the problem of saving at least some of humanity.” In the eyes of most decision-makers, challenging the dominant social order, profits, and wealth accumulation simply is not an option. Capitalism remains inevitable and unquestioned: “there is no alternative.”

Skeptical readers may agree that capitalism is typically taken for granted in cases for space colonization but find this a moot point because *perhaps there really is no alternative to capitalism*. The prospects for an alternative to capitalism are grim. The concept of capitalist realism is meant to shine light on an ideology *and* real social conditions. In other words, capitalist realism does not arise from distorted beliefs, but is a response to social conditions that (seem to) close off the possibility for a better world. There is a genuine difficulty in imagining alternatives to capitalism in part because there is not a functioning political infrastructure or global social movement to alter current conditions. In this context, it is tempting to openly affirm or cynically accept the thought that the continuation of business as usual off-planet for those who can afford it really is easier to envision than the far simpler task of altering the social relations that drive climate change. Indeed, the fact that the case for space colonization strikes contemporary consciousness as a more realistic strategy than transitioning out of capitalism speaks to the helplessness and hopelessness of our times.

Despite the political-economic barriers obstructing social alternatives to the system driving climate change (capitalism), there *are* alternatives, and they should be kept in constant view. For example, the case for “degrowth” aims to keep energy and resource use within planetary limits by purposefully limiting material and energy throughput in wealthy countries through means such as worker, consumer, and energy cooperatives, work time reduction, deliberative democracy, and other means (e.g., Kallis, 2018; Hickel, 2020; Stuart et al., 2020b). Increasing economic growth is associated with greenhouse gas emissions, does not make humans happier after basic needs are met, and is an ecological impossibility in the long-term. Downscaling overall material and energy throughput to avoid catastrophic climate change is possible and can be achieved through desirable social changes that increase equality and happiness. Some will reasonably ask, “Could this work in the real world?”

We reply to the question “Isn’t ‘degrowth’ utopian (in the sense of unrealistic and unachievable)?” with a different question: *Why* is ceasing to produce and consume for the sake of production and consumption less realistic than space colonization? To make the proposal for degrowth more concrete, the following strategies are often proposed by “degrowthers” and related activists (e.g., “eco-socialists”): Using productivity gains to reduce the amount of time spent at work, upscaling renewable energy through cooperative ownership (and other forms of public ownership), and nationalizing fossil fuel companies in order to phase out most fossil fuel extraction while reemploying fossil fuel workers in renewable energy efforts (for summary, see Stuart et al., 2020a). On what grounds are these proposals unrealistic relative to space colonization? In comparison to space colonization, work time reduction, fossil fuel nationalization, and cooperative/public renewable systems are arguably more rational, realistic, and just strategies to address the threat of species extinction through ecological collapse. One reason these proposals may seem unrealistic is that they are labeled “political” while space colonization is considered an apologetic, merely “technical” approach. We disagree with this premise. One goal of this paper is to highlight how space colonization is *necessarily* political. From the seemingly purely technical decisions of space scientists to the sources and allocation of funding for colonization projects, the entire endeavor has a constant political-economic context, though one that is typically taken for granted, and will have social impacts. Thus, any of the questions leveled at

“political” approaches to address the ecological crisis should also be directed toward those advocating space colonization: *Is there a guarantee that this plan can be implemented? How are you going to gain mass support? The strategy is untested - what if it fails?* Etc.

Ideological norms are another basis for deeming work time reduction, fossil fuel nationalization, and publicly-owned renewable unrealistic. Indeed, capitalist realism sees all alternative models for the future as dogmatic and dangerous (Fisher, 2008). Further, these proposals go against the hegemonic notion that growth is good at all costs. In a recent piece, Tim Jackson (2021) argues that the billionaire space race is the “ultimate symbol of capitalism’s flawed obsession with growth” and highlights an irony: the quest for space colonization implicitly acknowledges that unlimited growth is impossible, yet simultaneously assumes that the solution to natural limits is more growth (into space). Yet ideology always has a social context. An accelerating capitalist “treadmill of production,” for example, provides historical validity to that idea that “growth is good” (Schnaiberg, 1980).

A third and more serious basis for labeling these strategies unrealistic relative to space colonization is discussed above: the problem of real political helplessness in developing a viable alternative to capitalism. We agree that the latter is an enormous obstacle to forming alternative social futures. Helplessness is one social cause of capitalist-realist ideology (Gunderson, under review). However, the awareness of possible social alternatives, and organizing social movements to achieve them, will remain a thorn in the side of capitalist realism, not to mention the only route to avoid climate catastrophe.

The continuation of capitalism assumed in the case for space colonization and capitalist priorities also explicitly inform motives to colonize space (e.g., it is supported by some billionaires precisely because it is a mean to increase profits). Focusing on space colonization detracts attention, resources, and energy away from the need to rapidly adopt systemic changes to save Earth. The case for space colonization is untenable when social alternatives to the structural drivers of possible ecological collapse are considered.

## 5. Conclusion

We apply the concepts “irrational rationality,” a term condensing the Frankfurt School’s assessment of the contradictions of capitalist rationalization, and Fisher’s (2008) notion of “capitalist realism,” the termination of the ability to imagine alternatives to capitalism, to sociologically analyze the case for space colonization as a means to preserve the human species from a catastrophic ecological future. Along with failing to make a convincing instrumental case for space colonization as an effective means to preserve the species, justifications for space colonization are irrationally rational because they employ the same logic and inversion of means and ends that caused the degradation of Earth. Capitalist realism underpins the contemporary case for space colonization as the continuation of capitalism is not only taken for granted, but, further, capitalist priorities are used as justification. The case for space colonization is untenable when social alternatives to capitalism, the driver of the ecological crisis, are considered.

One may respond to our analysis that a space colony is an opportunity for a “new beginning,” to create an off-planet utopia free of current historical fetters. Our reply is this: If there is an alternative social model to capitalism, which drives the ecological crisis, what aspects of a space colony are more conducive to the realization of this alternative? Why not pour resources, time, effort, and thought into building that utopia on what is, for now, a much more hospitable planet? A utopia that is more reflective, slower, less busy, and happier as well as works less and enjoys more. “That’s utopian,” scoffs a hypothetical SpaceX engineer who considers future plans for an outer-space colony on a planet with an average temperature of around minus 60 degrees C (Sharp, 2017), populated by human-Martians who have undergone extensive genetic modification, as comparatively down-to-earth thinking. That this kind of retort is valid in current social conditions is precisely the problem.

We close with a seemingly abstract passage from Adorno’s *Minima Moralia*, where he provides the image of a future utopia as a humankind whose needs are met and, upon realizing it is another animal on Earth, lies down to enjoy existence rather than “storming under a confused compulsion to the conquest of strange stars.”

“Perhaps the true society will grow tired of development and, out of freedom, leave possibilities unused, instead of storming under a confused compulsion to the conquest of strange stars. A mankind which no longer knows want will begin to have an inkling of the delusory, futile nature of all the arrangements hitherto made in order to escape want, which used wealth to produce want on a larger scale. ... *Rien faire comme une bête* [Doing nothing, like an animal], lying on water and looking peacefully at the sky, ‘being, nothing else, without any further definition and fulfilment’, might take the place of process, act, satisfaction, and so truly keep the promise of dialectical logic that it would culminate in its origin. None of the abstract concepts comes closer to fulfilled utopia than that of eternal peace.” (Adorno, 1974: 156–57)

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