



From creative destruction to convivial innovation - A post-growth perspective

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ABSTRACT

In this paper, we argue that the notion of Creative Destruction underpinning classical innovation management theory as well as having crystallised into technological determinism and productivism has come to a dead-end. Framing innovation's ultimate goal as the endless pursuit of economic growth is unrealistic if we wish to address pressing environmental challenges. We show that Creative Destruction historically emerged as an ideology from a specific set of values and worldviews at the cradle of Western capitalism and its need for valorisations. Capital valorisation imposes its logic on innovation, definition of needs, consumption, and organisation of work. The mantra of 'innovate or die' and its underpinning values represent a hegemonic view on technology aligned with the capitalist mode of production. We argue that a counter-hegemonic view emphasising conviviality and use-value is possible instead and needed to address the environmental and social challenges of our time. We posit that the (re-)emerging mode of production, commons-based peer production (CBPP) has such potential. Indicative cases show that innovation underlined by counter-hegemonic values already exists, albeit in the cracks of the dominant system and in constant danger of co-optation. Governmental institutions need to support these alternative practices of innovation.

1. Introduction

"The ultimate, hidden truth of the world, is that it is something that we make, and could just as easily make differently." — (Graeber, 2015, p. 121)

The 'innovate or die' mantra has indisputably dominated Science and Technology (S&T) policy in the last decades of the 20th as well as the beginning of the 21st century (Pansera and Fressoli, 2021). Under this mantra innovation is generally seen as neutral, apolitical, and inevitable; a necessity for any type of progress and prosperity. It is often supported and underpinned by an almost religious faith in progress that crystallised into technological determinism and productivism. The first sees technical change as inevitable, the latter considers innovation always good and desirable. This interpretation of innovation is in many ways connected to the role of technical change in industrialised capitalist societies. A role condensed in Schumpeter's concept of Creative Destruction, an idea borrowed from Sombart's (1913) *War and Capitalism* (Reinert and Reinert, 2006). In the 1930s Schumpeter (1934)

argued that one of the main drivers of capital accumulation is technological change (incl. innovation), which continuously revolutionises the way goods and services are produced and delivered, introducing dynamism and instability into the context of a competitive free market economy. Shortly after, i.e. in the decades following World War II, the endless pursuit of economic growth became one of the core economic and political goals (Dale, 2012). Hence, the interpretation of innovation anchored in the concept of Creative Destruction, coupled with the systematic application of science for the development and expansion of market economies, has helped produce an unprecedented era of economic as well as material growth.

The pursuit of endless economic growth and expansion has been ecologically problematised as early as the 1970s (see Georgescu-Roegen, 1971; Meadows et al., 1972). For a breadth of scholars (see e.g. Daly and Farley, 2011; Hickel and Kallis, 2020; Spash, 2017; Victor, 2008) the ever increasing use of materials and resources is the reason for climate change, ocean acidification, species extinction, and other types of ecological degradation. Humankind faces unprecedented changes due to

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its increasing material throughput that ignores the biophysical limits of our planet (Hoekstra and Wiedmann, 2014; Rockström et al., 2009). It therefore begs the question why an interpretation of innovation based on Creative Destruction with the purpose of endless expansion persists? These mainstream interpretations of innovation can be interpreted as actively propelling climate change and other ecological degradation further undermining a sustainable future on this planet. In this paper we therefore argue that the seemingly neutral view of innovation as a necessary driver of economic growth and thus prosperity has not only become obsolete, but also represents a noxious and dangerous compass guiding S&T policy.

To question the neutrality of innovation we draw insights from Science, Technology and Society (STS) scholarship and beyond; in particular Walsh's (2021, p. 2) argument that "innovation today is best understood as innovation under capital". Walsh (2021) suggests STS scholarship to (re)consider its Marxist roots to achieve a truly critical view on innovation (see also Sheehan, 2021). Following this line of thought the basic assumptions of technological determinism (i.e. artefacts produce society) can also be questioned (MacKenzie, 1984). Following these arguments, a more nuanced and politicised framing of technology as socially constructed phenomena could be adopted to guide the ways society manages and governs innovation (Pansera and Fressoli, 2021; Winner, 1993). In other words, this paper takes the perspective that innovation ought to be understood in its specific historic and cultural settings. Creative Destruction (and thus the current understanding of innovation) as an ideology emerged from a specific set of values and worldviews that have been the cradle of Western capitalism (Jimenez et al., 2022). Modern ideas of innovation can be viewed as stemming from the needs of capitalism for valorisations (MacKenzie, 1984). Valorisation is here understood as the process of directing investment towards the increase (and ultimately accumulation) of capital. Investment employs technology to transform labour and natural resources to abstract value to be realised in markets. Valorisation is closely connected to commodification and drives accumulation by creating and reproducing the conditions for accumulation to take place. Therefore, under the understanding of innovation in the context of capital valorisation, the sole purpose of innovation is to increase capital returns. Political ecologists like Gorz (2012) argue that the process of capital valorisation imposes its logic on science and technology (hence also innovation), definition of needs, consumption, and organisation of work. Being embodied in this logic of valorisation, the dominant neutral view on innovation rarely questions goals, purposes and values of innovation (Walsh, 2021).

But what if innovation can be underpinned by different values and purposes? In this context, we generally build on theoretical propositions developed by STS, including critical and social constructivist views on technology. However, following Walsh's (2021) call for Marxist perspectives, we shall complement this with Gramscian concepts of hegemony and counter-hegemony. Through this lens it becomes possible to describe different modes of innovation underpinned by hegemonic and counter-hegemonic sets of societal values. We argue that current views on innovation are underlined by the hegemony's common senses of valorisation logics explaining its depoliticisation and the general perception of innovation as apolitical. With the aforementioned lens we hope to speak to STS scholarship and more classic innovation scholars by using a Gramscian influenced perspective that makes it possible to unfold paradoxes around innovation which might otherwise be tough to observe (see Walsh, 2021).

As this special issue suggests, innovation management has traditionally focused on innovation generation, process management, and diffusion, with relatively little emphasis on sustainability and societal aspects. The argument in the above paragraphs opens up the idea that this 'classic' innovation management is not a natural or an a-historic construction. It can be viewed as a socially constructed ideology emerging from the imperative of valorisation and thus, not the only possible underpinning principle of innovation. Our main hypothesis is

that if innovation is not underpinned by hegemonic pressures of valorisation, it can open the door to a variety of alternative social possibilities that have the potential to address social justice and environmental issues. In line with this special issues' call for papers we interpret our task as researchers to normatively present alternative purposes for innovation. Following recent debates about post-growth and degrowth (Pansera and Fressoli, 2021), we argue that the fundamental purpose of innovation should not be to increase productivity to foster economic growth. Instead the purpose of innovation should shift towards the aim of use-value creation. By use-value creation we mean socially useful production that seeks to fulfil societal needs.¹ Use-value should be understood in contrast to exchange-value (Marx, 1969 [1867]). According to Marx (1969 [1867]), use-value is subsumed under the pursuit for exchange-value generation in the capitalist mode of production. Exchange-value defines value by the potential financial gain that can be achieved through a goods exchange; meaning that under this definition value can only be generated through financial gain in market exchange. However, this does not mean that under a focus on use-value that no exchange is possible or no markets would exist. Very much to the contrary, exchange and markets still have an important role to play in a society focusing on use-value creation, that is goods and services can and should still be exchanged and traded to help fulfil societal needs. Hence, under the focus on use-value creation, exchange and the market do not become the end goal in value creation (as for exchange-value) but rather a means to an end, which is fulfilling societal needs.

We offer a tentative window to a counter-hegemonic vision of innovation through commons-based peer production (CBPP). Benkler (2007, 2002) first documented early forms of massive online collaboration as a(n) (re-)emerging mode of production that is radically different from conventional industrial production. The success of free and open-source software projects and Wikipedia brought CBPP into the spotlight. They demonstrated how the aggregated contributions of volunteers, pooling resources with no predefined structure and roles can yield better results than rigid hierarchies and market rationality (Bauwens et al., 2019). They also reified the relevance of the commons in economic discourse and life. Starting from the digital commons of knowledge, software, and design, and moving to the relational commons of the social web, CBPP eventually casts new light on the natural and social commons that capitalism takes for granted and exploits. A counter-hegemonic perception of innovation informed by CBPP can provide the grounds for innovation that (a) caters for the commons upon which it rests; and (b) creates the conditions for positive social and ecological impact. In this paper, we borrow from empirical perspectives of participatory research we conducted elsewhere to demonstrate this potential by presenting two illustrative cases of CBPP organisations.

The remainder of the paper is structured as follows. Section 2 describes the theoretical underpinning of the paper. In Section 2.1, we describe what we claim to be the dominant view on innovation, how it arose and its problematic assumptions. Section 2.2. teases out the underpinnings of the current hegemonic view of innovation and in contrast develops a counter-hegemonic purpose and set of values of technology as well as innovation. In Section 3, we briefly describe our empirical approach before describing two CBPP cases in Section 4 to analyse these in light of the counter-hegemonic values developed in Section 2.2. Following the findings, in Section 5 we discuss how CBPP could be viewed as a way forward out of the hegemonic interpretation of innovation through 'Creative Destruction'. This section also problematises the threat of co-optation faced by alternatives such as CBPP and how these threats might be mitigated by a state supporting counter-hegemonic innovation. We finally conclude the paper by proposing a

¹ We do not claim to define societal or indeed human needs here. Debate is ongoing what such needs might look like and if indeed they are clearly definable. However, on the abstract level we argue that fulfilling societal needs ought to be the aim of society's structures.

research agenda in Section 6.

2. Theoretical framework

2.1. The dead end of the hegemonic view of innovation

Innovation dominates public debates about growth, competitiveness and development. It has become a powerful imaginary that pervades not only policy making but also our daily lives (Godin, 2015). We are requested to be innovative scholars, doctors, teachers, and artists; few professions are free from this innovation mania (Russell and Vinsel, 2018). This idea is so deeply entrenched that organisations are under the pressure to continuously change, improve, ameliorate, and disrupt previous ways of doing things (Bessant et al., 2005). In academia, this centrality of innovation has been in part promoted by the Schumpeterian turn in the study of technical change, which provides a robust explanation of how industrial capitalism overcomes the law of diminishing returns by constantly scaling up the function of production and increasing the productivity of factors (i.e. labour and capital). This is achieved through a continuous differentiation of products and, above all, the creation of new goods, services and markets (i.e. what it is generally meant by the term innovation) (Freeman and Soete, 1997).

Almost forgotten for decades, Schumpeterian concepts were 'rediscovered' in the 1980s - coincidentally in perfect timing with the neoliberal turn - and inspired the emergence of evolutionary economics (Nelson and Winter 1982; Rosenberg, 1982) and a vast scholarship of innovation studies (Adams et al., 2006; Fagerberg and Verspagen, 2009). Innovation then became the central subject of a variety of research agendas designed to measure, foster, manage, and govern technical change. Some scholars focused on managing innovation at the organisational level (Bessant et al., 2005), others concentrated their efforts to understand the systemic interactions that enable or disable innovation processes (Edquist, 2005; Fagerberg and Srholec, 2008; Lundvall, 2010). Nevertheless, according to Papaioannou (2020, p. 238) "[m]uch of this neo-evolutionism has positioned innovation as if it was a value-neutral process of supply and demand, taking place in a free market and having nothing to do with political institutions and the state".

In an unstoppable triumphal march, innovation has been re-labelled in multiple ways to exemplify social sensitivities such as eco (Carrillo-hermosilla et al., 2009), inclusive (Chataway et al., 2014), frugal (Pansera, 2018), transformative (Avelino et al., 2019), social (Manzini, 2015), and responsible (Stilgoe et al., 2013); just to mention the most prominent. Even prominent scholars close to the circle of evolutionary economics advocated for a problematization of the innovation discourse especially in relation to the Global South. For example Srinivas and Sutz's (2008) work on innovation in 'developing countries' or Cozzens and Kaplinsky's (2009) work on innovation and inequality. That is not to say that such alternative formulations do not propose novel conceptualisations of innovation. Some of these alternatives do offer a structural vision for innovation in society, in terms of institutions, organisational practices, and production processes. However, rather than replacing, these approaches complement innovation management practices that still embrace two basic assumptions that have become hegemonic (and thus largely unquestioned) in the way innovation is overwhelmingly framed: i) Innovation delivers growth and prosperity for all and is thus inherently good (*productivism*); ii) Innovation is inevitable and unstoppable (*determinism*). These two assumptions can be viewed as highly problematic and, we argue, have led innovation studies to a dead-end.

Regarding productivism, after more than four decades of research on the impacts of science and technology, STS scholarship (amongst others) has provided solid evidence that show that innovation processes are often associated with risks and noxious social and environmental consequences (Giampietro and Funtowicz, 2020; Stilgoe et al., 2013). Potentially controversial technologies around GMO (genetically

modified organisms), nuclear power, geo-engineering, nano-technologies, or synthetic biology, just to mention a few, highlight that technological innovations are contested and their politics might be disputed (Pansera et al., 2020). Innovation tends to create winners as well as losers and, often, for each solution to a problem, new and multiple issues emerge (Pfothner and Juhl, 2017). Innovation hailed as a driver for economic growth is (as mentioned in the introduction) also ecologically problematic (Pansera and Fressoli, 2021). Moreover, 'classical management of innovation' comes with the 'illusion of control' that has been argued to be too often a source of unexpected negative consequences of technological development (see Stilgoe et al., 2013). The emergent field of Responsible Innovation has tried to develop mechanisms of institutional governance to reduce the uncertainty that characterise innovation management with partial success (Owen et al., 2021). The promising effects of such a debate is that the potential noxious effects of uncontrolled innovation is finding attention in conventional innovation studies as well (Biggi and Giuliani, 2021).

As for determinism, STS scholars have highlighted and argued for years that innovation, far from being a neutral and apolitical process, can be viewed as socially constructed around values, ideologies, and worldviews of the society in which it emerges (Jasanoff and Kim, 2015; Winner, 1980). This view implies that technology does not follow a linear evolutionary path forward, but it is more likely to proceed by a succession of leaps forward and periods of stagnation (Bijker, 1995; Callon, 1991). Further, under this view, far from technological artefacts creating society, technology is argued to be underpinned by societal values and purposes (MacKenzie, 1984). That means that the currently dominating understanding of innovation and technology ought to be understood in the historical setting it arose in, and continues to dominate. Schumpeter's argument was that innovation and technological change is one of the key drivers of economic expansion through capital valorisation. In other words, conceptualisations of technological change and innovation that are based on Schumpeter's interpretation ought to be understood in the context of capitalism, its production processes, as well as its wider social relations (Walsh, 2021). This means understanding the purposes imbued into the conceptualisation of innovation in this setting.

Following Foster et al. (2010) capitalism can be defined as a social formation or societal system based and driven by the endless expansion of economic activity for the purpose of capital accumulation. Capital accumulation enables further economic expansion (growth) which in turn enables new opportunities to accumulate capital (van Griethuysen, 2010).² It is in the context of these processes that innovation, and particularly its purposes, have to be understood. The persisting conceptualisation that innovation and technological development ought to pay off and drive profit maximisation through capital valorisation only makes sense in this context. In other words, capitalism through the purpose of capital valorisation is imposing itself onto (amongst many other structures) innovation and the technologies emerging from it (Gorz, 2012). This mirrors Feenberg's (2002) - and others before him like Marcuse, Elull or Illich - in the field of critical theories of technology, assertion that the incumbent socio-economic system imbues the underlying technical rationale in society with its values. Primarily those of economic efficiency and profit, as dictated by the most powerful social groups in society.

The arguably imbued purpose of capital valorisation in innovation not only influences the emergence of technology for exactly this purpose but also the maintenance of social relations enabling this purpose further. As MacKenzie (1984, p. 501) puts it: "Production technology

² Here is also where the previously mentioned ecological critique of continued economic growth ties in (see e.g. Hickel and Kallis, 2020). Other scholars have further argued that the principle of capital accumulation leading to economic growth requires an ecological opposition to the capitalist mode of production (see e.g. Foster, 2011; Spash, 2020).

will thus be designed with a view to ensuring successful valorization, and valorization will typically not simply be a matter of ‘profit maximizing’ but will involve the creation and maintenance of desired social relations.” Innovation is therefore not only about progress in science and technology or the adoption and ‘diffusion’ of new technologies, but arguably also about the creation, maintenance and development of a particular form of production and way of organising society as well as its economy i.e. the capitalist mode of production (Walsh, 2021). This means that innovation can be viewed as not only influenced by the dominant values and ideology in society but also used to maintain and reproduce them. The language and concepts around hegemony and counter-hegemony by Antonio Gramsci can lend a hand here for analytical purposes.

Gramsci (1971) conceptualises the concept of hegemony to mean the dominant ideology, culture, norms, and structures that persist in society at a certain point in history. This conceptualisation of hegemony can help explain why certain understandings persist with minimal coercion (Fontana, 2008). For Gramsci (1971) any hegemony persists through consent, i.e. consenting to the norms, cultures, and structures of the hegemony. This consent is manufactured through society’s dominant structures, norms, and other social relations aligning with the persisting hegemony (Buttigieg, 1995). Essentially, consent is (re)produced through the hegemony’s values, norms, culture, and structures being regarded as common senses e.g. sets of values and norms that people take for granted (Gramsci, 1971). The use of the ‘non-existent’ plural of common sense is intentional by Gramsci in this context to describe the plurality of norms and values that are being consented to (Hoare and Nowell-Smith, 1971). Common senses therefore represent an uncritical and largely unquestioned understanding of values, norms, and their connected social processes, essentially representing the dominant worldview (*Weltanschauung*) in a hegemony. This uncritical understanding also means that a hegemony and its common senses are mainly perceived as ‘natural’ (Lösch, 2017). In other words, a hegemony is often not perceived as a hegemony at all due to the depoliticisation of its common senses. This depoliticisation - i.e. the inability to speak of or imagine alternatives - is vital as a hegemony can largely persist with minimum coercion as long as its common senses remain (broadly) unquestioned and unchallenged. By acting in line with the hegemonic common senses, the hegemonic structures and social relations are constantly reproduced.

From the above it is reasonable to suggest that the persistent, largely uncritical, and quasi-natural formulation of classic innovation (and innovation management) is not only a product of capitalist hegemony and its mode of production, but also fundamental for its reproduction. For example, the seemingly natural perception of innovation as needing to follow the imperative and purpose of profit maximisation, capital valorisation, and economic expansion underline the active and uncritical reproduction of capitalist hegemony as well as its common senses. In other words, the quasi-natural view of innovation is neither neutral nor apolitical, but highly political in the sense that it legitimises, reproduces, and favours capitalism’s mode of production over alternatives.³ Of course the argument that the dominant view of innovation represents a depoliticised view (see Walsh, 2021) that co-emerged with industrial capitalism (see Pansera and Fressoli, 2021) does not require a Gramscian perspective. Yet, terming the predominant view on innovation as hegemonic or aligned with the common senses of capitalist hegemony does two things. First, it underlines that the dominant view on innovation is highly uncritical and underpinned by the purpose for capital valorisation rather than actual societal needs (or at least it prioritises valorisation over societal needs). Second (and most importantly), it opens up the analysis of alternative counter-hegemonic views on innovation, underpinned by different common senses. Hence, in the following

section we explore one such view, anchored in the purpose of use-value creation and conviviality.

2.2. A counter-hegemonic view of innovation based on conviviality

For Gramsci (1971) a counter-hegemony seeks to challenge and replace hegemonic ideas, structures, norms, and class relations (Carroll and Ratner, 2010; Fontana, 2008). A key aspect of counter-hegemony is re-politicising the dominant common senses by showing that alternatives are possible while subjecting the persisting common senses to questioning and critique (D’Alisa et al., 2013; García López et al., 2017). Challenging hegemony’s common senses is the first step to take if one aspires to undermine its reproduction (Hoare and Nowell-Smith, 1971). As has been argued (see e.g., García López et al., 2017; Pansera and Owen, 2018a) counter-hegemony can start to take hold in society when everyday activities start defying the dominant common senses and experiment with alternative ones. In other words, counter-hegemony is in the first steps fostered by unveiling the values and ideologies underpinning seemingly apolitical activities and replacing these with other (counter-hegemonic) ones. As we have shown in the previous section, the discourse of innovation, or what Vinsel and Russell (2020) call the ‘innovation speak’, has become a dominant common sense that pervades not only the practices and strategies of private companies, but also the actions of the state and supranational institutions. Reconstructing the history of how innovation became an almost unquestioned credo is not the scope of this paper (for a complete overview see the work of synthesis of Godin (2015) as well as Pansera and Owen (2018b)). What is important to state is that, although it seems naturalised and perfectly plausible, the innovation mania that affects our industrial society can be viewed as just a very specific historicised way of framing technical change that can and, as we argue, needs to be questioned, problematised, and overcome.

A starting point for a counter-hegemonic view on innovation is to question the centrality of the pursuit of capital accumulation and valorisation. As we highlighted earlier, the purpose of innovation can and ought to be very different from what is currently perceived as common sense. The predominant view of innovation has been spawned in- and in turn reproduces a system of imaginaries, ideas, and practices that can be regarded as disastrous both from a social as well as ecological perspective (Pansera and Fressoli, 2021). By arguing that innovation has no natural purpose of capital valorisation and profit maximisation, but that this is rather a product of hegemonic depoliticisation, it also becomes clear that other underpinnings of the hegemonic view on innovation (i.e. common senses) start to topple. That is, it becomes apparent that further quasi-natural assumptions reproduce and maintain the structures that help to hold on to these beliefs and enable the process of valorisation further (Gorz, 2012; MacKenzie, 1984; Walsh, 2021).

These other aspects include, but are not limited, to fencing off- and appropriation of knowledge, planned obsolescence, and eco-efficiency. **Fencing off- and appropriation of knowledge** ensures that innovation can be used for the purpose of capital accumulation and valorisation through for example patents (Rigi, 2013). **Planned obsolescence**, including the impossibility (or even unlawfulness) to repair, further ensures that future innovations can be capitalised on (Dietz and O’Neill, 2013). One of the best examples here is the unfathomable speed of new Apple iPhones being pushed into the market and the rapidness of older models becoming everless compatible, both hardware and software wise. The concept of **eco-efficiency** also needs to be understood in the context of for-profit innovation. Eco-efficiency aims to reduce energy and resource use per produced unit, which also translates into a reduction of production cost (Dyllick and Hockerts, 2002). Hence scholars such as Porter and Kramer (2006) argue that measures like eco-efficiency should be adopted by firms to ensure competitive advantages, i.e. maximise profits and valorise capital. Eco-efficiency tends to lead to the rebound effect, which describes the absolute increase of material and energy use due to efficiency measures (Alcott, 2005). The

³ Interesting in this context, Walsh (2021) highlights that innovation was historically seen as a tool to challenge the status quo.

rebound effect mainly takes place due to the need to valorise and accumulate capital in a capitalist system (van Griethuysen, 2010). Here, eco-efficiency takes on a much more sinister face if understood as a tool that is first meant to continue the system of capital accumulation and sustainability second (sustainability could even be viewed as a facade, e. g. greenwashing) (Nesterova and Robra, 2022).

A counter-hegemonic view on innovation not only requires a very different purpose, but also very different underpinnings that could potentially be seen as counter-hegemonic common senses. Hinton (2020) emphasises not-for-profit instead of for-profit purposes in businesses. In the same vein, instead of exchange-value creation as an end for innovation, it should be underpinned by use-value⁴ creation (Pazaitis et al., 2017). In other words, the purpose of innovation ought to be the creation of useful goods that help satisfy societal needs. Or as Gorz (2012, p. 8) argues:

“The point is to subject economic and technical development to a pattern and orientations which have been thought through and democratically debated; to tie in the goals of the economy with the free public expression of felt needs, instead of creating needs for the sole purpose of enabling capital to expand and commerce to develop.”

Of course one could argue that profits and profit maximisation (similar to economic growth) is rather a means to the end of satisfying needs. However, we follow here in a more heterodox economic interpretation, such as ecological economics, which argues that the drive for economic growth (and profit maximisation) has long become an end in itself and has historically failed to tackle societal problems, but rather created them (Daly and Farley, 2011; Spash, 2017).

Following on from the counter-hegemonic purpose of innovation as a focus on use-value and needs, this interpretation can now be underpinned by different common senses or sub-purposes. The concept of conviviality (see Illich, 2001 [1973]) seems a fitting starting point for these underpinnings. Not least because the concept has previously been used to describe the aspects of sustainable technology (Vetter, 2018) and innovation (Pansera and Fressoli, 2021). Vetter (2018) (re)interprets conviviality for the purpose of determining the appropriateness of technology in the context of degrowth. Pansera and Fressoli (2021) adapt Vetter's (2018) interpretation for the purpose of innovation in a post-growth setting. Post-growth and degrowth question the necessity of continued economic growth for prosperity. Degrowth envisions a society that can flourish without the necessity of continued economic expansion (Schneider et al., 2010). Yet, at the same time these concepts should not be confused with negative growth *per se*. Degrowth does not aim for negative growth, however reduction in economic activity necessary for sustainability would likely entail reductions in GDP (Kallis, 2018). The concepts of conviviality and degrowth are closely related (Deriu, 2015). Hence, in the context of this paper we use conviviality as encompassing the core principles of degrowth and post-growth conceptualisations.

By opposing the purpose of innovation as a driver for economic growth, a counter-hegemonic understanding of innovation also fits the conceptualisations of post-growth and degrowth. However, in light of the abstractness of the conviviality aspects identified by Vetter (2018) in regards to degrowth (relatedness, adaptability, accessibility, bio-interaction, and appropriateness), it seems more effective to deduct the common senses of a counter-hegemonic innovation paradigm in contrast to the above three underpinnings of the hegemonic interpretation of innovation. This way the counter-hegemonic common senses can be viewed as under the umbrella of the counter-hegemonic purpose of use-value creation and a focus on societal needs. Yet, these underpinnings arguably still fit degrowth and post-growth.

In contrast to fencing off and appropriation of knowledge for the

purpose of capital valorisation, **openly accessible knowledge** (Howson, 2021; Rigi, 2013) can arguably only be achieved under the umbrella of innovation's purpose to create use-value to satisfy societal needs. Open-access to knowledge, understood through the concept of knowledge commons may lead to a wider dissemination of innovation in various settings, satisfying a breadth of human needs (Bauwens et al., 2019; Vetter, 2018).

An underpinning of **adaptability, repairability, and maintenance** represents a further counter-hegemonic common sense. This should be seen in contrast to planned obsolescence and lack of repairability. Innovation without the purpose of profit maximisation could arguably focus much more on the durability of goods, but also the potential to adapt these to various settings and needs (Kostakis et al., 2018). Particularly the concept of adaptability can be related back to Illich's (2001 [1973]) concept of conviviality. Convivial tools allow for adaptability for needs as opposed to manipulative tools which are designed for a minimal amount of purposes and often coupled with planned obsolescence. Adaptability goes hand in hand with the concept of openly accessible knowledge as it is further enabled through this. Innovation underpinned by open-access arguably opens up the possibility of various adaptations in many settings (particularly through the internet) (Benkler, 2007). Adaptability and sharing of knowledge under an understanding of innovation for the purpose of capital valorisation seems far less likely.

In contrast to eco-efficiency, the counter-hegemonic common sense can be seen as **eco-sufficiency**. Robra et al. (2020) define eco-sufficiency as a focus on 'enough' while considering ecological limits. "Enough" relates in this context to sufficient fulfilment of human needs" (Robra et al., 2020, p. 2). Eco-sufficiency therefore ties back into the counter-hegemonic focus on use-value and needs, but also the ecological underpinnings of conviviality. Eco-sufficiency represents a means of meeting the end of fulfilling needs. This is in contrast to eco-efficiency, where ecological factors are often cancelled out or worsened through the rebound effect due to a focus on the end of reducing cost rather than fulfilling satiable needs. It is very unlikely for eco-sufficiency to take hold in the capitalist setting hence tying it back under the umbrella of innovation without the focus of profit making.

It is prudent in the context of contrasting the hegemonic view on innovation with a counter-hegemonic one to mention competition. The concept that innovation thrives in a systemic setting of competition really only makes sense if innovation has the purpose of profit maximisation, i.e. when actors compete against each other in terms of their ability to make profits. Arguably such a systemic emphasis on competition should not be reproduced in a proposition of a counter-hegemony. However, that is not to suggest that competition cannot have a role in a counter-hegemonic view of innovation, rather it will be subsumed, or at least complemented by, under collaboration and sharing (Pazaitis et al., 2017). Further, it needs to be acknowledged that a counter-hegemonic purpose and its underpinning common senses represent a theoretical interpretation with a focus on innovation 'management'. It is without a doubt that these will require a supportive and compatible institutional framework. A likely fit might be interpretations aligned with the commons including appropriate institutional arrangement such as common property regimes and work mutualization/sharing amongst others (Bauwens et al., 2019; Bollier and Helfrich, 2019).

In summary, the counter-hegemonic purpose of innovation and its potential common senses are listed in contrast to the hegemonic purpose of innovation and its common senses in Table 1 below. Further, Fig. 1 graphically highlights our counter-hegemonic interpretation of innovation in connection to its counter-hegemonic commons senses enabled through this view. It is important to state that these are abstract categories. The underpinning common senses have to be understood as being able to support the overall purpose. This means that any of the underpinning common senses alone or in combination do not represent counter-hegemonic innovation as such if not subsumed under the overall counter-hegemonic purpose. The abstracted counter-hegemonic

⁴ Use-value here seen in contrast to exchange-value and understood as set out previously in the paper as socially useful and fulfilling societal needs.

Table 1
Hegemonic innovation vs. counter-hegemonic innovation.

	Hegemonic view	Counter-hegemonic view
Purpose	Capital valorisation and profit making/maximizing	Use-value creation and focus on societal needs
Underpinning common senses	Fencing off- and appropriation of knowledge Planned obsolescence (incl. lack of repairability by design)	Open-access to knowledge Adaptability, repairability, and maintenance
	Eco-efficiency	Eco-Sufficiency

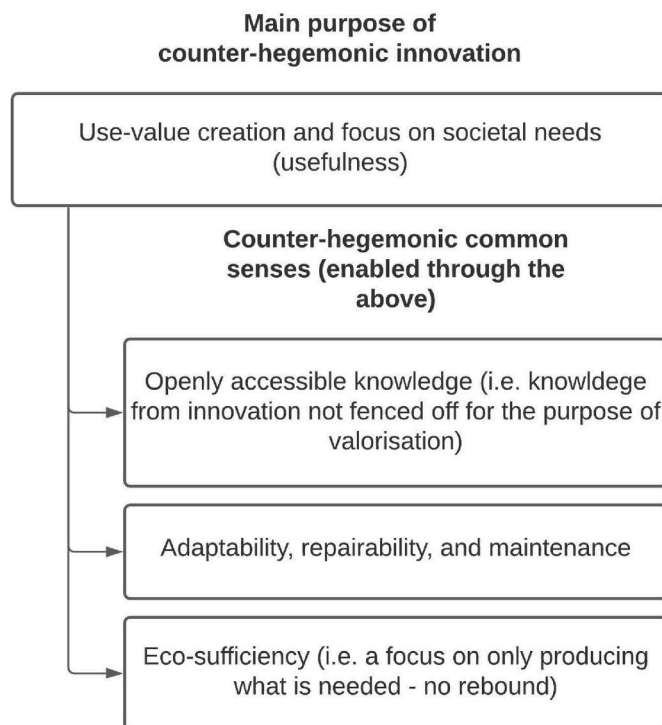


Fig. 1. Counter-hegemonic innovation and its resulting underpinnings.

purpose and underpinning common senses serve as the a priori theoretical model/understanding that is used to analyse the illustrative cases in Section 4. This is in line with critical realist approaches to organisational case study research where abstract a priori theoretical concepts such as these are essential (Ackroyd and Karlsson, 2014; Vincent and Wapshott, 2014). Ultimately these a priori counter-hegemonic categories also represent the codes for data analysis.

3. Research approach and methods

We utilise an illustrative case study approach to showcase real world innovation initiatives that inform our counter-hegemonic framework. Since we are researching an emerging phenomenon, there are no structured sets of data to draw on and analyse. Hence the case study approach allows for a variety of data gathering sources for a robust examination (Flyvbjerg, 2006). We present two CBPP organisations and how they enact the counter-hegemonic view of innovation conceptualised in Section 2.2. The two cases were selected to highlight different forms of CBPP organisations in a diverse setting of markets/industries. Further, the organisations' perceived alternative approach to organisation and production was regarded as also likely highlighting alternative approaches to innovation. The presented cases have been studied in depth over an extensive period of time. This paper builds on this empirical and experiential knowledge by focusing on the elements that illustrate the counter-hegemonic innovation purpose and

underpinnings identified in Section 2.2. above.

All data was collected with an emphasis on participatory case study approach to investigate the cases in their contextual setting and understand their underlying processes (see Reilly, 2010). This has allowed the authors to acquire a deep understanding and appreciation of the cases. We collected data in multiple ways: from open conversations, semi-structured interviews, and document analysis, to field observations, and active participation in workshops, meetings, and gatherings.

More specifically, in the case of Wind Empowerment (WE), 15 in-depth semi-structured interviews were conducted and analysed. The interviews were structured to touch upon the values of the organisation itself and more concretely to understand the perceived purpose of the organisation and hence the purpose of what they developed and produced. The interviews were between 40 and 90 minutes each and were conducted and recorded on Skype. The interviewees were selected from the case using snowball sampling (see Biernacki and Waldorf, 1981). Additionally, four board and strategy meetings were observed; the field notes from these meetings were used for analysis. Further, the case also provided three key strategic documents that were analysed.

In the case of L'atelier paysan (AP), 10 in-depth semi-structured interviews, each lasting for a minimum of 60 minutes, were conducted and recorded in-person. The interview questions were structured to explore the values embedded in the technological development processes of the initiative. In the initial stages of data collection, key members of the organisation were identified and selected for interviews due to their leading role. More interviewees were identified using snowballing. The selection focused here on prolonged participation in the initiative as well as potentially diverse perspectives regarding technological innovation. Additionally, field notes were taken in two prototyping workshops, two education seminars, a dissemination/celebration festival, the organisation headquarters, in peoples' homes and on the road to workshops. Multiple interactions with a variety of relevant actors in these occasions, further complemented the field notes. Lastly, data from online platforms, comment sections, fora and technology documentation (audio-visual material, reports, bills of materials, manufacturing guidelines) were also analysed.

We adopted an iterative approach where, initially, through our extensive knowledge of such innovation initiatives we have established an outline for the counter-hegemonic purpose and common senses. We then used these as lenses/filters to scour our data in order to establish their empirical evidence and refine them. More specifically, the a priori counter-hegemonic purpose and its three underpinnings identified in section 2.2 (Use-value creation and focus on societal needs; Openly accessible knowledge; Adaptability, repairability, and maintenance; Eco-sufficiency) were used as codes to analyse the empirical data. This means we compared the empirical data to the a priori framework of the counter-hegemonic purpose of innovation and its underpinnings to understand how the cases might or might not fulfil these. This approach on the one hand helped us represent the voices and empirical reflections of the people in the field actively enacting these counter-hegemonic views alongside our own, as innovation frameworks are often conceptualised by policy instruments and academics rather than the people in the field. On the other hand, this approach also enabled us to show empirical rigour by basing the a priori theoretical framework on previous research.

4. Counter-hegemonic innovation in commons-based peer production

CBPP is a(n) (re-)emerging mode of production and organisation,⁵ where communities coordinate in a peer-to-peer fashion sharing resources and outcomes as commons (Bauwens et al., 2019). Successful

⁵ For the difference between CBPP as a mode of production and CBPP organisations see Robra et al. (2021).

CBPP cases demonstrate how new and significantly improved products, services, and production processes can be driven with little to no reliance on monetary incentives and future capital returns (Kostakis et al., 2018). More importantly, the ‘commoning’ of knowledge, technological and organisational practices plant the seeds for the expansion of this mode of production in other domains. Many highly dynamic sectors of the, so-called, digital economy are currently underpinned by innovations derived from CBPP (Pazaitis and Kostakis, 2022): from free and open-source software (FOSS) operating at the back-end of the majority of today’s websites or running the fastest supercomputers and data centres, to the social activity powering platforms like Facebook or Amazon. In other words, many of the digital innovations hailed in terms of Creative Destruction are reliant on a mode of production and innovation potentially fundamentally at odds with it.

In the following we describe two CBPP cases. Wind Empowerment and L’atelier paysan. These represent two sectors covering basic human needs, namely, energy and food. We analyse these cases in relation to how they align with the a priori theoretical framework of the main purpose of counter-hegemonic innovation as well as its counter-hegemonic underpinnings highlighted in Fig. 1 above. The following results derive directly from our in-depth knowledge and data on the cases acquired in empirical participatory research. Below, we first present each case individually, highlighting how they align with the a priori theoretical framework. Secondly we summarise the findings in Table 2 below.

4.1. Wind Empowerment

Wind Empowerment (WE) is a global CBPP network of 73 organisations and numerous individuals, spanning almost all continents. The aim of WE is the development and sharing of knowledge around the design, production, and maintenance of Locally Manufactured Small Wind Turbines (LMSWTs) (Latoufis et al., 2015). Through this “WE aims to empower its members in achieving its goal of sustainable rural electrification” (Robra et al., 2021, p. 352). In this context, WE’s charter states that:

“Wind Empowerment (WE) supports the development of locally built wind turbines for sustainable rural electrification”.

This highlights that WE is working actively towards a perceived societal need i.e. helping people access renewable energy as one interviewee emphasised:

“I mean surely the most important [mission] for us is that we help people access electricity”.

The practice of creating and disseminating knowledge of LMSWTs has been initiated by Piggott’s (2008) *A Wind Turbine Recipe Book*, a design and manufacturing manual for simple and robust small wind turbines that can be adapted to different contexts (Pazaitis et al., 2020). This open design has enabled multiple actors around the globe to adopt and modify it according to context-specific needs, challenges and resources in diverse settings (Robra et al., 2020). LMSWTs stemming from WE’s knowledge commons have been utilised in various sustainable rural electrification projects in the Global South (Latoufis et al., 2015), due to their affordability and orientation towards the use of local resources for manufacturing and maintenance.

While observing several meetings it became clear that the network constantly seeks to develop more efficient and easier ways to construct LMSWTs while also looking to develop them further to ensure their adaptability, repairability and easy maintenance. When talking about specific parts of the manufacturing process one interview stated that they were “constantly innovating or improving these areas through collaborative projects”.

Another interviewee talked about the focus on fulfilling needs in developing new hardware but also emphasising the need for easy maintenance:

Table 2
Summary of counter-hegemonic innovation alignment in CBPP cases.

Case	Use-value creation and focus on societal needs	Openly accessible knowledge	Adaptability, repairability, and maintenance	Eco-sufficiency
Wind Empowerment	Focus on small-scale local energy production; Design and production driven by the communities concerned	Shared LMSWT designs and instructions; Shared experiences across individual users and organisations	Users included in manufacturing to enable maintenance and repair of LMSWTs; Turbines are adapted and optimised to local requirements and conditions	Focus on acute energy needs in local setting; LMSWTs only used as energy solution if locally effective; Designed to rely on locally sourced materials
L’atelier Paysan	Focus on providing technological tools for small-scale farmers; Users are active participants in conceptualising, designing, and manufacturing of tools; Production driven exclusively by participants’ needs	All relevant information (bill of materials, schematics, fabrication processes) for the tools become available after extensive community testing as digital commons; Workshops for knowledge and knowhow exchange are typical	Tools designed for wider accessibility in their reproduction; Regular training workshops for the development of necessary skills for fabrication and maintenance; Designs often adapted to fit different conditions and needs with the design adaptations becoming available as well	Technological innovation that matches ecologically and socially regenerative agricultural practices at appropriate scale(s)

"I think the first thing is, is the knowledge available? This is quite important because if you go for a power converter, for instance, if you buy something from the shelf, you will get some things that will be glued, that will have some varnish on it, that is not easily maintainable, that will come from China and you can have high customs. So it's kind of difficult to source these converters in some places in the world where they are needed. And so we decided to tackle this issue in order to make something that is quite modular and that can fit like these applications, these rural electric facing applications. And so yeah, we had nothing, we haven't found anything that was fulfilling this need. And so this is why we decided to tackle this issue."

The same interviewee also emphasised the open-access to knowledge as a key focus for WE:

"I would say that going open source is one of the goals of WE. Sharing knowledge is the top priority of WE and, and as such, like starting this development [of the converters] was a way to have, let's say not necessarily to be a short time related decision by saying yeah, we will have something working in six months. But more something like if we make it, to have something that is community based and that can meet the needs of the stakeholders. Then it will run for a long time. So this was the idea behind [it], like, targeting a long term objective."

This focus was shared by all interviewees. Generally the innovations WE creates are openly accessible, and members share insights and knowledge.

The previously mentioned focus on needs was further highlighted by another interviewee:

"[W]e want to make sure that we are creating projects that are needed, we don't just want to put up wind turbines for the sake of putting up wind turbines, you know what I mean? And so, one of our main missions is, you know, obviously rural electrification. So, we're not just gonna do like, we're not going to go ahead and electrify like or go install wind turbines where there is already electricity and not necessarily a need. So we want to make sure that whatever we're doing it's, like, for a need and we've assessed this and we make sure that those involved have a stake in it, like, have a say in it."

Overall this highlights that WE is driven by the idea of fulfilling needs, with many organisations of the network seeking to help rural communities access electricity in sustainable ways. The focus on needs is further emphasised by the fact that WE seeks to only employ their LMSWTs if fitting as a solution in a specific context. That is, if other sustainable electricity production might be more viable, like small scale hydro then, these are recommended, as highlighted by the below quote:

"There was very recently an organisation that contacted us [...] 'Would we be able to install a wind turbine system to provide them with electricity?' Essentially we said no, but we said no for very good reasons, and that was that the location that they're in has very little wind. They have good wind for maybe 3 months of the year. So obviously the batteries that are charged in those 3 months are not going to last the rest of the year. So what we did was look towards the other resources that they had, for example solar and hydro. We found that they had a fantastic hydro power resource quite close to them, so we directed them to some friends from a hydro power organisation very similar to ourselves."

Hence, WE's application of LMSWTs is always with the local specifications in mind. The members operating across the globe adapt the turbines to fit local environments and share this knowledge in the network. Further, repairability and maintenance by locals/users is one of the main goals by WE and it is a priority to give people the tools and knowledge to do so.

What is very important to note in all of the above is that WE operates and thus also innovates (incl. adaptation) LMSWTs solutions without

being primarily driven by profit incentives. Within WE's innovation processes, profit making is, if at all, only present to a marginal extent. This is further highlighted due to the charity status set out in the organisation's constitution which also dictates that only not-for-profit members have an official voting right in the organisation's decisions. One interviewee put it in the following:

"We are by definition a non-profit entity because we are a charitable incorporated organisation. So legally we can't make a profit and I don't think we would ever look to make a profit either."

4.2. *L'atelier paysan*

L'atelier paysan (AP) is a cooperative at the centre of a network of farmers, engineers and practitioners in France collaborating to design and manufacture custom farming technologies. Their mission statement asserts that "technological practices in agriculture are mainly driven by the agro-industry, and correspond to its particular needs. This complex process is likely to continue, until farmers using these technological practices which are not tailored to their real needs, reassert ownership of the system-wide design of their farms."

The initial motivation of this group, and others such as Farm Hack in the US, has been to address common challenges faced by small-scale farmers engaged in environmentally and socially sustainable (and in some cases regenerative) practises (Giotitsas, 2019). Comparing their work to agribusiness, an interviewee put it as: "The main purpose of industrial technology is to make money. Our purpose is to assist people make appropriate, simple tools with a high level of agronomy" and adds regarding user innovation culture that even if it is appropriated by big companies "their goal is to make profit. We do not pay our shareholders. We are not accountable for that. We are accountable for our social goals."

Examples of AP's technologies include a weeder for organising market gardening on a small scale or a mobile pigsty used to regenerate farming land. These examples and others are primarily created due to limited financial incentives for market driven innovations to cater for such needs. Even if there are tools available in the market, they are either too expensive or not scale-appropriate. AP develops tools exclusively after farmers have expressed a need for them. The organisation includes the farmers in every step of the development process, acting as a facilitator or guide from a practitioner's perspective. One interviewee expanded on this:

"We don't activate the resources of the cooperative for individual needs. Only for collective needs because we think the tool needs to be appropriated by several people to be justified."

The same interviewee added that their "organisation would be a hub of resources for farmers exchanging knowledge and know-how with the support of a team of engineers". As such farmers dictate the parameters for designing the tools and provide precious insight based on the experience and tacit knowledge.

AP organises regular workshops to prototype the various tools it develops, and, after extensive field tests, recalibrates them to best suit their needs or to create different versions for varying biophysical conditions. These workshops, as well as others organised for this specific purpose, have a knowledge transfer element too, where participants develop multiple small scale fabrication and repair skills (like iron welding). This, in conjunction with designing the tools for accessibility (in terms of equipment, locally sourced materials, or even utilising scraps and waste material), is to empower users to manufacture and maintain their tools locally and, ultimately, further innovate themselves.

AP and other open farming communities share knowledge and designs concerning tools, but also organisational practices, as digital commons to accommodate similar needs elsewhere. The commitment to openness is rooted in the conviviality of the communal innovation process. As an interviewee mentioned:

"My capacity to build tools comes from other people. Family, farmers I met from travelling. It is only logical to give it back. [...] [T]he machines I built years ago are a lot better today because people have adapted and modified them. That would not be possible with patents."

Adaptability is explicitly reflected in the initiative's values: "The technology can always be improved and tailored to the particular needs of local farmers. We always encourage those farmers to give back their modifications of adaptations, so everybody can take advantage of them." Frugality in terms of resource consumption and material recycling was further specifically mentioned: "We prefer it when farmers look at our designs and then look around their farm to find what they can use to build the machine. We encourage this because it is less resource and energy consuming." Autonomy is highly relevant too, as exemplified in the following statement:

"People may use high tech machines but they need to be conscious of the dangers. What happens when the machine breaks? We need to preserve farmers' independence, autonomy, resilience."

Such practices create connections and synergies through contributions to digital commons of designs, knowledge and software, and often mutual exchanges in local meetups and events, that can enhance innovative capacities everywhere. According to one interviewee the ultimate goal of such a framework is sustainability: "We are sensitive to the needs of small scale farmers and I really think this is the best way to produce food. With more diversification and agroecology. Because when producing organic you are still not there, you need to improve your practices", pointing to regenerative methods for ecosystems.

There are already several documented cases of other such initiatives emerging, in Greece, Bhutan, and Estonia, in which authors of this paper participate. Sustainable entrepreneurial practices can benefit from them, creating local innovation systems building on open, customised, and needs-based manufacturing and maintenance, adapted to local environmental needs and improving local economies (Kostakis et al., 2021; Pantazis and Meyer, 2020).

5. Discussion

The findings highlight that innovation under quite different epistemic and ontological bases is possible. Further still, these alternative imaginaries around the purpose of innovation and technology are already being enacted, for example in the context of CBPP. This ties into our arguments made above that innovation is imbued with societal values and hence there is no linear or deterministic trajectory for it. The alternatives we have illustrated direct their modes of production and innovation to cater, repair, maintain, and re-use resources, including materials, technologies, and even pre-existing knowledge and skills. This is in stark contrast to constant disruption and replacement. This tendency clearly shows that the hegemonic Schumpeterian notion of Creative Destruction is not the only possible mode of innovation. Creativity remains a central element, whereas 'destruction' is replaced by an emphasis on use-value and needs. Obviously, this does not mean that innovation underpinned by hegemonic common senses cannot be directed to cater, repair, maintain, and re-use as it is certainly evident in many sectors, such as recycling or the circular economy (Calisto Friant et al., 2020; Genovese and Pansera, 2021). Yet, arguably in those instances it does not seem to be the main purpose if still subsumed under the purpose of capital valorisation. What the cases clearly show is that modes of innovation that are not underpinned by valorisation logics do exist and, under certain conditions, can outperform classic innovation driven by growth and profit logics. Our findings also clearly show that what we defined in Section 2.2 as innovation underpinned by the counter-hegemonic values emerge and struggle for survival within niches or cracks of the dominant hegemonic values and underpinnings, to adapt the language of Wright (2021). This also underlines that these

alternatives still need to persevere and thrive in a system with dominant values that are fundamentally at odds. This makes these alternatives' existence precarious.

Alternative practices can be, and very often are, easily co-opted for the purposes of capital accumulation and economic growth (Pazaitis and Kostakis, 2022; Spash, 2020). Co-optation has previously been discussed in the context of CBPP and various licences have been proposed that bar the use for for-profit and valorisation purposes (Bauwens et al., 2019; Bauwens and Kostakis, 2014). Such licences could fence counter-hegemonic innovation off from co-optation for valorisation purposes and thus could help the wider emergence of such innovation. Further, Pazaitis and Kostakis (2022, p. 760) emphasise the difference between peer production (PP) and CBPP in this context: "for profit initiatives utilize peer production practices to maximise shareholder value while the commons-oriented initiatives utilize such practices to maximize sharing and commons creation". Indeed, Benkler (2017) proposes that PP could be used as a tool to drive economic growth if contained in a firm-based setting. The so-called digital economy is heavily reliant on such a deployment of PP by distorting its commons-based elements (Pazaitis and Kostakis, 2022). PP operates within an institutional setting that actively rationalises the capital-oriented outcomes over the commons-based ones. It often leads to the submersion of CBPP practices under the valorisation logic, which destroys the very social fabric underpinning digital innovations. Meaningful social and ecological impact is diminished as commons-based relations are deemed practically invisible in the system's reproduction. In the end, industrial production is based on the exploitation of natural resources and unpaid domestic care work to reproduce itself (Barca, 2020). The digital economy further exacerbates this process, with capital-intensive infrastructures that intensify the exploitation of nature and people on one hand, alongside business models that exploit layers of digital commons and user activity on the other (de Rivera, 2020; Pazaitis and Kostakis, 2022).

However, on the flipside of hegemonic co-optation lies the potential for creating counter-hegemonic entry points in existing institutions. The very existence of these alternatives against all odds in their contradictory setting already speaks for this potential (Robra et al., 2021). As said, CBPP cases demonstrate that innovation *can* happen based on different underpinnings. CBPP *organisations* showcase practices to organise this counter-hegemonic view of innovation. Parker (2021, p. 7) calls for a shift of attention from 'management' to 'organising' as an area of inquiry containing "plural epistemologies and methodologies for thinking about the shape of the future", management being one of them. In the same vein, the arguably dead-end of classical innovation management can be addressed through different ways that organisations innovate and that innovation can be organised. Organisations can potentially enact counter-hegemonic activity by following the alternative underpinnings lined out in this paper. Through these activities new forms of organisational governance can emerge (Bauwens et al., 2019). In other words, new forms of organising innovation on the micro-level can emerge by starting to innovate with different purposes in mind. Further, within these organisations, CBPP can be seen as the locus that helps the cultivation and reproduction of counter-hegemonic ideas and practises, seeking to challenge and transcend current institutions. Social groups may be mobilised to exert consent and pressure towards new institutions (Pazaitis and Drechsler, 2020). This mutually reinforcing process creates what De Angelis (2017) calls 'enabling environments' for individual emancipation. Yet, organisations following the presented counter-hegemonic understanding of innovation will likely still face more precarious economic situations (at least in the current capitalist setting).

According to Pazaitis and Kostakis (2022) CBPP and commons-based innovation requires a supportive state - we use state in *sensu lato* including regional governments, municipalities or city councils. This can be adapted to also mean a supportive state that does not assume that technology and innovation need to be price-incentivised or profit driven. A transformed role of the state, often referred to as the Partner

State (Orsi, 2009) or Enabler State (De Schutter and Dedeurwaerdere, 2021), can dialectically operate upon and through civil action to establish counter-hegemonic ideas, and define new institutions. Pazaitis and Drechsler (2020) build on D'Alisa's (2019) interpretation of Gramsci's (1971) conceptualisation of the integral state where counter-hegemonies can arise in civil society that need to be adopted by political society (what is traditionally perceived as the state alone) to help enshrine counter-hegemonic common sense. We can hypothesise that the concretisations of the counter-hegemonic purpose and underpinnings of innovation presented in the cases of this paper would likely flourish more and in various other places if they received state support.

It has been demonstrated that extremely successful projects that deliver outbreking innovations have been state-driven in the first place, which then spilled over into the private sector (Mazzucato, 2013). Yet, as argued earlier, the hegemonic view on innovation holds on to the belief that innovation is validated through and for the purpose of capital valorisation. It is evident that projects aligned with the hegemonic understanding of innovation have various paths to be successful in the game by taking its rules for granted, compared to alternative modes of innovating (Fressoli et al., 2014). Indeed, in some instances the cases presented in this paper have tried to align their activities to a certain extent with a hegemonic understanding of innovation solely for the purpose to be able to apply for funding, even up to the point of internal co-optation (Giotitsas, 2019; Robra et al., 2021). However, if it is true - as suggested by this special issue - that 'classical' innovation management has hit a dead-end, it should be in the interest of policy makers to support the counter-hegemonic view of innovation developed in this paper. That is, governmental institutions like the European Union (EU) could start to actively fund innovation activities that reject valorisation logics in favour of societal needs. The EU currently funds, or has previously funded, 'alternative' concepts such as open innovation, responsible research innovation, digital social innovation, and innovation hubs. Some may argue that these frameworks, although presented as alternatives, reproduce valorisation logics of 'classical' innovation in other forms, or are expected to do so by the funding structures supporting them. Nevertheless, these attempts are tangible signs of an emerging consensus around the idea that other forms and ways of innovating - including other values and purposes for innovation - are urgently needed.

It needs to be re-emphasised that innovation is neither deterministic nor apolitical. Yet, the role of innovation cannot be understated in creating and reproducing underpinning values of society, its economy and mode of production (albeit non-deterministically). This means that a counter-hegemonic understanding of innovation can help the emergence of a different societal structure not based on the destructive imperatives of limitless economic growth and capital accumulation, upon which conventional understandings of innovation are based. As argued before, such different societal structures could equate to degrowth and post-growth conceptualisations. Hence, by supporting the counter-hegemonic understanding of innovation, governmental institutions could actively decide to support and encourage the emergence of structural change needed for a more sustainable society which helps to avoid existential problems like climate change and ecosystems' collapse. Interestingly, the EU has already started to discuss and debate post-growth futures (European Environment Agency, 2021). However, more explicit support is required. Whether the state support we are calling for here is possible, or likely, in a capitalist state is up for debate and warrants further discussions and research; which escapes the scope of this paper. However, what is clear is that such a supportive state needs to co-emerge alongside alternatives such as the ones we have presented. Both, alternative organisations and the state, have to act upon each other to enable new social relations. The hegemonic view on innovation similarly is a product of the co-emergence of early capitalist firms alongside the capitalist mode of production. Various prefigurative forms of state support in relation to the commons-based forms of organisation

have already been observed on municipal levels (see Kioupkiolis, 2022). Hence, why should another co-emergence not be possible again?

6. Concluding remarks and future research agenda

We believe that the 'classic' innovation management approach, conceptualised as a hegemonic framing of innovation, has reached a dead-end in the face of pressing social and environmental issues that it has helped to create in the first place. This paper presents an understanding of innovation underpinned by different values and common senses as it is already emerging in the cracks of the dominant system. Beyond contributing to a different conceptualisation of innovation, the counter-hegemonic definition of innovation and technology presented in this paper contributes to understanding how post-growth societies could emerge. Technology and innovation have largely been viewed in seemingly black and white terms within post-growth scholarship up to the point of technophobia (Howson, 2021; Robra and Becker, 2022). However, the conceptualisation of technology in this literature is mainly connected to what we presented as the hegemonic view on innovation. The alternative view presented in this paper therefore contributes to post-growth scholarship by providing a more nuanced understanding beyond the black and white dichotomy, emphasising the importance of innovation and technology for new societal structures to emerge. Adding to this, the main contribution of the paper should be seen as a potential start to the discussion between 'classic' innovation scholars, STS scholarship, and post-growth scholarship. 'Classic' innovation scholars can definitely enrich their theoretical arsenal with the analytical tools of STS and post-growth scholarships that focus on power relations, politics, purposes and values of science, technology, and innovation systems. On the other hand, our analysis is meant to encourage STS scholarship and beyond to rethink the purpose of innovation and technology. Consideration around the hegemonic and potential counter-hegemonic underpinnings can build necessary bridges between the two fields.

Many questions of course remain unanswered about how to replace the current dead-end understanding of innovation. It is clear that the presented cases exist in rather precarious settings where they need to survive in a system dominated by values fundamentally at odds with theirs. More research should look at how their existence and emergence can further be supported and, crucially, how the enactment of the counter-hegemonic values presented in this paper could lead to needed societal structural change towards this direction. It also needs to be explored further what sectors might gain more prominence over traditionally more ecologically destructive sectors such as the fossil fuel industry while a counter-hegemonic understanding of innovation might emerge and take hold. Similarly, the concept of the Partner State should be investigated further in these contexts beyond our broad policy suggestions. Furthermore, considering that in modern industrial society a great deal of innovation is directly fed by science, rethinking classic innovation in a post-growth vein would necessarily imply the development of different imaginaries for our scientific institutions, their goals and their function in society (Giampietro and Funtowicz, 2020).

The above future research avenues further underline the complexity of change needed to allow for different imaginaries of innovation and technology to take hold in society. This will not be an easy undertaking, yet the alternative i.e. 'classical' innovation management, is feeding unsustainable economic growth that is incompatible with continued life on this planet and has put humanity on a self-destructive path. To place human ingenuity at the service of people, we need to reframe the very core ideas that guide and govern innovation. In this vein, we might even want to save and resignify the Schumpeterian notion of Creative Destruction into a counter-hegemonic slogan. Creative destruction is not evil *per se*. We do need creative *disruptions* in the way we produce energy, the way we move around or produce our food. But above all, we need a disruption in the way we conceptualise innovation.

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Declaration of competing interest

The authors declare that there are no competing interests.

Data availability

The data that has been used is confidential.

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