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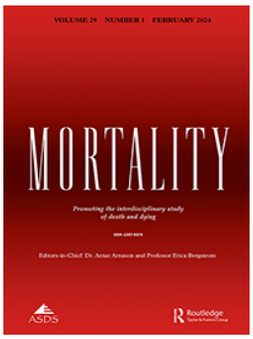

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Exploited in immortality: techno-capitalism and immortality imaginaries in the twenty-first century

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ABSTRACT

Immortality constitutes a very human desire and its pursuit arguably shapes prominent features of human societies. In the twenty-first century, capitalism develops technologies that promise immortality as indefinite survival. Scholars who study immortality often showcase the links between technology, social structures and immortality projects, but a critical inquiry is needed to examine how (techno-)capitalism creates immortality projects that expand the frontiers of capital in contemporary societies. In this article, I highlight how techno-capitalism configures three prominent immortality imaginaries: transhumanist digital immortality, radical biological life-extension, and cryonics. I identify three tendencies of techno-capitalism – 1) expanding commodification to new realms of life, 2) creating new forms of alienation and 3) subordinating life to the private accumulation of capital – and explain how they shape the immortality imaginaries. I argue that pursuing techno-capitalist immortality would induce significant harms for human beings, promising freedom from death but actually sustaining techno-capitalism's exploitative relations.

KEYWORDS

Immortality; techno-capitalism; imaginaries; exploitation; alienation; sociology of immortality

Introduction

Imagine a cybernetics company implanting life-saving protheses to a man, Mr. Jones, after he suffers severe accidents. Eventually, all of Mr. Jones' body becomes artificial, prosthetic. Mr. Jones cannot pay the cybernetics company for all his protheses, so the company sues him, demanding that the protheses be returned. Mr. Jones refuses returning his life-saving protheses because doing so would kill him. The cybernetics company then requests to acquire Mr. Jones in lieu of debt, claiming property over him. This nightmarish scenario is the plot of *Are you there, Mr. Jones?* by Lem (1969). What kind of world would we see if similar scenarios depicting immortality unfolded in real life?

Academics have begun to study immortality as a phenomenon worthy of sociological inquiry in recent decades. The emerging sub-field of 'the sociology of immortality' (Jacobsen, 2017c) integrates insights from the social sciences to study in nuanced and complex ways how human beings 'practice immortality'. Practicing immortality assumes

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symbolic forms like remembering the dead (Walter, 2017) or memorialising them in the public sphere (Kearl, 2010). Immortality can also be practiced in daily behaviour, for instance by exercising daily or following healthy diets (Jacobsen, 2017a). But immortality may also be practiced as a denial to global tendencies that threaten our survival, such as climate change (Dickinson, 2009).

In the twenty-first century, new developments in technology promise actual immortality, in reality a form of continuous, indefinite survival of the mind and the body (see Bauman, 1992b; Huberman, 2018). Projects that promise *immortality as survival* increasingly rely on advanced digital and biological technologies, with the process of reaching immortality constituting a technological practice. Heikkurinen (2018) views technological practice as a mode of being, with an insatiable tendency to transform, to make things out of other things. The projects that promise immortality as survival reflect this insatiable tendency, regarding the human organism to be perfectible and death an obstacle to be overcome (Huberman, 2021).

But projects of immortality as survival do not emerge in a vacuum. They are embedded in a techno-capitalist system and promoted in imaginaries by political-economic elites with ties to digital and biological technology corporations (Farman, 2020). Some scholars have discussed the relationship between technology, capitalism and immortality projects (Lafontaine, 2009; Öhman & Floridi, 2017; Romain, 2010), but this relationship warrants further critical inquiry. Why should the relationship between techno-capitalism and immortality be of concern? Because techno-capitalism's pursuit of immortality is inseparable from questions of power and wealth in contemporary societies. As Suárez-Villa (2009) argues, techno-capitalism deploys technique (inherent to the rationality of technological practice) to create social domination. Prominent imaginaries of techno-capitalist immortality conceal this social domination behind the promise of liberating us from death. A critical inquiry inspired by Marxist theory can reveal how techno-capitalist immortality projects shape and limit the experience of immortality, harming human beings in the process. Just recall poor Mr. Jones. Although he survived grievous accidents after being implanted protheses by the cybernetics company, he was reclaimed as company property.

In this article, I aim to offer a critical reading of techno-capitalism's problematic tendencies as depicted in imaginaries of immortality as survival. I review the literature on techno-capitalism and its sub-domains of digital capitalism and bio-capitalism, identifying three techno-capitalist tendencies: 1) expanding commodification to new realms of life, 2) creating new forms of alienation, and 3) subordinating life to the accumulation of capital. After framing imaginaries of immortality as suitable units of inquiry, I explain how techno-capitalism's tendencies shape three prominent imaginaries of immortality as survival: A) transhumanist digital immortality, B) radical biological life-extension, and C) cryonics. I argue that pursuing immortality as survival from within techno-capitalism induces significant harms for human beings, both individually and collectively, by perpetuating the system's exploitative relations. For this reason, immortality can become a prominent political-economic battleground in the twenty-first century.

I position my contribution as primarily theoretical, building on previous studies on this topic (Cohen, 2020; Farman, 2020; Romain, 2010). While empirically rich, the textured, on-the-ground depiction of actors, practices and technologies in these studies limits their critique of abstract capitalist processes that shape projects of immortality (Roberts, 2012).

I critically review the literature on transhumanist digital immortality, radical biological life-extension and cryonics, to illustrate how the imaginaries share problems rooted in techno-capitalism. I also reference organisations and groups pursuing these immortality projects for illustrative purposes, rather than approach it as empirical research. I thereby highlight how certain immortality projects expand the frontiers of capital in contemporary societies, trapping human beings in capitalist relations and subordinating immortality to corporate control.

Techno-capitalism and its harms

Techno-capitalism in the twenty-first century

The twenty-first century configuration of techno-capitalism constitutes a system – including its internal processes and interconnections – that produces advanced digital and biological technologies to facilitate the accumulation of capital. Once produced, capitalism's structural tendencies, like maximising profits and commodifying social relations, adapt to fit the new technologies. In techno-capitalism, corporations exploit technological creativity, commodify it, and direct it to create new inventions and innovations (Suárez-Villa, 2009). By focusing on twenty-first century techno-capitalism, I identify specific features previously absent in industrial variations of capitalism.

This understanding of techno-capitalism – and its sub-domains of digital capitalism and bio-capitalism[1] – opens a theoretical avenue for identifying problems in prominent imaginaries of immortality. Techno-capitalism uses advanced technologies under its control, such as digital technology and biotechnology, to modify people's bodies, minds and relationships with others to create profitable products and services. Examining techno-capitalism in the twenty-first century allows us to see how capital increasingly engulfs more dimensions of human life, including the pursuit of immortality.

Techno-capitalism's first sub-domain, digital capitalism, focuses on how investment in digital infrastructure boosts capital accumulation. Digital infrastructure then modifies how people and organisations increase their capital, for instance by strengthening private forms of ownership or creating new commodities and markets (Pace, 2018). In digital capitalism, capitalists own digital networks and infrastructure, and employ them for business ventures (see Schiller, 2007, 2011). Digital technology mediates the activities of workers who produce informational commodities in capitalist organisations, a process that extracts surplus value and reinforces class relations (Fuchs, 2013). Additionally, hardware, software and digital consumer goods constitute commodities in digital capitalism. When sold in the market, these commodities further capital accumulation (Fuchs, 2019; Pace, 2018).

Bio-capitalism fashions biomaterial into commodities by using different biotechnologies, such as stem cells and tissue engineering, gene modification and xenotransplantation (transplanting tissues and organs from one species into another). Biomaterials 'are increasingly inserted into projects of product making and profit-seeking', thus creating a 'novel kind of capital: biocapital' (Helmreich, 2008, p. 464). Commodities illustrative of bio-capitalism include genome sequences, pharmaceutical products, and tissues and organs grown for transplantation in external hosts. Under bio-capitalism, animals and plants are modified at the level of the organism and harnessed for industrial production of

medicines. These animals and plants are not simply commodities but biotechnologies themselves: 'As living organisms they are thus simultaneously "natural" and "technological", not simply an *outcome* of commodity production, but an *instrument* of it as well' (Fish, 2013, p. 13, emphasis in original).

Three harmful tendencies of techno-capitalism

Three tendencies characterise techno-capitalism: 1) expanding commodification to new realms of life, 2) creating new forms of alienation and 3) subordinating life to the private accumulation of capital. As commodification expands to new realms of life, the whole of the human being – the body, the emotional state, interpersonal relationships – becomes exchangeable for the right amount of money (see Petersen, 2018; Tang, 2021). Expanding commodification comprises a salient tendency of contemporary capitalism (Hall, 2022), and is accelerated by developments in digital and biological technologies. Techno-capitalism creates alienation by disturbing the relationship people have with the fruits of their labour. It also disrupts people's relationships with one another and with their own selves, estranging people from their bodies and minds (Prosono, 2008). Techno-capitalism similarly engulfs human interactions and the human body in logics of capital valorisation (De Rivera, 2020; Prosono, 2008). In doing so, techno-capitalism strips human beings of any intrinsic value, treating them only as means to further the private accumulation of capital.

Technology companies like Google, X (formerly Twitter) and Facebook extract personal data from users of their services and turn this data into informational commodities to obtain profits. Alienation separates the users of digital services from the product of their work. This alienation unfolds when human beings use 'Internet of Things' objects, like smart fridges or wearable devices, and they produce data later extracted by advanced technologies and turned into commodities that create value for the capitalists (Dahlgren et al., 2021). This process creates an asymmetrical power relationship that dispossesses users from their data (Thatcher et al., 2016). Moreover, the demands of capital subordinate social life because capitalist digital platforms like Facebook extract economic value from their users' interactions, like memorialising the dead (Bell et al., 2015). These platforms encourage certain types of communication (such as rankings between users or likes in publications) to fit capital's strategic needs (De Rivera, 2020).

Techno-capitalism also fashions biological elements of the organism into commodities. Petersen (2018) exemplifies this with the anti-ageing treatment market. Commodification unfolds when human cells are harvested, commercialised and exchanged in market-based relations. Alienation befalls human beings after separating elements of their organism, like stem cells, to further the production of commodified anti-ageing treatments. In Petersen's example, the demands of capital subordinate life because the corporations that offer anti-ageing treatments exploit ageing and health anxieties, and elements of the human body further their capital accumulation.

Echoing Bauman's assertions that immortality 'became one of the multitudes of objects of desire which markets are all-too-ready to supply and money (at any rate big money) can buy' (Bauman in Jacobsen & Kearl, 2014, p. 308), I contend that techno-capitalism's three tendencies also manifest in imaginaries of immortality as survival. Together, the three tendencies reproduce exploitative relations and dispossess human

beings from elements that are intrinsically theirs. In this article, the tendencies function as analytical categories that show how techno-capitalism configures prominent immortality imaginaries. For instance, expanding commodification could manifest with the appearance of services that treat the body or the mind, intimate domains of the human being, as commodities of the immortalisation process, exchangeable for money in market relations. Alienation could manifest in disrupting the relationship between the body and the mind or in extracting surplus value from commodified bodily elements. Finally, subordinating life to the private accumulation of capital could limit a person's ability to maintain an autonomous existence, independent from techno-capitalism.

Postmortal society and immortality imaginaries

Studying immortality from a social sciences perspective opens our eyes to the fact that immortality shapes society. Looking closely, we can see immortality present in our everyday practices, in newly-developed technologies, and in social structures. Cave (2012) argues that immortality drives civilisational endeavours, from creating institutions and belief systems to preserving the clan and the family. Studies on immortality often depict the contexts of Western, post-industrial societies such as the United States and the United Kingdom (Kearl, 2010; Walter, 2017), although some studies detail immortality projects in the Global South (Ewuoso & Fayemi, 2021; Maciel & Pereira, 2015). The immortality projects materialising around the globe indicate the presence of a 'postmortal society' (Jacobsen, 2017b).

The early twenty-first century sees multiple immortality projects surfacing continuously, with people aiming to transcend death primarily by performing life strategies or via symbolic forms of immortality. Life strategies diminish the power and influence of death via medicine, advanced technology and everyday health-driven actions, like engaging in self-care, taking pharmaceutical products, maintaining fitness and eating well (Bauman, 1992a, 1992b; Jacobsen, 2017a). Other strategies employ human enhancement technologies, such as regenerative medicine and stem cell donation, to maintain youth and achieve extended lifespans (Bonifati, 2017).

Symbolic immortality, in turn, refers to the human attempt to confront death anxiety in ways that allow us to feel posthumously connected to life's ongoing flows (Lifton & Olson, 1974). Symbolic digital immortality may involve people mourning and memorialising the dead through their remaining data in digital platforms, as well as creating and interacting with posthumous communication technologies (Hurtado Hurtado, 2023; Morse, 2023). Currently, cultural and religious practices even harness digital technologies to create new forms of interacting with ancestors, as seen in Japan (Gould et al., 2019).

Imaginaries, used here to denote collective ideas about longed-for futures of society that are also materially performed in the present, comprise rich sources of information to explore the societal reach of immortality projects. Contemporary imaginaries that show so-called 'actual' immortality – the indefinite survival of the body and mind through technology – appear in multiple media and are assimilated by social groups, like the transhumanists (Huberman, 2021). Immortality as survival produces social stratification, because it gives those with wealth and power higher degrees of freedom, allows them to live longer than the rest, and grants them higher chances of colonising the future (Bauman, 1992b).

The imaginaries of immortality as survival could be considered sociotechnical, because they rely on breakthroughs in science and technology to perform and materialise shared understandings of future visions of immortality (Jasanoff, 2015). Expectations about the future of immortality drive actors to materially perform them in the present, hoping to realise them. The literature on the sociology of expectations depicts actors imagining and reformulating their expectations as conditions change within sociotechnical environments, since artefacts and matter can resist attempts to shape or use them (Tutton, 2017). Importantly, as Groves (2017) notes, subjects co-produce sociotechnical environments – e.g. technological devices, infrastructures, specialist organisations – that simultaneously reflect their expectations and can be modified, but also limit the possibility of outsiders to modify the environments. Hence, actors like scientists, engineers, entrepreneurs and corporations, possess greater means for co-producing specific sociotechnical imaginaries, whereas outsiders – like the average citizen – may be excluded from obtaining the resources to envision and enact a comprehensive vision for the future (Tutton, 2022).

Focusing on how techno-capitalism pushes for imaginaries of immortality as survival brings into focus their internal contradictions and reveals how they create new forms of domination. Some scholars already recognise how capitalist dynamics appropriate (symbolic) immortality in corporate discourse and in the posthumous careers of dead celebrities (see Penfold-Mounce, 2020; Teodorescu, 2017). For imaginaries of immortality as survival, a Marxist-inspired critical reading would illustrate how resources and social stratification are key factors in creating the sociotechnical environments where ideas of immortality are performed (Pentaris, 2021). This means highlighting how specific subjects and groups imagine and enact their desired immortality imaginaries: primarily the capitalist class, supported by governmental organisations, entrepreneurs, and computer and biomedical scientists. Such a reading should account for how capital configures, enables or constrains the imaginaries. Additionally, the analysis should consider the differential benefits generated by the immortality projects and how, if at all, the immortality projects sustain techno-capitalism. To retain the critical potential of this reading and complement the rich empirical accounts of techno-capitalist immortality (Farman, 2020; Huberman, 2021; Romain, 2010), I adopt a panoramic perspective to represent the dynamics between actors, technologies and capital as instances of the three techno-capitalist tendencies, rather than considering the dynamics as causal factors of techno-capitalism (Roberts, 2012).

Techno-capitalism and immortality as survival: three imaginaries

In this section, I portray three imaginaries of immortality as survival – transhumanist digital immortality, radical biological life-extension and cryonics – and articulate how they are shaped by techno-capitalism. I explain here how techno-capitalism's tendencies of 1) expanding commodification, 2) creating new forms of alienation, and 3) subordinating (immortal) life to the private accumulation of capital configure each immortality imaginary. The imaginaries constitute suitable units of inquiry because they manifest how actors and technologies co-produce ideas and desires about immortality in complex political-economic environments.

Transhumanist digital immortality

The transhumanist imaginary of digital immortality consists of granting mind-continuity immortality by transferring the minds (consciousness) of human beings into technological vessels. Within the transhumanist digital immortality project, 'the continuity of the self, and its connection to something greater, entails re-conceptualising the person as not just a biological entity, but as a cybernetic one comprised of coded information' (Huberman, 2018, p. 58). Farman (2020) discusses how networks of immortalists, engineers and informatic futurists assimilate and promote ideas about the cosmos, including ourselves and our identities, being reducible to information. These actors then establish or associate with research centres and universities. In doing so, previously fringe ideas acquire legitimacy, shape mainstream science, and obtain financial capital from government organisations, like the National Science Foundation in the United States, and technology companies like Google and Neuralink Corporation.

Prominent figures endorsing this immortality project include Ray Kurzweil, former director of engineering at Google, and Martine Rothblatt, co-founder of the Terasem Movement. Rothblatt, in particular, outlines how transhumanist digital immortality could be achieved: technical specialists would record one's life in the form of 'mindfiles', subsequently used to create 'mindclones', identical digital copies of the self with 'cyber-consciousness' (Rothblatt, 2014). Rothblatt's example illustrates how scientists and engineers would act on collectively-shared ideas about immortality to develop technological artefacts.

Techno-capitalism and its three tendencies shape this imaginary as currently portrayed and enacted by its main actors and organisations. Commodification already appears in Rothblatt's depiction of for-profit mindcloning services. Rothblatt strongly suggests that access to these services would initially be based on wealth (Rothblatt, 2014, pp. 150–152). This would make access to immortality a luxury service. Moreover, commodification would underpin the private accumulation of capital, as implied in Rothblatt's account of the actors leading the transhumanist digital immortality project: entrepreneurs and businesses that collect, repackage and capture your data 'and deliver it to you neatly organized to upload into your mindfile with mindware. Certainly this is a business opportunity that won't be overlooked by data-collection companies, existing or yet to be started' (Rothblatt, 2014, p. 59). By transforming digital immortality into a business model, corporations would extract surplus value from a person's continuous digital existence and effectively become owners of immortal life (Peters & Jandrić, 2019).

Two technologies would facilitate the business models of transhumanist digital immortality: algorithms and brain scanners. Farman (2020) characterises algorithms as digital tools that mediate the interactions between human minds and machines. Farman emphasises algorithms' effectiveness at modifying subjectivities and behaviours in a way that favours Silicon Valley's techno-capitalism: people increasingly engage with algorithmic digital environments and shift their rationality and impulses, increasing Silicon Valley's profits. Human subjectivity would gradually resemble a relational database (Farman, 2020; Rothblatt, 2014), thereby facilitating mind-uploading.

Brain scanners would digitally model the brain and recreate its functions in an electronic medium. Nick Bostrom, transhumanist and director of the Future of Humanity Institute at the University of Oxford, proposes that a 'brain scan of

sufficient resolution could be produced by disassembling the brain atom for atom by means of nanotechnology' (Bostrom, 2003, p. 16). The idea of brain scanning already drives start-up technology companies to prototype it, as in the case of Nectome. Nectome cryopreserves brains for eventual high-resolution scanning and upload into a data server. Importantly, Nectome's co-founder Robert McIntyre attributes 'amazing commercial potential' to brain scanning, reflected in the private investments (more than $1 million USD) and public grants the company attracts (Regalado, 2018). Both algorithms and brain scanners show how breakthroughs in these technologies push forward the immortality agenda and attract new capital flows.

The above processes depict techno-capitalism perpetrating two forms of alienation. First, the mind is separated from the body and transferred to a technological vessel. This separation of mind from body makes the subsequent being a (trans)human digital immortal, a new kind of being. The digital immortal would constitute an informational commodity, insofar as private business owns the storage data servers and sells digital immortality as a service. Second, this process also transforms complex ways of thinking, desires and intuitions – elements of human subjectivity – into data and algorithms. Techno-capitalism therefore imposes upon human beings a form of instrumental, means-ends rationality and dispossesses them of their affective and creative impulses. The results are (trans)human digital immortals who lose much of their original humanity.

Achieving mind-continuity digital immortality would drive private capital accumulation. Based on what we know about the digital immortality industry today (Öhman & Floridi, 2017), we can foresee the following. First, techno-capitalist companies would develop and own the digital infrastructure needed to transfer the human mind into a digital vessel. Second, reaching mind-continuity immortality would become commodified in services offered by techno-capitalist companies. Third, keeping the digital immortals active, 'alive' may be subject to continuously paying for the commodified services, as in a subscription-based business model, unless the families of the immortals own the data servers and maintain them. Consequently, the existence of these digital immortals would depend on the profitability of the immortality services. Techno-capitalism could offer – and condition – differentiated tiers of immortality, with higher-priced services offering a 'fuller' digital afterlife experience and lower-priced services restricting much of the conscious digital afterlife. In this imaginary, techno-capitalism subordinates the experience of immortality to its profit imperative, regardless of any cost to the (trans)human digital immortal (Pentaris, 2021).

Radical biological life-extension

The imaginary of radical biological life-extension portrays the use of biomedical technologies to gain indefinite immortality and, in some cases, perpetual youth. Indefinite immortality and perpetual youth would be achieved by using the technologies of regenerative medicine, including stem cell engineering. Natasha Vita-More envisions regenerative medicine giving humans the capacity to self-repair, meaning that 'we will become physically regenerative. We will perpetually regenerate worn-out cells, turning diseased cells into operative ones' (Vita-More, 2008, p. 147). In this imaginary, scientists and clinicians partner with universities and private businesses, all of whom act on the shared belief that ageing is a disease that needs to be cured,

because cells themselves age and die, mutations accumulate, and our organisms become less resilient. Biomedical gerontologist Aubrey de Grey expresses this belief in his mission to comprehend '*the nature of the damage itself* – the accumulating lesions that are the source of age related loss of functionality in the organism – and then either to reverse that damage, or to eliminate its threat to our health and life expectancy' (De Grey & Rae, 2007, p. 78, their emphasis).

Techno-capitalism configures the bioeconomy to pursue the body's indefinite youth – essentially, a contingent form of immortality. San Francisco-based biotechnology company Altos Labs exemplifies this. The company launched with the goal of 'unraveling the deep biology of cellular rejuvenation programming' and restoring 'cell health and resilience to reverse disease, injury, and the disabilities that can occur throughout life' (Altos Labs, 2022). Its press release reveals that 'renowned company builders and investors' – including Yuri Milner and Jeff Bezos – gave the company $3 billion USD 'to integrate the best features of academia and industry' in developing transformative medicines (Altos Labs, 2022). The transformative medicines perform a dual role: as biotechnologies, they advance the agenda of the life-extension immortality imaginary and might even revolutionise medical interventions; as commodities, they increase the capital accumulation of techno-capitalist investors and corporations.

Techno-capitalism's radical biological life-extension imaginary subjects human beings to new manifestations of alienation. The first is alienation from other human beings by fracturing their network of social relations. It distances those who undergo life-extension from those who may wish, but cannot access, the same process due to high prices. Friends, family and other acquaintances would age and die while the life-extended humans remain young and healthy in their organism. Consequently, radical life-extension and perpetual youth would challenge evolutionary frameworks and break social connections by isolating and devaluing the elderly (Lafontaine, 2009).

The second manifestation of alienation is alienation from our bodies. In this imaginary, bodily regeneration uses our own bodies to produce stem cells that are engineered to create new organs or to help us self-repair (Vita-More, 2008). The capitalist corporation extracts value from the human body by obtaining non-differentiated cells, storing them, and then growing them as required. Then, they are sold back as treatments to the individuals who need them for the processes of bodily self-repair (Petersen, 2018). Recalling Fish (2013) and Helmreich (2008), this process transforms our own bodies into biotechnologies and biocapital, which become instruments for our commodified immortality projects of life-extension.

Subordinating life to the private accumulation of capital manifests in how organisations grant access to biomedical interventions. Several authors (Lafontaine, 2009; Petersen & Seear, 2009; Vita-More, 2008) portray highly sophisticated processes that require advanced technological infrastructure. But radical biological life-extension imaginaries depict this infrastructure as being developed with 'government support for the biotechnology-based economy, combined with continuing private sector investment in pharmaceutical and technological research and development (R&D) focused on the purported problems of ageing' (Petersen & Seear, 2009, p. 269). The technological infrastructure would likely be controlled by biopharmaceutical capitalist companies. To maintain their business models, biopharmaceutical companies would draft 'body maintenance contracts' between them, consumers and insurance companies (de Rosnay et al., in

Lafontaine, 2009). Fulfilling these contracts, however, would bind consumers to the companies' services if they wish to remain healthy and, importantly, continue postponing death. Hence, this immortality project depends on the private accumulation of capital in biopharmaceutical companies. If body maintenance became unprofitable, companies would abandon this attempt at immortality for other business ventures.

Cryonics

The cryonics imaginary of immortality depicts the preservation of the human body by subjecting it to extremely cold temperatures to revive it in the indefinite future. Preserving the body relies on vitrification, an approach that uses a chemical solution to replace water in cells, prevent the forming of ice, and maintain the functional integrity of the heart, lungs and brain (Cohen, 2020; Mercer, 2017). Cryopreserved individuals are declared legally dead, though the companies that store them view them as patients in deep unconsciousness (Mercer, 2017). The actors pursuing this immortality project share the belief in technological and biomedical progress, which leads them to develop better cryopreservation technologies and research potential revival and regeneration mechanisms. As described above, Romain (2010) views cryonics as an investment that seeks to overcome the obstacle of death and extend the life of a person into the far future. She considers cryonics to be specific to the United States because it is primarily of interest to Libertarian white males of the upper-middle classes. Bernstein (2019), however, identifies cryonics as an immortality project that is also pursued in contemporary Russia, while Lohmeier et al. (2015) find support for cryonics in Germany among middle-income respondents.

Techno-capitalism is integral in shaping cryonics' imaginaries because it commodifies cryonics in the form of market services. Though cryonics organisations such as Alcor Life Extension Foundation (henceforth, Alcor) and the Oregon Cryonics Institute are legally non-profit foundations, they have close links with life insurance companies (i.e. capitalist enterprises) that pay for the hefty fee of cryopreservation.[2] While the Oregon Cryonics Institute only charges fees for the cryopreservation services, organisations like Alcor rely on continuous payment from members (as of 2022, between $17 USD and $100 USD per month, based on age). Hence, paying for cryopreservation entails either purchasing specific forms of life insurance that cover cryonics services or paying full or in instalments for the service.

Commodification is not restricted to purchasing cryopreservation services. The cryonics imaginaries commodify the human body insofar as they promote the idea of investing in the cryopreservation of one's own body. Romain (2010, p. 205) characterises cryonics as 'very much a capitalist form that is similar to other types of insurance and speculative investment'. People view their bodies as objects to invest in, modify via cryopreservation and store for future revival. The human body thus becomes a commodity itself because maintaining its structural integrity makes the body financially valuable as an investment.

Alienation can unfold by shaping the subjectivities of cryonics customers, who begin to understand their bodies as something other than themselves. Some Alcor members characterise their own bodies mainly as containers of information: 'there's information in our bodies and our brains, we all know that [. . .]. Alcor

and cryonics provide me with a service where that information in my body and brain is stored and is preserved' (Alcor Cryonics, 2015a). Although this characterisation resembles the transhumanist digital immortality manifestation of alienation, most cryonics customers would expect a tangible embodied revival. Alienation also manifests in members' views on their cryopreserved bodies acting as an investment against death and disbelief at those who can invest in cryopreservation but ultimately choose not to: 'I cannot understand when I hear about people with millions or even billions of dollars dying when it's a tiny amount of their wealth. What's the downside? [. . .] I am very, very confident that this [cryopreservation] is going to work' (Alcor Cryonics, 2015b). The testimony additionally conveys how expectations increase (or hold back) investment in the techno-capitalist cryonics imaginary, but also reveals its main beneficiaries: the capitalist class, or customers who possess significant wealth and can invest in cryopreserving their bodies.

The cryonics imaginary subordinates immortal life to the private accumulation of capital insofar as revival depends on an individual's functional role in capitalism. Romain (2010, p. 205) argues that consumers of cryonics services 'buy the privilege to imagine a utopian future and abundant life, and they orient themselves toward this future; yet this is a privilege few can afford and even fewer think – or feel entitled – to purchase'. Their expected future revival could consequently benefit the (techno-)capitalist economy. First, the revival would require private investment in the technological infrastructure that enables it. Today, Big Tech figures such as Google co-founder Larry Page and PayPal co-founder Peter Thiel are driving investments in this area (Bernstein, 2019). Continued technological investment manifests in this imaginary with increasingly sophisticated cryopreservation techniques and storage vats. Second, and more significantly, the reintegration of the cryonics consumers towards the nebulous future is premised on their potential to consume more and acquire more material wealth. Romain describes how 'some cryonicists have devised ways to invest money in an interest earning dynasty trust so that it could be accessed after emergence from cryonic suspension in the future (and after it had accrued significant interest)' (Romain, 2010, p. 207). Techno-capitalism therefore harnesses cryonics as an immortality project with a potent appeal to the capitalist class: to live on into the far future to continue consuming and accumulating wealth. In this way, techno-capitalism perpetuates itself.

The harms of techno-capitalist immortality

I argue that pursuing immortality as survival from within techno-capitalism induces significant harms for human beings. Techno-capitalist immortality projects perpetuate exploitative relations and subjugate the humans who pursue immortality as survival to capital's imperatives. Techno-capitalism's three tendencies – expanding commodification to new realms of life, creating new forms of alienation, and subordinating life to the accumulation of capital – are integral to these imaginaries and to the immortality projects at their core. The three tendencies bring about destructive effects both at the individual and collective levels of human life. Therefore, societies that grant space for immortality projects to flourish *from within techno-capitalism* may have to confront challenges of great magnitude. A visual representation of these challenges is seen in Image 1.

Image 1. Societal tensions in future imaginaries of techno-capitalist immortality. Left: Transhumanist digital immortality procedure. Centre: Riots outside a company offering immortality services. Right: Luxurious healing facility for life-extension treatments. Concept art sketch commissioned by the author.

A first harm depicted in all the techno-capitalist imaginaries of immortality is the dependency of the immortals – whether they be digital, self-repairing and young, or cryoresurrected – to techno-capitalism. Because immortality is commodified in these imaginaries, the immortals' existence depends on the profitability of the immortality-granting services for the capitalist enterprises that offer them. This dependency reproduces techno-capitalism's exploitative relations because *the immortals cannot exist outside of capitalist relations*. Following Öhman and Floridi (2017), I view controlling a person's productive life activity as an act of aggression. In the imaginaries, the immortals structurally function as instruments of profit generation, not as autonomous subjects to whom human rights apply. Techno-capitalism treats the immortals as resources and hijacks their autonomy by extracting surplus value from the processes that grant them an immortal existence. I contend, opposing the claim that these immortality projects would free human beings from their biological limits and from death, that immortality granted by techno-capitalism traps people in an oppressive and exploitative system.

A second harm revolves around the consolidation of corporate power and the subsequent exacerbation of societal inequalities. Since the immortals' existence would depend on the private accumulation of capital, big capitalist companies of digital services and biotechnology would become centres of biopolitical control. Companies would decide who continues experiencing lives of privilege, and who does not. Referring to the (American) transhumanists, who often promote these imaginaries of immortality, Jenny Huberman describes how they aim to create 'topographies of privilege where the capacity to dictate who may escape death and live ever longer and more enhanced lives appears to be increasingly central to their attempts to establish their sovereignty and power' (2022, p. 69). This goal of the transhumanists reflects Bauman's (1992a, 1992b) insight that immortality projects and inequality are tightly interwoven. In line with this, Pentaris (2021) associates a capitalist essence to the transhumanist struggle against death, which heightens social stratification and deepens inequalities.

Average citizens, however, may support techno-capitalist endeavours. Romain (2010) and Lohmeier et al. (2015) show that middle-class groups might invest in these projects out of death anxiety or because they believe the benefits outweigh the costs. These groups can become potential markets that demand further development of techno-capitalist immortality projects. At the same time, scepticism and outrage at the primary investors and potential beneficiaries of these projects has been documented (Huberman, 2022; Hurtado Hurtado, 2022). This suggests that differential capabilities for envisioning and enacting imaginaries are at play here (Groves, 2017; Tutton, 2022). These imaginaries possess a potent appeal to members of the capitalist class, technology entrepreneurs, and to some engineers, computer and biomedical scientists, who aim to develop the technologies that would make immortality as survival a reality. Research institutes, technology companies, biomedical centres and governmental organisations aid them by granting funding and legitimacy to their visions. Their visions are then shared, and supported or critiqued, by outsiders.

The differential capabilities in imagining and enacting the future relate to the third harm: the totalising pretensions of the techno-capitalist imaginaries of immortality and their foreclosure of the possibility space for radical societal alternatives. Currently, the techno-capitalist imaginaries of immortality are inseparable from the oligarchical rule of wealthy elders and the exploitation of human and non-human beings (Huberman, 2022). But the literature on immortality shows plural ways of practicing immortality. Jacobsen (2017b) points to practices as diverse as digital remembrance and survival retreats. Similarly, Hurtado Hurtado (2022) describes three futures of immortality that foster intergenerational, ecological and post-anthropocentric immortality projects. An appropriate response to techno-capitalism's attempted colonisation of imaginaries of immortality would be to imagine modes of being – living, dying and being remembered – outside of these boundaries. Groups like The Order of the Good Death believe that integrating death as part of our lives can make us more ethical subjects (Dawdy & Kneese, 2022). Similar groups could challenge possible closures of the possibility space for practicing immortality and realise the potential of immortality projects that are democratic, cooperative and free. This is an ethico-political choice (Bryant & Knight, 2019).

I maintain, based on the three harms discussed above, that *immortality could become a new political-economic battleground* in the twenty-first century. In the United States, Dawdy and Kneese (2022) depict the antagonism between the DIY death-care activists, who value death's constitutive role in human life, and those transhumanists who seek immortality to perpetuate their privilege. Other societal problems, like the Climate and Ecological Emergency (CEE), raise similar prospects. Tony Walter notes that the CEE increases human intergenerational awareness of our actions, creating 'a global sense of the living and the dead and their effects on succeeding generations – the planet itself becomes a medium through which past, present and future generations influence each other' (Walter, 2022, p. 11). Walter evokes immortality projects based on remembering previous generations and adopting ecological immortality as a foundational worldview (see also Hurtado Hurtado, 2022). Such forms of symbolic immortality, however, might be meaningless to supporters of techno-capitalist immortality. Hence, conflicts might emerge between climate justice activists who promote ecological, collective forms of immortality and the

political and economic elites who pursue their own individualised forms. If the latter relentlessly pursued personal projects of immortality as survival, the negative effects would be felt beyond the domain of death and immortality practices, such as in the additional biophysical stress natural ecosystems would experience (see Heikkurinen, 2018).

Creating alternative immortality imaginaries raises two relevant questions. First, should commodification be avoided? Walter (2020) explains that death and dying move between commodification and de-commodification in the modern world. As the 21st century progresses, the same dynamic might occur with immortality projects. My concerns are that the immortals cannot exist independently of commodified services that drive the private accumulation of capital, and that the immortality projects only reinforce exploitative capitalist relations in societies. De-commodified immortality services, if they were to exist and be considered ethically desirable, would be preferable because they would escape the logic of capital accumulation.

Second, how could we promote alternative immortality imaginaries? Here, I affirm this is a matter of ethico-political imagination and its enactment. Eriksen (2021, p. 79) documents how immortality projects like Bina48 go beyond human concerns, aim to work for the betterment of humanity, and include 'the humanoid' in their ethical goals. This suggests the need of adopting a more-than-human ethics in creating alternative immortality imaginaries. Moreover, I propose that broader populations should gain control of the means to imagine and enact their desired imaginaries, and not leave the creation of imaginaries to the capitalist class, technology entrepreneurs, and networks of engineers and scientists.

Conclusion

This article's techno-capitalist imaginaries of immortality depict a perverse but likely irony. As I have argued, pursuing immortality as survival from within techno-capitalism might trap us in exploitative relations, rather than liberate us from our biological limits and death. Mr. Jones in Stanisław Lem's short story *Are you there, Mr. Jones?* was at risk of being destroyed, or otherwise permanently owned, by the cybernetics company that gave him his life-saving protheses. The techno-capitalist imaginaries of transhumanist digital immortality, radical biological life-extension and cryonics suggest similar consequences could await those who attempt to gain immortality through these means. These immortality projects also induce significant societal harms. They consolidate corporate power and increase the capacity of techno-capitalist companies to decide who gets to experience immortal life and who is left to die. The techno-capitalist imaginaries of immortality as survival hold captive the aspirations of the capitalist class and reproduce the hegemonic social order. This limits the emergence of more liberating ways of practicing immortality.

The potential for immortality to become a political-economic battleground in the twenty-first century thus invites us to consider emancipatory – rather than exploitative – immortality projects. What would they look like, and what features would they possess? Recalling Schulz (2015, p. 131), dissidents, warners and utopians must act to avoid the totalising grasp of hegemonic imaginaries. Critical social scientists thus have an important role to play. More scholarship on present and future conflicts in pursuing immortality

could illuminate ways for immortality to drive civilisational endeavours that create more just societies.

Notes

1. Other scholars suggest similar readings of techno-capitalism. See Suárez-Villa (2009) and Peters and Jandrić (2019).
2. See Alcor's membership section for details on payment: https://www.alcor.org/membership/.

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