

# Beyond the State and Market: Theoretical Perspectives on the Commons

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## Abstract

This article is primarily a theoretical examination of commons-based peer production. It analyses the contradictions of the commons through a post-hegemonic lens that projects a post-capitalist commons-oriented transition. Starting with a focus on the commons from a political economy perspective, the key characteristics of neoclassical economics are outlined and compared with commons-based economics. The purpose is to identify the potential socio-economic benefits of the latter in contrast to the former. Next, several different conceptual formulations of the commons are discussed. On the political side, this encompasses liberal, reformist and anti-capitalist approaches. On the economic side, the digital economy, moral economy and the possibilities for cooperative, platform-based commons are discussed. Particular emphasis is given to open source and blockchain initiatives designed to interlink commons-based practices and support the formation of a collective subject. The conclusion reflects upon possible directions for a post-hegemonic commons strategy.

Over the last two decades, depictions of a commons-based economy have been driven by a range of factors, including financial instability, increasing recognition of the need to respond to climate change, the proliferation of online communication technologies and decreasing costs of information. The commons are based on a simple yet radical idea: great improvements in production and management can be achieved by reducing barriers to knowledge exchange and power-sharing. Collaboration and openness can result in a constantly improving collective repository of best ideas and practices, including manifestations of a digital commons alongside a rural and urban commons (Benkler, 2006; Bollier and Helfrich, 2015; Ostrom, 1990).

The commons can be conceived as comprising three elementary components: (1) a resource; (2) a community; and (3) a commoning activity (Bollier and Helfrich, 2015; De Angelis, 2017). The commons consists of distributed or communally shared property resources/infrastructures (natural resources, technology, knowledge, capital, culture), which are self-managed by user communities in accordance with collectively established rules or norms (Bauwens et al., 2019; Bollier and Helfrich, 2015; Ostrom, 1990).

Commons-based practices have the potential to disrupt centralized capitalist production through the decentralized use of the internet and free/open source software/hardware (Bauwens et al., 2019; Birkinbine, 2020). The commons favor, in principle, decentralized self-management over hierarchical management, openness over privacy, cooperation over competition, sustainability over capitalist growth, and equitable distribution of value over profit maximization. The commons are considered to increase flexibility, diffuse knowledge, and reduce waste and transaction costs, thereby reaching higher levels of social innovation, democratic inclusion and environmental sustainability (Kostakis and Bauwens, 2014). Eventually, commoning and open sourcing become mechanisms for enabling a cosmopolitan bottom-up collaboration (Benkler, 2006, Kostakis and Bauwens, 2014).

This article focuses on the internal contradictions which emerge not only between the commons and the market economy, but within the commons itself. Section 1 contrasts commons-based economics with the neoclassical economics that sustains neoliberalism and the expansion of the corporate model into state management (Papadimitropoulos, 2020: 9-10). Section 2 expands the theory of the commons by providing a critical account of the current literature. Section 3 focuses the analysis on technologically driven economic models such as platform capitalism and the digital commons. Section 4 concludes with a critical assessment of the contradictions of the commons with the aim of advancing its viability.

The core argument here is that commons-based economics challenges neoclassical economics on various grounds. The global digital commons introduces the dimension of information abundance that can potentially extend local rural and urban commons and establish a new mode of production on the model of cosmopolitanism (Bauwens et al., 2019). Globally available knowledge, software and design connect to local manufacturing via the internet and open sourced desktop manufacturing technologies (such as the three-dimensional printing and computer numerical control machines). A global digital commons can potentially combine with local rural and urban commons, fablabs, social enterprises, blockchain-based platforms, open cooperatives and the solidarity economy to establish a glocal, post-capitalist mode of production premised on openness, sharing, self-management and the equitable distribution of value among multiple stakeholders. The glocal commons brings together the global digital commons of the internet with local commons through the customization of open source knowledge to local conditions. Glocal commons may enhance worker-owned firms and traditional cooperatives operationally dependent on closed copyright terms by constituting multi-stakeholder schemes that employ, instead, open licenses, open supply chains and open book accounting. Glocal commons have the potential to democratize the economy by granting the ownership and the management of the means of production to the people. Ultimately, glocal commons proponents point to the possibility of sustaining a decentralized, networked ecosystem of value creation by mutualizing knowledge and resources. The mission is to establish an alternative socio-economic paradigm that could gradually replace neoliberalism with the post-capitalism of the commons (Papadimitropoulos, 2020).

However, a number of contradictions plague the commons both internally and externally: vested interests, ideology, lack of capital, skills and resource availability, gated communities, neoconservatism and techno-elitism, to mention a few (Harvey, 2003: 168, 177-179; Kostakis and Bauwens, 2014). Marx's analysis highlighted the internal contradictions of capitalist production (capitalist vs proletarian, capital vs labor, exchange value vs use value, etc.) that were destined to doom capitalism to failure and replace it with communism (Harvey, 2014). However, the argument presented here inverts Marxian-style analysis to address internal oppositions of the commons. To be

precise, the internal oppositions of capitalism are reproduced *within* the commons through the contradictions between commerciality and non-commerciality, directors and executants, plutocracy and democracy, competition and cooperation, and so on.

For the commons to resolve these contradictions and progress into an organic, self-sustaining model of superseding neoliberalism, a networked ecosystem of open cooperatives is required. This would provide user communities with a sustainable livelihood along the lines of democracy and the equitable distribution of value. The internet, blockchain and open source technologies have the potential to scale the commons by providing novel tools of governance and funding. The Commons Stack, for example, is a not-for-profit association that draws on the work of Elinor Ostrom to build commons-based microeconomies to sustain public goods. It aims to create a library of open source blockchain tools that can enable purpose-driven communities operating in the service of cyber-physical commons to raise and allocate funding, make decisions and measure their impact on the basis of computer-aided calculations (this involves retrospective and real time analysis as well as modeling and simulation) (Fritsch et al., 2021). The cyber-physical commons are an extension of the glocal commons from the internet to the blockchain. Cyber-physical commons attempt to bridge the local and global digital commons by means of crypto-economics, which examines socio-economic coordination games in algorithmically designed peer-to-peer networks. Crypto-economics combines institutional economics, behavioral economics, computer science, algorithmic game theory and mechanism design to steer socio-economic behavior in decentralized peer-to-peer networks.

Thus, public goods expand from local commons managed by governments and/or communities to a cyber-physical commons self-managed by communities on the internet and blockchain. Local commons require scarce resources that are potentially rivalrous or excludable as in the case of community land trusts or grazing lands, whereas cyber-physical commons create public goods in the form of information and knowledge built in open source software that can be locally customized to serve various functions (from community currencies and reputation tokens to building agricultural tools).

However, technology alone cannot address the contradictions of the commons. For a dominant socio-economic model to rival or supersede neoliberalism, a post-hegemonic transformation of society would be essential. Post-hegemony is the transformative political strategy that seeks to integrate the different types of commons (digital, rural, urban) into a synergetic network of cosmo-local commons, supported by reticular market and institutional mechanisms aligned around the commons. Post-hegemony can be distinguished from classical Marxist versions of hegemony (Lenin, 1961) centered on the communist party as the vehicle for distributing power to the people. Hegemony seeks to scale the commons vertically or top-down by means of democratic socialism whereas post-hegemony advances federated anarcho-syndicalism horizontally or from the bottom-up.

Effective incentive schemes, purpose-designed policies, financial mechanisms, law reforms, affordable housing, and education together constitute a post-hegemonic holistic strategy aiming to transform neoliberal capitalism into the post-capitalism of the commons, supported by a partner state represented by the interests of the people rather than elites. To put it succinctly, the transition from neoliberalism to post-capitalism entails the transformation of the capitalist enterprise into an open cooperative running on the principles of sharing, sustainability, democratic self-management (one member-one vote) and the equitable distribution of value among multiple stakeholders. In this

regard, the state would function as an enabler to transform neoliberalism into the post-capitalism of the commons.

## Neoclassical economics vs commons-based economics

This section contrasts mainstream economics with non-mainstream economics. The basic difference lies in the degree of state intervention in the economy. The aim here is to highlight the advantages of commons-based economics vis-à-vis neoclassical economics.

### *Neoclassical economics*

Neoclassical economics, the ideological bedrock of neoliberalism, contains the following assumptions:

1. An economy entails the allocation of scarce resources for the purpose of maximizing social welfare, which is the mere aggregate of individual preferences. The basic motive of human behavior is self-interest. Each individual aims to maximize utility, which is the advantage and pleasure deriving from satisfying one's own preferences (Marshall, 2013). Markets help match scarce resources with individual preferences via impersonal exchange/trading (Smith, 1977).
2. Owing to scarcity, trading is a more equitable means of allocating resources and maximizing social welfare compared to barter and the primitive gift economy. Unfettered markets are the most efficient means of allocating scarce resources to the highest valued use. The process is set by price signals voluntarily generated by the actions of buyers and sellers. Prices are an accurate and sufficient signal of information to allow supply and demand to match up and generate social welfare (Hayek, 1944). Ultimately, prices are the sole markers of value.
3. The unintended consequences of unrestricted trade generate social welfare, since in a voluntary exchange both individuals become better off (Smith, 1977). The more exchanges, the better for society, since more needs are being met and more individual preferences are satisfied.
4. Firms reduce transaction costs through markets (Coase, 1937). Hierarchical management of firms and divisions of labor increase specialization, productivity and efficiency. Market exchange moves existing stuff around, while the division of labor creates stuff, in effect maximizing social welfare (Smith, 1977).
5. Collective action planned by state or groups misallocates resources due to the lack of information necessary to coordinate economic activity (Hayek, 1944).
6. Property is justified on the grounds of individual labor (Locke, 1960). Property rights guaranteed by contracts protected by the state are necessary and sufficient for the production of knowledge.
7. Competition is inherent to the human species (Hayek, 1944).
8. The role of the state is to enable the functioning of the economy, reduce transaction costs and promote competition. The state should intervene in the economy only in conditions of market failure (Hayek, 1944).

9. Finance performs a number of essential functions for the economy: it allocates capital by recycling surpluses across the globe from surplus countries to deficit countries in the form of investment and credit; it intermediates between savers and investors providing credit to individuals and companies; it promotes innovation and job creation; it manages risk; it provides liquidity; and runs the payment mechanism (Stiglitz, 2016: 40). Finance adds value to the real economy by completing markets, thereby propelling the Arrow-Debreu general equilibrium momentum: if all different agents create as many contracts as possible, complete all markets and trade continually among them, the economy will reach the Pareto efficient maximum possibility of human welfare.
10. Capitalism is considered a peaceful economic system that encapsulates the liberal ideal of self-regulating markets, operating as sites of voluntary exchange based on free trade and property rights. They are designed to foster technological progress and rising labor productivity to satisfy the wants and needs of all (Mazzucato, 2018: 63). An ideal capitalism is supposed to produce multiple equilibria, allocating scarce resources under the conditions of perfect competition and information fully accessible to all (Mazzucato, 2018: 63-64). The democracy of the market, thus, comes to represent an ethical pluralism that nurtures freedom of choice, tolerance and the rule of law.

Neoclassical economics acknowledges that markets can fail under various circumstances. Monopolies, information asymmetries between consumers and producers, externalities not reflected in market prices, and the provision of public goods are all instances of market failure (Jacobs and Mazzucato, 2016: 16). Governments should intervene and seek to “correct” market failures, where appropriate, by promoting competition, requiring more available information for consumers, forcing firms to pay for externalities and providing or subsidizing public goods. Governments should limit themselves to a minimum regulatory framework of employment, low taxation, consumer and environmental protection. Excessive regulation is considered to slow economic activity to a crawl and precipitously reduce government revenues, eventually “killing the goose that lays the golden eggs.”

#### *Commons-based economics*

Non-mainstream economics, ranging from post-Keynesian to leftist economics, argues for radical state intervention in the economy (Papadimitropoulos, 2020). However, to tackle the structural contradictions of capitalism that produce immense inequalities and threaten to destroy the planet, it is necessary to alter the mode of capitalist production from within. State-centered democratic rebalances of the capitalist economy need to tilt towards a post-capitalist, commons-oriented transition geared by the self-management of economy and society. Commons-based economics are anchored in the following arguments (see Table 1):

1. Contrary to neoclassical economics’ assumption that collective action is not feasible without clearly specified property rights, Ostrom’s work (1990) on local commons has demonstrated that collective action is feasible even among multiple stakeholders (the state, private institutions, individuals, communities). Potentially, they all have an interest in self-managing a common-pool resource, be it a river, a pasture, an isolated building, or a community garden. Ostrom’s polycentrism model is relevant to contemporary multi-stakeholder public/private/common partnerships, as evidenced in the rural and urban commons initiatives flourishing

in many countries, including Belgium, France, Canada/Quebec, Italy, the Netherlands, Switzerland, and Japan. However, Ostrom's model of rural and urban commons alone cannot threaten capitalism. For this to happen, a broader strategy is required that will radically transform neoliberalism into the post-capitalism of the commons.

2. Information can potentially challenge scarcity, since it creates an abundance of value owing to its unique characteristics. It is not "used up" when consumed and it can be infinitely reproduced at zero marginal cost. An agent who transmits information can still keep and consume the same information. And a great number of agents can consume the same information simultaneously (Brousseau and Curien, 2007). The "difference" between non-rivalrous public goods (Samuelson 1954) and the digital commons is that the former are managed by the state while the latter are self-managed by peer-to-peer networks on the internet. The digital commons helps state-managed public goods expand into self-managed cyber-physical commons.
3. Intellectual property rights aim to tackle the contradiction between the abundance of information and the creation of markets for information by creating artificial excludability and scarcity of information. However, such rights eventually lead to the underutilization of information and the inefficient use of knowledge (Arrow, 1962).
4. Kostakis and Bauwens' (2014) model of *cosmolocalism* enables the digital commons to move beyond scarcity (through hardware, resources, infrastructures, capital) to create an abundance of information which everybody can contribute to and draw from according to their needs and capacities. The global (digital) commons connects to local rural and urban commons, social enterprises, blockchain-based platforms, and open cooperatives via desktop manufacturing technologies, such as three-dimensional printing. Glocal commons set out a new socio-economic paradigm for democratizing the economy by granting the ownership and management of the means of production to people, assuming the latter are provided the necessary education to engage in grassroots techno-social innovation (Bauwens et al., 2019). Blockchain-based funding and governance tools can further support a post-capitalist commons-oriented transition (Rozas et al., 2018; Fritsch et al., 2021).
5. The digital commons of open knowledge, software/hardware and design promotes self-organization through *stigmergy*, *equipotentiality*, *holoptism* and *modularity* (Bauwens et al.; 2019). Stigmergy is a form of indirect coordination whereby participants match their skills with the needs of the system, building on traces left by other participants. Equipotentiality offers equal opportunities for everyone to participate according to their skills. Participation is conditioned a posteriori by the process of production itself, wherein skills are verified and communally validated in real time. Holoptism grants access to all information necessary irrespective of a participant's positional power, thereby minimizing information and power asymmetries. Modularity is the degree to which a project can break down into smaller components that can be independently and asynchronously produced and recombined (i.e., Wikipedia, Linux). The higher the degree of modularity, the greater the autonomy and flexibility of peer production.

6. Glocal commons prevent free riding, overuse or underuse of common-pool resources by self-monitoring mechanisms that are reinforced both online and offline. Examples include platform moderation and meta-moderation (i.e., Slashdot), technical solutions embedded in the platform (i.e., Slashdot, Nasa Clickworkers project, Kuro5hin); norm-based social organization (i.e., limited-access commons, Wikipedia, Kuro5hin) (Benkler, 2006; Ostrom, 1990) and algorithmic mechanism design (Rozas et al., 2018; Fritsch et al., 2021).
7. Prices, contracts and strict property rights are lossy, sticky and costly (Benkler, 2006). The information and allocation gains of glocal commons translate into better, fairer and more sustainable socio-economic outcomes in comparison to price signals and managerial hierarchies. Self-organization, decentralization, transparency and sharing supported by open source code, open value chains and open book accounting induce inclusion, distribute value, reduce waste and sustain a circular economy (Bauwens et al., 2019). Blockchain-based funding and governance tools may align individual economic incentives with the collective production and stewardship of public/common goods (Fritsch et al., 2021). Computer-aided tools introduced by the Commons Stack such as the Augmented Bonding Curve and Conviction Voting can provide liquidity and stewardship of the commons while tempering speculation.
8. Competition is not a zero-sum game between rivals but a win-win game between peer producers collaborating on symmetric terms. Rationality does not always translate into self-interest, since humans often rationally pursue non-self-interested goals. Cooperation rather than competition is the evolutionary drive of human species' survival (Bowles and Gintis, 2011).
9. From a commons-based perspective, neoclassical economics misconceives capitalism as an ideal form which bears little resemblance to the way capitalist markets actually function. If private property is the product of individual labor, then a large chunk of profit derives historically from the exploited labor of slavery, serfdom and modern wage exploitation. Capital has accumulated historically via the raw power of unequal exchange (rents), occasionally reinforced with colonialism, wars, monopolies, oligopolies and cartels, all supported by banking, financial and state-military complexes. In short, capitalism has been, by and large, the product of power, theft and violence, supported by liberalism, which, for some, is the political legitimization of capitalism. The commons has the potential to address the injustices of capitalism and liberalism by introducing a post-liberal, post-capitalist ethical economy operating on the basis of affection, solidarity, cooperation and care.
10. In a post-capitalist commons-oriented transition, the central state transforms into commons-centric partner states which implement direct democratic procedures. Their purpose is to diffuse rather than concentrate power and nurture social transformation from the bottom-up rather than engineer it from top-down (Kostakis and Bauwens, 2014).

Table 1. Neoclassical vs commons-based economics

Capitalist firm	Commons-based open cooperative
self-interest	diversity of motivations: self-realization, altruism, affect, care, solidarity
competition (zero-sum game) for scarce resources	cooperation (win-win game) for scarce and abundant resources
centralized, hierarchical top-down management	decentralized bottom-up democratic self-management
planned obsolescence, (artificial) scarcity	market value created from scarce resources adding value on top of the abundance of the commons
imperfect market price signals, overproduction, negative externalities, waste, unsustainability	open supply chains, greater coordination between supply and demand, circular economy, internalization of negative externalities, sustainability
centralized research, development and innovation	decentralized open knowledge and design, optimum participation through modularity and granularity, commons-based eco-techno-social innovation
intellectual property rights	copyfair licenses and blockchain-based smart contracts designed to secure the commons against capitalist co-optation
information asymmetry, privacy	holoptism, transparency, open access
division of labor, alienation of labor, precariousness, intensification of labor, performance pressure, stress, health morbidities	mutual coordination by stigmergic collaboration, equipotentiality = participation conditioned, a posteriori, by the process of production itself, where skills are verified and communally validated in real time; this entails creativity and self-realization
salaries, unjust co-optation of surplus value, network effects (internet), positive externalities, value crisis, enclosure of the digital commons via the co-optation of "free labor," rent seeking, surveillance capitalism, the tragedy of the commons	open value accounting in which incomes are distributed according to one's contribution, tokenization of the "free labor" involved in the employment of general/cognitive/affective intellect across the (digital) commons value chain, fair material and immaterial value flow that recognizes reputation, care, affect and reproduction, the comedy of the commons
profit maximization among shareholders	equitable distribution of value among multiple stakeholders
finance and credit	community transaction mechanisms such as as internal lending, smart contracts, participatory budgeting, common liquidity funds, resource pooling, microfunding, augmented bonding curve
regulatory state, minimum state, capitalist state, social-democratic state	commons-centric partner state



## Political theory of the commons

The commons reflect various intellectual strands. The very idea originates in the gift economy of primitive societies, Aristotle's republicanism, feudal commons and modern political philosophy (Fourier, 1971; Marx, 1857/1858; Owen, 1991; Proudhon, 1994). The most contemporary elaborations of the commons cover a broad spectrum of disciplines, ranging from philosophy (liberalism, Marxism, anarcho-syndicalism, critical theory, post-Marxism and existential political philosophy) to sociology, law, crypto-economics, management studies, media and communication studies and computer science (Papadimitropoulos, 2020).

Nowadays, three main political approaches to the commons are evident (Papadimitropoulos 2020): liberal (Benkler, 2006; Lessig, 2001; Ostrom, 1990); reformist (Arvidsson and Peitersen, 2013; Bollier and Helfrich, 2012, 2015, 2019; Kostakis and Bauwens, 2014; Olin Wright, 2009; Rifkin, 2014; Rushkoff, 2016; Scholz, 2016; Scholz and Schneider, 2016); and anti-capitalist (Dardot and Laval, 2014; Dean, 2009, 2012; De Angelis, 2017; Dyer-Witheford, 1999, 2015; Federici, 2012; Gibson and Graham, 1996, 2006; Hardt and Negri, 2000, 2004, 2009; Kioupkiolis, 2019; Mason, 2015; Söderberg, 2008; Žižek, 2008, 2010).

A similar reading has been recently undertaken by Antonios Broumas (2017, 2018). He classifies theories of the commons into two basic strands: social democratic and critical. The former strand separates into liberal and reformist versions, while the latter is comprised of poststructuralist and anti-capitalist perspectives. Broumas' work focuses on the production, distribution and communication of information, knowledge and culture, in other words, the intellectual commons. Liberal approaches often share neoliberal and libertarian views alongside reformist/post-capitalist approaches. The latter often contain anti-capitalist views mixed with liberal and socialist elements. Anti-capitalist approaches split into socialist and anarchist approaches, often combining post-capitalist elements in different proportions and versions. Finally, the advent of blockchain-based crypto-economics has given rise to the division between crypto-libertarians and crypto-commonists (Fritsch et al., 2021).

Advocates of the liberal position favor the coexistence of the commons with market and state operations. Reformists argue for the gradual structural adjustment of neoliberalism to the commons, while anti-capitalists distance themselves from both liberals and reformists by placing the commons against neoliberalism. On this view, the commons should operate independently of the state-market nexus.

One core theme of both the reformist and the radical argument dates back to Karl Marx's (1857/1858) claim that the technological evolution of the means of production will force capitalism to transform, via socialism, into communism in the long run. Marx was, of course, a humanist and not a technological determinist. This conviction, however, does not detract from the fact that technology assumes a central role in his political economy (Bimber, 1990). Today, the presumed advent of communism is projected through the prism of a post-capitalist transition powered by the internet of things (IoT), free, open source software/hardware (FOSS), the digital commons and blockchain. Post-capitalism refers to the creation of an alternative economy not driven by hierarchical top-down management seeking to maximize shareholder profits through the production of exchange value (Gibson and Graham, 1996, 2006; Mason, 2015). Post-capitalism aims, rather, at the production of use value, the democratic self-management of production and the equitable distribution of added value among multiple stakeholders such as consumers, prosumers, workers,

members, users, etc. The commons literature portrays multiple variants of this potential transition (Papadimitropoulos, 2020).

### *The liberal approach*

Elinor Ostrom (1990) was awarded the Nobel Prize in economics in 2009 for having analyzed numerous successful cases of self-managed common-pool resources (i.e., forests, pastures, fisheries, irrigation fields). Common property regimes have flourished for centuries across the globe, from USA and Switzerland to Spain, Nepal and Indonesia. Her polycentrism model illustrates the diversity of institutions dealing with environmental conservation worldwide. In contrast to standard property-rights regimes, her research highlights various common property regimes, self-managed on a bundle of rights (access, withdrawal, exclusion, management, alienation), rather than on a single proprietary model (Ostrom, 1990; Hess and Ostrom, 2007: 11) (Table 2). Polycentrism seeks to overcome the dichotomy of privatization versus government regulation through a combination of state, market and community-based mechanisms governing common-pool resources.

Table 2: Typology of property (adapted from Hess and Ostrom, 2007; Birkinbine, 2018)

		Rivalry	
		high	low
Exclusion	high	private goods (scarce resources)	intellectual property (knowledge, language, software)
	low	common-pool resources (forests, irrigation fields, groundwater basins, fisheries, forests, etc.)	public/common goods (defense, highways, parks, airwaves, knowledge, language, culture, free software, etc.)

However, Ostrom's polycentric approach to the commons does not overcome the fundamental contradictions residing at the core of capitalist production, that is, the division between directors and workers, the owners and non-owners of the means of production. Ostrom does not call into question the undemocratic nature of capitalist firms and the subsequent inequitable distribution of value. The same contradictions of ownership, management and value penetrate the core of state management where a small minority of delegates get to manage public affairs on behalf of the people. In short, a lack of democracy characterizes both markets and the state under the capitalist system.

Yochai Benkler (2006) coined the term "commons-based peer production" to describe a non-market sector of information, knowledge and cultural production, not based on private property rights. Rather, what prevails is an ethic of sharing, self-management and cooperation among peers who have open access to fixed capital such as the internet and free software. Commons-based peer production consists of open contributory networks of distributed tasks, set and executed by groups online in a decentralized and autonomous fashion. "Commons" here refers to a particular institutional form of structuring the rights to access, use and control resources. This differs significantly from a private property-based regime that entails both managerial hierarchies and markets. The defining features of the commons are: (1) decentralized self-governance utilizing

participatory, meritocratic (do-ocracy) and charismatic, rather than proprietary or contractual models; (2) the centrality of non-monetary motivations; and (3) the permeable boundaries between state and firm (Benkler et al., 2015: 2-3; Benkler, 2006). Some prominent examples of the digital commons are Wikipedia, Slashdot, Loomio, Drupal, Linux, Apache, Mozilla, WordPress, and LibreOffice.

Non-monetary motivations often combine with monetary motivations within worker-owned cooperatives, not-for profit organizations and NGOs. However, the conception of the commons refers to aspects of these organizational forms that are free from exclusive appropriations by any private entity (Benkler, 2006). There are a number of different entities and business models operating on the commons. Digital commons and/or digitally supported commons have created new logics of value creation and revenue model possibilities that are not present in the natural resources-based commons such as gardens or summer meadows. Digital commons cannot sell their content, but they can leverage it to create revenue, or they can sell advertising space and sponsorship. Crowdsourcing and donations, as sources of revenue, may be more successful when a project is supported by a broader community as in the case of Wikipedia and Mozilla Firefox. Unlike free and open source software (FOSS), open hardware commons may sell hardware. But open hardware commons face non-negligible marginal costs included in the production and distribution of physical goods. The materiality of hardware does not allow for the freemium and premium strategy to which FOSS has recourse. Some firms can, instead, produce a product with a free licence and another product with a proprietary licence. Subscriptions and transaction fees are the most common ways of obtaining revenue for platform cooperatives due to their crucial role in coordinating diverse activities such as the selling of products and the renting of different professional services (for example, Stocksy, Fairmondo, Loconomics) (Morell et al., 2017: 51).

Mozilla, for example, runs the open source web browser Firefox, which is a digital commons. Mozilla is made up of two entities: Mozilla Foundation, a non-profit, and Mozilla Corporation. Mozilla Foundation oversees the corporation, which is responsible for Mozilla's software development, marketing and distribution. The corporation collects the revenue generated by Firefox, but it has no publicly traded stock, no dividends and no shareholders. All profits are redirected back to the Foundation's social mission to develop public access to, and adoption of, the open source Mozilla web browsing and internet application software. By not delivering profits to shareholders as capital gains, Mozilla is able to maintain its network of volunteers and 500-1000 paid employees. Capital is therefore in the service of its employees and customers, not vice versa (Rushkoff, 2016: 127-128).

Drawing on Jürgen Habermas' writings (1996), Benkler incorporates the principle of commons-based peer production into civil society. He aims to broaden the scope of individual and collective autonomy by surpassing the limits of managerial hierarchies (corporate or governmental) and market imperatives. He considers commons-based peer production a third institutional model that offers substantial degrees of civil freedom independently of state and market operations.

However, for Benkler, commons-based peer production is not supposed to replace state and market operations. The commons are portrayed as a third institutional form coexistent with the state and the market. His approach rightly emphasizes premature developments of commons-based peer production which are subject to limitations of inefficiency, public skepticism, disorganization, non-scalability, and lack of capital. Nonetheless, Benkler's outlook is utopian in envisaging that the boundaries of commons-based peer production can be extended to encompass the world economy. However, his work identifies no clear path towards a commons-oriented transition that connects the

local and global commons via the digital commons. Benkler's approach to the commons is primarily limited to the digital commons, and the scope of the commons is limited in respect to the functions of state and market. Put simply, Benkler limits the commons to a digital liberal commons.

### *The reformist approach*

This reformist approach links Ostrom's conception of the local commons with Benkler's global (digital) commons. The scope of the commons is broadened with the aim of gradually transforming neoliberalism into the post-capitalism of the commons, aided by a partner state as opposed to a nation state, distributionist welfare state, socialist state or a neoliberal state.

David Bollier and Silke Helfrich (2019) outline an approach whereby the state could facilitate a post-capitalist power shift from the market to the commons. Jeremy Rifkin (2014), meanwhile, introduces the model of green capitalism in relation to an IoT infrastructure, fueled by renewables:

The Internet of Things will connect everything with everyone in an integrated global network. People, machines, natural resources, production lines, logistics networks, consumption habits, recycling flows, and virtually every aspect of economic and social life will be linked via sensors and software to the IoT platform, continually feeding Big Data to every node – businesses, homes, vehicles – moment to moment, in real time. Big Data, in turn, will be processed with advanced analytics, transformed into predictive algorithms, and programmed into automated systems to improve thermodynamic efficiencies, dramatically increase productivity, and reduce the marginal cost of producing and delivering a full range of goods and services to near zero across the entire economy. (Rifkin, 2014: 11)

Rifkin advocates the gradual shift of green capitalism towards the collaborative commons, supported by the internet and free/open source software/hardware. Trebor Scholz (2016) adds a cooperative twist to the collaborative commons by juxtaposing *platform cooperativism* against platform capitalism (the so-called sharing and gig economy). Platform cooperativism consists of online business models operating on the basis of democratic self-governance, platform co-ownership, and equitable distribution of value. Examples of platform cooperativism include Stocksy, Fairmondo, Loconomics, Blockfood, Applicolis, CoopCycle, and Cobudget. These innovative organizations are increasing in number, and they test a range of operating models.

Michel Bauwens and Vasilis Kostakis (2014) offer a challenging spin to platform cooperativism by introducing the model of *open cooperativism* between the commons and ethical market entities. This model operates in terms of open protocols, open supply chains, commons-based licensing and open book accounting. Open cooperativism is backed by a partner state through formal arrangements such as taxation, funding, regulation, and education. Open cooperativism aims at the creation of a commons-oriented economy based on shared resources from where actors can draw and contribute according to their needs and capacities. Some cases of open cooperativism currently active are Enspiral and Sensorica (Bauwens and Pantazis, 2018, Pazaitis et al., 2018).

Bauwens and Kostakis further attempt to bridge Ostrom's local commons and Benkler's global (digital) commons by incorporating the ecological model *Design Global-Manufacture Local* (DG-ML) into commons-based peer production (Kostakis et al., 2015; Kostakis and Bauwens, 2014). The DG-ML model has been enabled today by the conjunction of modern information and communication technologies with desktop manufacturing technologies (such as three-dimensional printing and computer numerical machines). Put simply, open coding connects to design and manufacturing via the internet and 3D printers. The DG-ML model follows the logic that what is

non-rivalrous becomes global (i.e., global commons of knowledge, design, software), and what is scarce (i.e., hardware) is local. Global (digital) commons connect to local rural and urban commons via transition towns, decentralized communities and fablabs/makerspaces based on free/open source software/hardware and renewable energy systems distributed through microgrids on blockchain and the IoT (Rifkin, 2014). Moreover, blockchain technology has the potential to link to the DG-ML model on the principles of open self-governance, decentralization and the equitable distribution of value (Pazaitis et al., 2017).

The DG-ML model introduces an on-demand distributed mode of production that differs from mass production in scale, location, operation and consumer-producer relationships. As such, it offers some potentially significant advantages: (1) lower production costs (no patent costs, no transportation and maintenance costs, no planned obsolescence); (2) democratized production through new bottom-up forms of value creation, collaboration and techno-social innovation; (3) the blending of consumption with production, thus empowering prosumers; (4) equitable distribution of value to community members; (5) enhancement of gender equality and non-discriminatory practices via customization and open access; (6) contribution to a sustainable and resilient society and economy (Kostakis et al., 2015: 126). However, it is still important to consider the extent to which global digital illiteracy still prevents this vision of the digital commons from reaching a critical mass.

The literature has documented, thus far, several case studies in the fields of agriculture, manufacturing and biotechnology such as AbilityMate, Wikihouse, RepRap, Osvehicle, FarmHack, Open Source Ecology, L' Atelier Paysan, Bionics (Giotitsas and Ramos, 2017; Kostakis et al., 2015; Papadimitropoulos, 2017). Farm Hack and L'Atelier Paysan, for example, bring together farmers, engineers, roboticists, designers, architects, fabricators, tinkerers, programmers, and hackers, in order to build and modify tools and machinery with the aim of moving towards sustainable farming through global design and local manufacturing. The design of tools and machinery is open sourced globally for agricultural communities worldwide to customize and experiment locally.

Overall, the problem with the reformist argument is fragmentation and the lack of political edge. Projects often operate as private ventures which do not cooperate with each other to create the networked ecosystem of open cooperativism which would be necessary to scale and challenge neoliberalism. The notion of the *political* here refers to the distinction between politics and the political dating back to the work of Carl Schmitt and developing thereafter in various strands of post-Marxist and post-foundational philosophy in the writings of Hanna Arendt, Cornelius Castoriadis, Ernesto Laclau and Chantal Mouffe, and Claude Lefort (Marchart, 2007). While *politics* corresponds to the narrow sense of the political, as constituted, for example, in the state, *the political* is the ontological essence of society, embracing economy and culture. Taken-for-granted meanings of the political can be constituted through the conflict between friend and enemy (Schmitt, 1996), hegemony and antagonism (Laclau and Mouffe, 1985), the instituted and the instituting (Castoriadis, 1991), and the symbolic (Lefort, 2000). In this context, the reformist model of the commons lacks a post-hegemonic political strategy that could unite the commons within a holistic self-sustaining socio-economic coordination mechanism.

### *The anti-capitalist approach*

A number of anti-capitalist theorists such as Alexandros Kioupkiolis (2019), Pierre Dardot and Christian Laval (2014) take a more radical stance by advocating for the autonomous development of the commons beyond and against neoliberalism. The aim here is to transform the social relations upon which capitalism is based. They envisage the commons as a model of self-governed communities which do away with profit, commodity, exchange value, competition, state and corporate power. Kioupkiolis, in particular, attempts to reconcile Laclau and Mouffe's verticalism with Hardt and Negri's horizontalism under a post-hegemonic politics where hegemony and the commons perform with different strengths at different levels of the political. Hegemony works outwards: against advocates of oppression, exclusion, homogenization, injustice and inequality. The commons work inwards: within the multiple organizations and social movements that abide by the principles of freedom and equality.

The anti-capitalist argument (Dardot and Laval, 2014; De Angelis, 2017; Hardt and Negri, 2000, 2004, 2009; Kioupkiolis, 2019) posits the establishment of a post-hegemonic bloc that would invigorate the commons as a robust and coherent movement beyond and against neoliberalism. What is absent, however, is a comprehensive elaboration on the techno-economic elements of the digital commons coupled with a set of concrete policies and practices that would progress the commons into an organic, self-sustaining socio-economic model.

### *Prefiguring the post-hegemony of the commons*

The liberal argument underestimates the reformist insight that technology has the potential to decentralize production, thereby forcing capitalism to transform into post-capitalism by altering the mode of production from within (Bauwens et al., 2019). Yet, technological determinism often tends to downplay the political by falsely presuming that technological fixes can account for democratic processes. A number of authors such as Scholz (2016), Bauwens (Bauwens et al., 2019) and Kioupkiolis (2019) attempt to reconcile technology and democracy but key issues remain unaddressed. One of the key challenges for the commons is the (in)compatibility of democratic governance with technological efficiency; that is, how to connect online processes with direct democratic participation. Participatory democracy, tele-democracy, cyber-democracy, post-democracy, the commons democracy, are all terms invented to ostensibly resolve the contradictions. However, cyber-optimism is still confounded by the non-replicability of the digital commons to economic arrangements and processes. In this regard, technology cannot but be subject to the political, that is, the moral ground that sustains the rationale behind coding and algorithms. Put simply, technology is necessarily embedded in the broad political institutionalization of society; this may be a democratic process, or not.

Whereas the reformists argue for the cooperation of the commons with the state and friendly capital, anti-capitalists argue for the autonomous development of the commons against and beyond neoliberalism. Yet, they cannot provide a viable strategy as to how to safeguard the autonomy of the commons in relation to structural dependency on state and capitalist production. Whereas the reformists attempt to abolish the heteronomy of the commons by means of reverse co-optation via *transvestment*, i.e., reversing the flow of capital from capitalism to the commons, they are unable to address the precariousness and economic unsustainability that pervades commons-based peer production. They too often lack a "business model" that would help peers monetize use value while gaining public trust and involvement in commons-based peer production.

The lack of the political reflects the contradictions of the commons. Localism, gated communities, vested interests, atavism, traditionalism, ideology, conflict, neoconservatism and techno-elitism are some of the problems facing the commons (Harvey, 2003: 169). Discrimination, racism, the misrepresentation of women in open source technologies (Mahmod and Dahalin, 2012; Nafus, 2011; Schor, 2016: 38-42; Toupin, 2021), precarious volunteering and activism, the domination of self-interest and competition over solidarity and cooperation, the rational mastery of techno-economism and the fear of the tyranny of the commons over heterogeneity of individuality, are all mere refractions of the core contradiction between capitalism and the broader idea of communism.

The economic contradiction between capitalism and communism corresponds with the moral/ethical conflict between liberalism and Marxism, the two most influential normative principles that have competed for political hegemony over the last two centuries. Fragments of that conflict penetrate the commons in multiple ways: institutionally, economically, politically, ideologically, psychologically, and bodily. The outcome of that conflict depends upon the way people engage with current economic and social systems.

For the commons to avoid both tragedy and/or parody, it is crucial to develop open, multi-disciplinary and mutually reinforcing networks that can provide for their members a sustainable livelihood along with the political conditions for democracy, autonomy and justice. This requires the creation of multiple socio-economic circuits of peer production and ethical market operation, supported by relevant state policies. The short-term goal of the commons would be the creation of a polycentric economy based upon a common pool of resources from where actors can draw and contribute according to their needs and capacities. The long-term goal would be the gradual adjustment of capitalism to the post-capitalism of the commons.

## The digital economy and the commons

Let us now consider the contradictions of the commons by focusing analysis on the juxtaposition between the techno-economic models of platform capitalism and the digital commons. The focus here is on the impact information and communication technologies have had on traditional capitalism during the last decades, especially in regard to the internet's disruption of traditional business models. The goal is to critically examine both platform capitalism (Srnicek, 2017) and socio-economic models such as the digital commons, FOSS, platform and open cooperativism.

Information technology poses numerous challenges for neoclassical economics. Information can be classified as a public good due to its unique characteristics. It is non-rivalrous since one person's consumption does not prevent another person from consuming the same piece of information. It is non-excludable unless enclosed by intellectual property rights infinitely reproducible at zero marginal cost, and anti-rivalrous since information breeds more information and network effects (Papadimitropoulos, 2020: 20-22). When it comes, for example, to broadcast media and internet-based content, it is suggested that the market will not provide a socially optimal allocation of resources (Cunningham et al., 2015: 26), hence the need for government intervention. Furthermore, the creation of scarcity/excludability through the imposition of intellectual property rights may lead to underutilization of information and the inefficient use of knowledge (Arrow, 1962: 609-626).

Instead of information technology becoming the "lubricant" that will remove all friction in commerce and bring about a transparent, ultra-competitive market economy, it is subject to market failures such as club effects, information asymmetries, adverse selection, market concentration and monopolization, while sowing the seeds of a cooperative economy (Brousseau and Curien, 2007:

19). Markets tend towards greater segmentation rather than fluidity; hierarchies become more malleable rather than more efficient. Most importantly, information becomes a free input into the production of knowledge, hence the creation of open source software and the digital commons. Rather than market operation reaching Arrow-Debreu's neoclassical equilibrium model of perfect information and perfect competition, it resembles a Schumpeterian-Hayekian model wherein firms, consumers, prosumers and communities constantly "co-invent" their mode and relations of production.

Eventually, network effects generated due to the open source nature of the internet (TCP/IP, HTML, HTTP, FOSS, Web 2.0, blockchain) give rise to a dual and often hybrid digital economy. On the one hand, platform capitalism exploits the digital labor of prosumers on the internet to create multi-sided markets for the purposes of profit maximization; on the other hand, collaborative models such as platform and open cooperativism build on open source software and the digital commons to create a post-capitalist commons-oriented economy (Birkinbine, 2020).

According to Kostakis and Bauwens (2014), FOSS sustains a cyber-communism operating at the heart of capitalism, where everybody can contribute and share according to their needs and skills. Yet, the more communist the software license, the more capitalist is the practice (Bauwens and Kostakis, 2014). In many cases, capitalist firms incorporate FOSS into their production to reduce costs. In other cases, FOSS has developed in the mode of a pro-capitalist commons that benefits both commoners and platform capitalists (Birkinbine, 2020). A number of capitalist firms have invested in FOSS for the purpose of outsourcing costs to volunteers all the while extracting profits from users' mass production. Meanwhile, commoners engaged in FOSS pro-capitalist commons may secure the sustainability of their projects. Blockchain technology introduces a new sort of contested commons. Crypto-currencies such as Bitcoin and Ethereum are cases of open source software employed both by platform capitalists and commoners (Fritsch et al., 2021).

Richard Barbrook (2008) considers cyberspace a form of high-tech anarcho-communism, which coexists symbiotically with platform capitalism. Anarcho-communism is often sponsored by corporate capital. The digital commons and the free circulation of information among users depend upon the capitalist production of computers, software and telecommunications, with capitalist firms exploiting the precarious labor of global cyber-proletarians (Dyer-Witthford, 2006). By the same token, cyber-production depends on the unpaid reproduction of labor, most often performed by women (Federici, 2012). Anarcho-communism is also symbiotic with the state that subsidizes and regulates platform capitalism. Within the digital mixed economy, anarcho-communism blends with liberal democracy. The internet user is a prosumer in the digital economy, a citizen of the state and an anarcho-communist within a gift economy (open source software and the digital commons), which is largely co-opted by finance capital.

Graham Murdock (2013) distinguishes between three moral economies: capitalism, government and civil society (Table 3). Capitalism seeks to maximize utility, individual freedom of choice and action through entrepreneurship, commerce and consumerism. Government addresses the limits of market-based activity by representing a cluster of public goods: public libraries, public parks, public museums and galleries, public service broadcasting, highways, defense. Civil society arises out of the myriad amateur cultural and communicative associations run by volunteers on the basis of mutuality.



Table 3. Moral economies (adopted from Murdock 2013).

Spheres	Capital	Government	Civil society
Goods	Commodities	Public goods	Gifts
Arenas	Markets	Polities	Networks
Payments	Prices	Taxes	Reciprocities
Relations	Personal possession	Shared access	Co-creation
Identities	Consumers	Citizens	Communards
Ethos	Individual liberty	Equality	Mutuality

Murdock (2013: 157) points out that the potential of a communicative commons represented by the government and civil society is continually compromised by commercial enclosure. At present, technological change exacerbates the disparity between private and social returns to information (knowledge) (Stiglitz, 2016: 48). It enhances rent seeking and the capacity for rent extraction, turning information into an artificially scarce good disproportionately exploited by corporations having differential access to it (see Mosco and Wasko, 1988). Asymmetries of information and concentrated market power create an oligopoly of knowledge production. Instead of the internet promoting innovation, creativity and freedom, it often turns into the most efficient censorship and surveillance mechanism, as evidenced in the cases of China and USA (Zuboff, 2019).

Platform capitalism has integrated communication and information technologies into a 24/7 global cybermarket (Srnicek, 2017) and is crowdsourced to users via waged and unwaged digital labor. Whereas waged digital labor is performed on crowdsourcing platforms, unwaged digital labor refers to almost any social activity on the internet, including chatting, posting, searching, reviewing, and commenting (Fuchs, 2014; Scholz, 2012). The platform users are making themselves available as the audience commodity for advertising (see Dallas Smythe, 1977, 1981: 22–51). Their online activities enable the collection of personal data which is then sold and used to target that advertising. Thus, digital labor fuels platform capitalism. Murdock (2013:164) considers the co-optation of the digital commons by platform capitalism a new enclosure movement.

Big data has helped turn the internet into advertising real estate. Big data fuels the customization of demand by c and marketers who count on analytics to successfully predict buying intentions. The internet and social media serve as agencies of attention and reputation, enabling those with a high online profile to redeem their accumulated reputational currency through social branding. Everyone else is engaged in mere relations of big data production, benefiting from the services provided by search engines and social media in disproportionate exchange for their personal data and privacy. Not only does digital industrialism replicate the core division of industrial capitalism, between directors and executants, it also further colonizes time and space by turning human data into a commodity reproduced by users themselves in a 24/7 offline and online market. People are reduced into a manageable “mainstream” set of trends, categories, and numbers, unwittingly reproducing the dehumanization of artificial intelligence (Papadimitropoulos, 2021: 250-253).

Blockchain technology has the potential to challenge power asymmetries and centralization. However, it is currently moving into a libertarian direction rather a collaborative one (Fritsch et al., 2021). Dispersed accounting and transactional verification systems still have very little to do with the actual functions they could enable in the real economy. Individualism and decentralization alone are insufficient to address the contradictions of capitalism and produce a more egalitarian,

democratic and equitable society. A number of authors have built on the Marxian category of the proletariat, arguing that digitization has created a new diversity. Ursula Huws (2003) speaks of a new class of information-processing workers—the cybertariat. In the same vein, Guy Standing (2011) and Nick Dyer-Witheford (1999: 88, 96) claim that poorly paid, insecure, and deskilled service workers constitute a new type of precariat. Andre Gorz (1980: 69) holds that automation and computerization have turned underemployed, probationary, contracted, casual, temporary, and part-time workers into a “post-industrial neo-proletariat.” Platform capitalism is a technologically advanced form of exploitation, in most cases resulting in a “race to the bottom” with regard to wages and living standards. Labor alienation, exploitation, precarity (Huws, 2014; Standing, 2011), and insecurity are the sheer outcomes of the strategic nullification of labor law in platform capitalism by corporations. They make use of legal gray zones to misclassify employees as independent contractors in order to evade taxes, and to violate local laws, labor laws, plus privacy and antidiscrimination laws (Scholz, 2016; Codagnone et al., 2016: 26–39). Finally, there is strong evidence that insecure employment and precariousness result in psychological morbidity (Virtanen et al., 2005).

#### *Cooperative, platform-based possibilities for the commons*

Commons-based cooperative models such as platform cooperativism, open cooperativism, local commons, digital commons and blockchain-based distributed autonomous organizations (DAOs) offer ways to address power asymmetries and the inequitable distribution of value manifested in both industrial and platform capitalism. Despite the fierce competition from platform capitalism, commons-based initiatives strive to create a post-capitalist economy anchored in the democratic self-management of production and the equitable distribution of value among multiple stakeholders. Commons-based models aim to promote gender equality, self-realization, openness, inclusion, cooperation, sustainability, care and affect as the primary markers of an alternative socio-economic organization of production and distribution. A number of DAOs such as Circles, Holochain, Aragon, 1hive and the Commons Stack are currently experimenting with blockchain-based tools. These may foster transparency and accountability as well as providing democratic governance and funding for the commons (Fritsch et al., 2021). The next step would be for communities to apply these tools in the mainstream economy. However, technology alone cannot lead to a commons-oriented economic, techno-social transformation.

The commons face numerous challenges and obstacles, which culminate in a number of internal and external contradictions: commerciality vs non-commerciality, competition vs cooperation, private property vs common property, exchange value vs use value, centralization vs decentralization, exclusion vs inclusion, individuality vs communality, localism vs globalism, fragmentation vs scale. These contradictions reflect the lack of the political; that is, commons initiatives exemplify a holistic strategy which seeks to unite local and global commons-based socio-economic models, organizational forms, cooperatives, enterprises and institutions into a post-hegemonic networked ecosystem of value creation that would mutualize knowledge and resources. Irrespective of whether the state comes first or follows social change, it must create the necessary macro- and meso-structures that would induce the bottom-up self-organization of an alternative socio-economic paradigm. Its mission is to gradually replace neoliberalism with the post-capitalism of the commons. Rather than relying on short-lived, decentralized, precarious and fragmented commons initiatives, a post-hegemonic chain of equivalence would unite different commons-based projects under a synergetic network that would reconcile pluralism and equality, individuality and

communality, commerciality and non-commerciality, exchange and use value, and private and common property. Post-hegemony seeks to do away with leftist, socialist versions of hegemony (Lenin, 1961) that concentrate power in the state. Instead, post-hegemony seeks to distribute power to the people via commonization of the state and the market. A chain of equivalence is “central” in the sense that it brings to the fore a “collective subject” that transforms society on the principles of the commons while promoting difference. A “collective subject” refers to the creation of a novel anthropological type that respects nature and the principles of the commons. Rather than relying on a representative democracy that is prone to elitism, corruption and inefficiency, a “collective subject” would disperse into an economic democracy that gives power to the people.

## Conclusion: overcoming the contradictions of the commons

One major contradiction of the commons is the equilibrium of communities versus the fluid, hybrid and mobile identities of individuals in the networked information economy. This is partially co-extensive with the internal contradiction between the non-commerciality and the commerciality of the commons, that is, maintaining the open character of the commons while securing income for those contributing. Externally, the commons are facing problems concerning access to capital and training, the lack of entrepreneurial and managerial skills and the absence of institutional support from governments, larger co-ops and NGOs (Bollier and Helfrich, 2015). Both internal and external contradictions can equally result in the tyranny of the commons over the heterogeneity immanent in the cultural diversity of any collectivity. How could, for example, individual interests align with community goals?

For manifestations of the commons to resolve their contradictions and progress into an organic, self-sustaining model capable of challenging neoliberalism, they need to evolve into open, pluralistic and mutually reinforcing networks of socio-economic activity that can provide a sustainable livelihood along with the political conditions for democracy, autonomy and justice.

Post-hegemony entails a transformative politics that combines liberal, reformist and anti-capitalist elements with the aim of altering the socio-economic system of capitalism from within. Post-hegemony seeks to integrate the different types of commons (digital, rural, urban) into a robust network of glocal commons, supported by reticular market and institutional mechanisms. It thus brings together liberal and Marxist elements to construct a post-capitalist economy that reconciles the contradictions of the commons by aligning individual incentives with collective goals. Post-capitalism translates into a model of open cooperativism among the commons and ethical market entities. Technological change offers significant mathematical tools, which, if designed to realize the egalitarian and democratic principles of the commons, could support, but not substitute for, the socio-political substratum that underlies social change. The affordances of digitalization cannot but be subject to the political substructure of society. Effective incentive schemes, purpose-designed policies, financial mechanisms, law reforms, affordable housing, education, are all part of a holistic multi-disciplinary strategy for transforming neoliberalism into the post-capitalism of the commons, supported by a partner state that represents the interests of the people rather than elites.

## Author Bio

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