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References
This work is dedicated to Jean Lievens, who passed away in 2016 after a lifetime of engagement for social justice and the commons.
1. Our argument in a nutshell

Not since Marx identified the manufacturing plants of Manchester as the blueprint for the new capitalist society has there been a deeper transformation of the fundamentals of our social life. As capitalism faces a series of structural crises, a new social, political and economic dynamic is emerging: peer-to-peer (P2P).

What is P2P? Why is it important in building a commons-centric future? And how could this happen? These are the questions we try to answer, by tying together four of its aspects:

1. P2P is a type of social relations in human networks.
2. P2P is also a technological infrastructure that makes the generalization and scaling up of such relations possible.
3. P2P thus enables a new mode of production.
4. P2P creates the potential for a transition to an economy that can be generative towards people and nature.

We believe that these four aspects will profoundly change human society. P2P ideally describes systems in which any human being can contribute to the creation and maintenance of a shared resource, while benefiting from it. There is an enormous variety of such systems: from the free encyclopedia Wikipedia to free and open-source software projects, to open design and hardware communities, to relocalization initiatives and community currencies.

1.1. What is P2P and how is it related to the commons?

To begin with, P2P computing systems are characterized by consensual connections between “peers.” This means the computers in the network can interact with each other. It is in this context that the literature started to characterize the sharing of audio and video files as P2P file-sharing, and that a part of the underlying infrastructure of the Internet, like its data transmission infrastructure, has been called P2P.

Let’s now assume that behind those computers are human users. A conceptual jump can be made to argue that users now have a technological affordance (a tool) that allows them to interact and engage with each other more easily and on a global scale. P2P can be seen as a relational dynamic through which peers can freely collaborate with each other and create value in the form of shared resources.

It is this mutual dependence of the relational dynamic and the underlying technological infrastructure that facilitates it, which creates the linguistic confusion between P2P as a technological infrastructure and P2P as a human relational dynamic. However, a technological infrastructure does not have to be fully P2P in order to facilitate P2P human relationships. For
example, compare Facebook or Bitcoin with Wikipedia or free and open-source software projects: they all utilize P2P dynamics, but they do so in different ways and with different political orientations (section 3 discusses this issue).

P2P is therefore a mode of relating that allows human beings, organized in networks, to collaborate, produce and exchange value. The collaboration is often permissionless, meaning that one may not need the permission of another to contribute. The P2P system is thus generally open to all contributors and contributions. The quality and inclusion of the work is usually determined “post-hoc” by a layer of maintainers and editors, as in the case of Wikipedia.

P2P can also be a mode to allocate resources that does not involve any specific reciprocity between individuals, but only between the individuals and the collective resource. For example, you are allowed to develop your own software based on an existing piece of software distributed under the widely used GNU General Public License, only if your final product is available under the same kind of license.

In the realm of information that can be shared and copied at low marginal costs, the P2P networks of interconnected computers used by collaborating people can provide vital shared functionalities for the commons. However, P2P does not only refer to the digital sphere and is not solely related to high technology. P2P can generally be synonymous with “commoning,” in the sense that it describes the capacity to contribute to the creation and maintenance of any shared resource.

There are multiple definitions of the “commons.” We adhere to David Bollier’s (2014) characterization of the commons as a shared resource, co-governed by its user community according to the rules and norms of that community. The sphere of the commons may contain either rivalrous goods and resources, which you and I cannot both have at the same time, or non-rival goods and resources, whose use does not deplete it. These types of goods or resources have in turn either been inherited or they are human-made.

For example, a type of commons may include the gifts of nature, such as the water and land, but also shared assets or creative work such as cultural and knowledge artefacts. Our focus here is on the digital commons of knowledge, software and design, because they are the “new commons” (Benkler, 2014). These commons represent the pooling of productive knowledge that is an integral part of the capacity for any kind of production, including physical goods.

P2P is arguably moving from the periphery of the socio-economic system to its core, thereby also transforming other types of relationships, such as market dynamics, state dynamics and reciprocity dynamics. These dynamics become more efficient and obtain advantages utilizing the commons. P2P relations can effectively scale up, mainly because of the emergence of Internet-enabled P2P technologies. This means small-group dynamics can now be applied at the global level.

1.2. Are P2P technologies good, bad or neutral?

We do not claim that a certain technology may lead to one inevitable social outcome. Yet we recognize the key role that technologies play in social evolution and the new possibilities they
create if certain human groups successfully utilize them. Different social forces invest in this potential and use it to their advantage, struggling to benefit from its use. Technology is therefore best understood as a focus of social struggle, and not as a predetermined “given” that creates just one technologically determined future.

Still, when social groups appropriate a particular technology for their own purposes, then social, political and economic systems can effectively change. An example is the role that the invention of the printing press, associated with other inventions, played in transforming European society (Eisenstein, 1983/2012).

The fast-growing availability of information and communication technology enables many-to-many communication and allows an increasing number of humans to communicate in ways that were not technically possible before. This in turn makes possible massive self-organization up to a global scale. It also allows for the creation of a new mode of production and new types of social relations outside of the state-market nexus.

The Internet creates opportunities for social transformation. In the past, with pre-digital technologies, the costs of scaling in terms of communication and coordination made hierarchies and markets necessary as forms of reducing these costs. Hence societies that scaled through their adoption “outcompeted” their tribal rivals. Today, by contrast, it is also possible to scale projects through new coordination mechanisms, which can allow small group dynamics to be applied at the global level. This means that it is possible to combine “flatter” structures and still operate efficiently on a planetary scale. This has never been the case before.

1.3. How does P2P relate to capitalism?

We are living through a historical moment in which networked and relatively horizontal forms of organization are able to produce complex and sophisticated social outcomes. The latter are often better than the artefacts produced through state-based or market-based mechanisms alone. Just consider how the peer-produced Wikipedia displaced the corporate-organized Encyclopedia Britannica, how peer-produced Apache HTTP server outcompetes Microsoft server software, or how Wikileaks survived the assaults of some of the world’s most powerful states.

The hybrid forms of organization within P2P projects do not primarily rely on either hierarchical decisions or market pricing signals, but on mutual coordination mechanisms, which are remarkably resilient. These emerging mutual coordination mechanisms, however, also become an essential ingredient of capitalism. This is the “immanent” aspect of peer production (or P2P production) that changes the current dominant forms.

But such mechanisms can become the vehicle of new configurations of production and exchange, no longer dominated by capital and state. This is the “transcendent” aspect of peer production, as it creates a new overall system that can subsume the other forms. In the first scenario, capital and state subsume the commons under their direction and domination, leading to a new type of commons-centric capitalism. In the second scenario, the commons, its communities and institutions become dominant and, thus may adapt state and market forms to their interests.
The new forms of collaborative production that rely on P2P mechanisms do have some hierarchies. Nevertheless, they generally lack a hierarchical command structure for the production process itself. Peer production has introduced the capacity to organize complex global projects through massive mutual coordination. What market pricing is to capitalism and planning is to state-based production, mutual coordination is to peer production.

As a result, the emergence and scaling of these P2P dynamics point to a potential transition in the main modality by which humanity allocates resources: from a market-state system that uses hierarchical decision-making (in firms and in the state) and pricing (amongst companies and consumers), towards a system that uses various mechanisms of mutual coordination. This does not mean that the market and the state will disappear entirely, but that the configuration of different modalities — and the balance between them — will be radically reconfigured.

None of this implies that the P2P transition will lead to a utopia, nor that it will be easy. Indeed, if the history of previous socio-economic transitions is any guide, the transition will most likely be messy. Just as P2P is likely to solve a number of problems in our current society, it will create others in the new one. Nevertheless, this remains a worthwhile social evolution to strive for, and even if P2P relations do not become the dominant social form, they will profoundly influence the future of humanity.

Summarizing the relationship between the relational and technological aspects, the P2P relational dynamic — strengthened by particular forms of technological capacities — may become the dominant way of allocating the necessary resources for human self-reproduction, and thus replace capitalism as the dominant form. This will require a stronger expansion of this P2P modality not just for the production of “immaterial goods”, but also for the production of physical (material) goods.

1.4. How is P2P to be implemented in practice?

While P2P is emerging as a significant form of technological infrastructure for various social forces, the way it is actually implemented (and owned and governed) makes all the difference. Not all P2P is equal in its effects. Various different forms of P2P technological infrastructure can be identified, each of which leads to different forms of social and political organization.

On the one side, for example, we can consider the capitalism of Facebook, Uber or Bitcoin. On the other, we can look at the commons-oriented models of Wikipedia, Enspiral, Farm Hack or free and open-source software projects (these are discussed in sections 2 and 3). Adopting this or that specific form of P2P technological infrastructure is the locus of intense social conflict, because the choice between them has enormous consequences on what may or may not be possible.

P2P enables a new (proto-)mode of production, named commons-based peer production, that is characterized by new relations of production. In commons-based peer production, contributors create shared value through open contributory systems, govern the common work through participatory practices, and create shared resources that can, in turn, be used in new
iterations. This cycle of open input, participatory process and commons-oriented output is a cycle of accumulation of the commons, which parallels the accumulation of capital.

At this stage, commons-based peer production process should be seen as a prefigurative prototype of what could become a completely new mode of production and a new form of society. It is currently a prototype, since it cannot as yet fully reproduce itself outside of a mutual dependence with capitalism. This emerging modality of peer production is not only productive and innovative "within capitalism," but also in its capacity to solve some of the structural problems that have been generated by the capitalist mode of production. In other words, it represents a potential transcendence of capitalism. That said, we argue that as long as peer producers or commoners cannot engage in their own self-reproduction outside of capital accumulation, it remains a proto-mode of production, not a full one.

Peer production can be innovative within the context of capitalist competition, because firms that can access the knowledge commons possess a competitive advantage over firms that use proprietary knowledge and can only rely on their own research (Tapscott & Williams, 2005; Benkler 2006). For example, by mutualizing the development of software in an open network, firms obtain vast savings in their infrastructural investments. In this context, peer production could be seen as a mutualization of productive knowledge by capitalist coalitions themselves, with IBM’s investments in free and open-source software projects as a case in point (Tapscott & Williams, 2005).

Yet this capitalist investment is not a negative thing in itself, but rather a condition that increases the societal investment in a P2P-based transition. It is precisely because P2P solves some structural issues of the current system that both productive and managerial classes move towards it. This means that capital flows towards P2P projects, and even though it distorts P2P to make it prolong the dominance of the old economic models, it simultaneously creates new ways of thinking in society that undermine that dominance.

Nevertheless, the new class of commoners cannot rely on capitalist investment and practices. They must use skillful means to render commons-based peer production more autonomous from the dominant political economy. Eventually we may arrive at a position where the balance of power is reversed: the commons and its social forces become the dominant force in society, which allows them to force the state and market forms to adapt to its own requirements. So we should strive to escape the situation in which capitalists co-opt the commons, and head towards a situation in which the commons capture capital, and make it work for its own development.

This proposed strategy of reverse cooptation has been called “transvestment” by Dmytri Kleiner and Baruch Gottlieb (Kleiner, 2016). Transvestment describes the transfer of value from one modality to another. In our case this would be from capitalism to the commons. Thus transvestment strategies aim to help commoners become financially sustainable and independent. Such strategies are being developed and implemented by commons-oriented entrepreneurial coalitions such as the Enspiral network or Sensorica (see section 2).

As said, the digital commons of knowledge, software and design are abundant resources enriched through usage. It is here that full sharing and the full ability for contributions must be preserved. But in the added value services and products that are built around these commons,
we deal with rival resources. Here the commons should be protected from capture by capital. It is in this cooperative sphere of physical and service production where reciprocity rules should be enforced. We propose to combine non-reciprocal sharing in the immaterial sphere, with reciprocal arrangements in the sphere of physical production. Thus, in our vision, commons-based peer production as a full mode of production combines commons and cooperativism (see section 4).

1.5. Towards a commons-centric society?

At that point, if the move from microeconomic P2P communities to a new “macroeconomic” dominant modality of value creation and distribution is successful, a transition phase towards a commons-centric economy and society can occur. This will be the revolution of our times, and a fundamental shift in the rules and norms that decide what value is and how it is produced and distributed in society. In short: a shift to a new post-capitalist value regime.

P2P is considered to be both a social relation and a mode of exchange, as a socio-technological infrastructure and as a mode of production, and all these aspects when combined contribute to the creation of a new post-capitalist model, a new phase in the evolution of the organization of human societies. This will necessitate a discussion about economic and political transitions. At the microeconomic level of commons-based peer production, P2P dynamics are already creating the institutional seedlings prefiguring a new social model.

P2P could lead to a model where civil society becomes productive through the participation of citizens in the collaborative creation of value through commons. In this pluralistic commonwealth, multiple forms of value creation and distribution will co-exist, but most likely around the common attractor that is the commons. We do not argue for a “totalitarianism” of the commons. But to make the commons a core institution that “guides” all other social forms — including the state and the market — towards achieving the greatest common good and the maximum autonomy.

2. P2P as a mode of production

P2P is not something new. It has existed since the dawn of humanity, and was the originally dominant form of relationship in the nomadic hunter-gathering societies. It then lost its dominance in the clan-based (tribal) arrangements of alliances of tribes, where reciprocity was dominant, and later to the hierarchy-based distribution of resources when pre-capitalist state systems became dominant. In these two systems though, the commons and their P2P logic retained very important functions. For example, the commons retained a significant function
in the European feudal systems and in the Asian imperial systems.

It is in industrial capitalism (and later in the state-socialist systems) that the commons and the P2P dynamics were effectively driven to the margins. However, with the affordance of P2P-based technologies, the commons and the P2P dynamics can now scale up to a global level, and create complex social artifacts that transcend the possibilities of both state- and market-based models alone.

The P2P capacity to relate to each other over the Internet entails the emergence of what Yochai Benkler (2006) has called “commons-based peer production” (CBPP). CBPP is a new pathway of value creation and distribution, where P2P infrastructures allow individuals to communicate, self-organize and, ultimately, co-create non-rivalrous use value, in the form of digital commons of knowledge, software and design. Think of the free encyclopedia Wikipedia, the myriad of free and open-source projects (e.g. Linux, Apache HTTP Server, Mozilla Firefox, Wordpress) or open design communities such as Wikihouse, RepRap and Farm Hack.

2.1. Diverse skills and motivations

CBPP is fundamentally different from the incumbent models of value creation under industrial capitalism. In the latter, owners of means of production hire workers, direct the work process, and sell products for profit maximization. Such production is organized by allocating resources through price signals, or through hierarchical command.

In contrast, CBPP is in principle open to anyone with skills to contribute to a common project: the knowledge of every participant is pooled. These participants may be paid, but not necessarily. Precisely because CBPP projects are open systems in which knowledge can be freely shared and distributed, anyone with the right knowledge and skills can contribute, either paid by companies, clients, or not at all. In these open systems, there are many reasons to contribute beyond or besides that of receiving monetary payment.

CBPP allows contributions based on all kinds of motivations, but most importantly on the desire to create something mutually useful to those contributing. This also generally means that people contribute because they find it meaningful and useful. From the point of view of the productive communities as well as simple users, the orientation of their work is most often on use value creation, not exchange value.

2.2. Transparent heterarchy

Of course, in CBPP many people are actually paid but, through collaboration with groups and individuals that are not, they produce commons. Hence, the work is not generally directed by the corporate hierarchies, but through the mutual coordination mechanisms of the productive community. This is possible because CBPP is based on open and transparent systems, in which everyone can see the signals of the work of others, and can therefore adapt to the needs of the system as a whole.

CBPP projects do have systems of quality control that represent a kind of benevolent hierarchy or heterarchy. These “maintainers” or “editors” protect the integrity of the system as a whole.
and can refuse contributions that endanger the integrity of the system. However, and this is crucial, they do not coerce work.

Further, CBPP is based on stigmergic collaboration. In its most generic formulation, stigmergy is the phenomenon of indirect communication among agents and actions (Marsh & Onof, 2007, p. 1). An action leaves a trace which stimulates the performance of a next action, by the same or a different agent. Therefore, in the context of CBPP, stigmergic collaboration is the “collective, distributed action in which social negotiation is stigmergically mediated by Internet-based technologies” (Elliott, 2006). For example, see how free and open-source software code and Wikipedia entries are produced in a distributed and ad hoc manner through the contributions from large numbers of people.

To recap, CBPP is based on open input; a participatory process of coordinating the work; and a commons as output.

2.3. A new ecosystem of value creation

Through CBPP we observe the emergence of a new ecosystem consisted of three institutions: the productive community; the commons-oriented entrepreneurial coalition(s); and the for-benefit association. Our description cannot be all-inclusive because each ecosystem is unique. Moreover, it cannot be definite since we deal with a rapidly evolving mode of production. The aim is to offer a bird’s-eye-view of the expanding universe of CBPP. The following table includes just five of the most old and well-known CBPP ecosystems:

<table>
<thead>
<tr>
<th>Productive community</th>
<th>Linux</th>
<th>Mozilla</th>
<th>GNU</th>
<th>Wikipedia</th>
<th>Wordpress</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entrepreneurial coalition</td>
<td>e.g. Linux Professional Institute, Canonical</td>
<td>e.g. Mozilla corporation</td>
<td>e.g. Red Hat, Endless, SUSE</td>
<td>e.g. Wikia company</td>
<td>e.g. Automatic company</td>
</tr>
<tr>
<td>For-benefit association</td>
<td>Linux Foundation</td>
<td>Mozilla Foundation</td>
<td>Free Software Foundation</td>
<td>Wikimedia Foundation</td>
<td>Wordpress Foundation</td>
</tr>
</tbody>
</table>

The productive community consists of all the contributors to a project, and how they coordinate their work. As said, the members of this institution may be paid or may volunteer their contributions because of some kind of interest in the use value of this production. But all of them produce the shareable resource.
The second institution is the commons-oriented entrepreneurial coalition, which attempts to create either profits or livelihoods by creating added value for the market, based on the common resources. Contributors can be paid by the participating enterprises. The digital commons themselves are most often outside the market, because they are abundant and not scarce.

What is crucially important in the relation among the entrepreneurs, the community and the commons on which they depend, is whether their relation is generative or extractive. Of course, extraction/generation are polarities and every entity will present a mixture. To demonstrate the difference between extractive and generative, think of industrial agriculture and permaculture. In the former the soil becomes poorer and less healthy, while in the latter case the soil becomes richer and healthier.

Extractive entrepreneurs seek to maximize their profits, and generally do not sufficiently re-invest in the maintenance of the productive communities. Like Facebook, they do not share any profits with the co-creating communities on which they depend for their value creation and realization. Like Uber or AirBnB, they tax exchanges but do not directly contribute to the creation of transport or hospitality infrastructures. So, the problem is that though they develop useful services that reuse unused resources, they do this in an extractive manner. Though they facilitate these services, they also create competitive mentalities: participants of their systems often construct new material infrastructures, e.g. new buildings to rent or cubs to hire, in their effort to maximize profits. Moreover extractive enterprises may free-ride on a whole set of social or public infrastructures (e.g. roads as in the case of Uber).

On the other hand, generative entrepreneurs create added value around these communities. Seed-forms of commons-oriented entrepreneurial coalitions create added value on top of the commons that they co-produce and upon which they are co-dependent. In the best of cases, the community of entrepreneurs coincides with the productive community. The contributors build their own vehicles to create livelihoods while producing the commons. They re-invest the surplus in their own well-being and the overall commons system they co-produce.

The third institution is the for-benefit association. Many CBPP ecosystems not only consist of productive communities and entrepreneurial coalitions, but also have independent governance institutions that support the infrastructure of cooperation and, thus, empower the capacity for CBPP. Though they often take the form of nonprofits, they do not command and direct the CBPP process itself. For example, the Wikimedia Foundation, as the for-benefit association of Wikipedia, does not coerce the production of Wikipedia producers. Likewise, the free and open-source software foundations that often manage the infrastructure and networks of the projects.

By way of contrast, traditional non-governmental and nonprofits organizations operate in a world of “perceived” scarcity. They identify problems, search for resources, and allocate those resources in a directive manner to the solving of the issues they have identified. This approach arguably offers a mirror image to the for-profit mode of operating.

For-benefit associations operate from a point of view of abundance. They recognize problems and issues, but believe that there are enough contributors that desire to assist in solving these issues. Hence, they maintain an infrastructure of cooperation that allows contributive
communities and entrepreneurial coalitions to engage in CBPP processes vital for solving these issues. Not only do they protect these commons through licenses, but may also help manage conflicts between participants and stakeholders, fundraise, and assist in the general capacity building necessary for the commons in particular fields of activity (for example, through education or certification).

2.4. The cases of Enspiral, Sensorica and Farm Hack

In addition to the well-documented ecosystems of free and open-source software projects (see indicatively Dafermos, 2012; Harhoff & Lakhani, 2016; Mateos-Garcia & Steinmueller, 2008; Scacchi et al., 2006; Benkler, 2006; von Hippel, 2016), the cases of Enspiral, Sensorica and Farm Hack offer new perspectives on the rich tapestry of the increasing number of CBPP ecosystems.

To begin with, Enspiral is a network of professionals and companies that are “working on stuff that matters”, i.e. socially oriented projects. It encompasses a broad community of diverse professionals (productive community), including developers, legal and financial experts. They pool their skills and creative energy to create a commons of knowledge and software. Around these commons a web of business ventures (entrepreneurial coalition) offers open source tools and services that enable creative communities like their own to address certain challenges related to democratic governance and the digital age. For example, Loomio is an open source platform for participatory decision making, while Rabid is a company offering expert services on web development.

The picture is completed with the Enspiral Foundation (for-benefit association), a cooperatively governed nonprofit that facilitates collaboration and supports the network as a whole. The Foundation is the entity with which all professionals and companies have a formal relationship. It maintains the network’s infrastructure, holds the collective property and guarantees its culture and mission.

At the time of this writing, there are about 300 people contributing to one or several of over 15 business ventures linked to the Enspiral Foundation. The ventures generate revenue by offering their software solutions and services to clients. In turn, they distribute this revenue back to the contributors and a part of it (usually 20 per cent) is contributed to the Foundation. Almost half of these funds cover the operational costs of the Foundation, while the rest is invested through collaborative funding in projects proposed by the community.

The Enspiral culture is dedicated to the creation of value for the society rather than for shareholders. It is statutorily oriented towards the common good and is pro-actively developing the conditions to serve this purpose. One of its core elements that illustrate this approach on value is “capped returns”. The general idea is to introduce an upper limit (a “cap”) on the total returns which investors may receive on the equity of a business. For this, the shares issued by a company are coupled by a matching call option which would require the repurchase of the shares at an agreed upon price. Once all shares have been redeemed by the company, it is then free to re-invest all future profits to its social mission. Through this mechanism, external

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1 The current cases are based on three forthcoming papers by the P2P Foundation. By the time this anchor essay will be published, we will be able to cite them.
and potentially extractive capital is “subsumed” and disciplined to become “cooperative capital”.

Next, Sensorica is a collaborative network dedicated to the design and deployment of sensors and sense-making systems. It offers an open platform for interaction among individuals, with any type of skills or expertise (e.g. engineers, researchers, developers or lawyers), and organisations from the business and public sector and the civil society. It is partially a commons-based community and partially an entrepreneurial entity. On one hand, the individuals and organizations (productive community) pool resources and organize around projects that produce open hardware technological solutions. For instance, one of the most successful Sensorica projects is Mosquito, which is a force/displacement sensor device with numerous applications in biotechnology.

On the other hand, a group of independent business entities (entrepreneurial coalitions), often launched by the community, introduce the innovative solutions in the market. All revenue is distributed back to the network and in particular to the people that have been involved. For this, Sensorica has developed a system that facilitates value accounting and resource management in the network. This system records and determines every member’s input in every project and redistributes revenues in proportion to each contribution. Simultaneously, it tracks all activities in the network with the relevant resources that are either used or generated by a project, as a project’s output can be another project’s input.

All the agents participating in the network are affiliated with a custodian (for-benefit association), which manages the common infrastructure and resources. It is a nonprofit organization holding all assets and liabilities of the network, based on a “non-dominium” agreement. “Non-dominium” reflects the fact that no agent or combination of agents may have dominant control over the shared resources. It illustrates the dynamic and highly adaptable structure of Sensorica that strives to combine open, large scale collaboration with fair distribution of the co-created value.

Last, Farm Hack is a community of farmers that build and modify their own machinery. Central node is its digital platform, where the productive community shares designs, know-how and ideas. Currently the platform features more that 500 pieces of machinery and the community has members from all over the world. The tools are made available under Creative Commons licences and may be accessed by everyone. A non-profit (for-benefit association) monitors, maintains and improves the platform according to the ethos and desires of the community.

At the same time, some of the most active inventors/farmers contributing to the platform invest a considerable amount of time and resources to prototype tools. The community enables them to engage into entrepreneurial activity (entrepreneurial coalitions) in order to continue enriching the community commons and sustain themselves in the process. The business model they adopt is up to them as long as the basic principle of openness is maintained. They may manufacture and sell the tools or components of them. They may sell partially assembled kits or simply conduct workshops to teach other farmers to build their own tools. This ongoing process is challenging and is a major point of discussion within the community. Yet the creation of sustainable commercial activity benefiting from and at the same time empowering the community is clearly desired.
Enspiral, Sensorica and Farm Hack fit within the parameters of our description, like many free and open-source software projects, Wikipedia and an increasing number of open design projects that build new post-capitalist ecosystems of value creation. These ecosystems of various CBPP projects are interrelated through their digital commons (the output of one project can be the input of another) and, thus, CBPP can be seen as a grand ecosystem consisted of diverse smaller ecosystems.

2.5. Moving from micro- to macro-scale

So, this micro-economic triarchy of CBPP institutions corresponds to the three great spheres of social life: the productive community corresponds to the civil society with its citizen-contributors; the entrepreneurial coalitions to the economic society of market entities; and the for-benefit association to the political society of the state.

The for-benefit associations of the CBPP ecosystems are, at the micro-level, a snapshot of “the state of CBPP”, in that they serve the “common good” of the whole system. They are responsible for the “field” within which the different players, i.e. the productive communities and the participating entrepreneurial entities, operate. They take care of the infrastructural needs and the common good of the ecosystem. They are also capable of imposing binding rules on the relevant domains. These associations are not merely based on contracts between individuals, but are autonomously governed institutions that represent the different stakeholders.

Hence, seen at the macro-level, this allows us to look at the evolution of the state in a commons-centric society as a “partner state”. The public authorities would empower and enable the direct creation of value by civil society at the scale of a territory, by creating and sustaining infrastructures for commons-based contributory systems. Any facilitating and capacity-creating action from the state today could be considered as a prefiguration of a full partner state in the future. Citizen-commoners and their social movements would drive the existing state form into partner state forms that recognize the individual and collective autonomy of citizens, just as the civil rights, suffrage, labor and women’s movements forced the state to adapt to new social demands.

As long as we live in an unequal class-based society, a state-based mechanism is arguably needed. Social movements, in this case the social movements that emerge from the shift towards CBPP, will though exert pressure on the state. If these social movements become majoritarian, this could lead to a transformation of the state form, from the present “market state” to a “partner state”, which would represent the interests of the commons sector. Ideally, as this state and commons-based civil society would create the conditions for a re-emergence of human equality, the state would gradually be “commonified” (as opposed to privatized) and radically transformed.

Similar to the strategy of transvestment of capital, this is not an “all or nothing” proposal, and could occur at all kinds of scales. But, for real systemic change to occur at the macro-level of global society, it would eventually require the reorganization of society under this new configuration. This means that whilst our strategy is reformist, as it works within the existing configurations, it is also revolutionary in the sense that it is based on an understanding that
the current extractive system must at some point undergo a phase transition to a new configuration.

Our approach is related to the theorization of "revolutionary reforms" by Andre Gorz (1967). A revolutionary reform is acceptable to the existing system but also creates conditions to its transformation. The basic income could be a good example of this, as it may break the necessity for labor to be commodified, and liberate time and effort towards the construction of self-chosen commons-producing activities.

Before outlining how a commons transition can lead, not just to the adaptation of the current system, but to its transformation (section 4), we discuss the socio-technological framework of cognitive capitalism and CBPP (section 3).
3. P2P as a socio-technological framework

Technologies should not be seen as neutral, deterministic nor as univocal in their effects. Instead, we should look at technology as “value(s)-sensitive” that responds to the material interests and social imaginaries of those that fund, develop and use them. This makes technology a terrain of struggle, in which different interests and values strive for supremacy (Feenberg, 2002). The most fruitful approach is to look at the varied potentials of new technologies, which can evolve in multiple ways, and how various social groups can take advantage of these potentials. Our vantage point is to which degree the new networking technologies are useful in the context of a transition towards a commons-centric society.

The Internet itself, and its complexity, is a good example of the various possible evolutionary paths since it was originally developed by the military-funded researchers of ARPA, in order to create a fully distributed structure that would share digital resources among geographically separated computers. The Internet was also adapted to their needs by the scientific communities who saw it as a means to share knowledge. It was further influenced by commercial interests after the invention of the World Wide Web, and by governments’ intent on controlling its mechanisms. But it was also taken up by the hacker movements and user communities adapting it to their uses. The Internet is therefore neither simply a tool of capital or of the state, nor a simple tool of liberation.

The technology needs to be appropriated by social groups, but the important issue here is that it creates new capacities, and these new capacities may be more important for those that did not have them, than for those who already did. Large companies and governments already had private networks that interconnected them. But these capacities have been largely democratized through the Internet, especially after the advent of the World Wide Web, and this despite the subsequent control of the Internet by dominant players. Like with the emergence of the printing press, the Internet democratized a capacity, which has then be fought over but the result of the social struggles may not undo the capacity that has been unleashed.

In the case of Internet, at least three capacities have been created:

1. A capacity for many-to-many communication using all other forms of previous media as these are all integrated and included in a universal digital medium.

2. A capacity for self-organization that is the result of that permissionless communication.

3. A capacity to create and distribute value in new ways, i.e. self-organization can be put to use in the sphere of production.

In this manner, like the invention of the printing press before it, the Internet has created a historical opportunity for reconfiguring production, exchange, and the organization of society at large. The core emancipatory feature of the Internet arguably lies in its capacity to massively
scale up many-to-many communication, and therefore, in its capacity to lower the cost of self-organization, and create and distribute value in radical new ways.

Despite the various adaptations of the social forces involved, and despite the partial subsumption of the Internet infrastructures to the needs of global capital and a new type of capitalist investors (Malcomson, 2016), the basic underlying freedom for the aforementioned capacities has not been fully destroyed (yet). Capital and governments need the capacities of the Internet as much as civil society does.

To understand the subsequent politics of socio-technological design of various P2P applications, we have developed a framework that explains how the encapsulations of these designs lead to different outcomes.

3.1. Two generic models

We attempt to provide a bird's-eye-view to the initiatives that utilize P2P social dynamics and technologies by introducing four quadrants. Each quadrant stands for a certain scenario in which a dominant force determines the design of the particular networks in order to facilitate certain outcomes. The forces at play want to protect their interests through the control of technological platforms, which encourage certain behaviors and logics but discourage others. In networks, human behavior can thus be influenced by design decisions and invisible protocols created in the interest of the owners or managers of the platforms.

Here is our summary graphic:
The vertical axis presents a polarity with at the top (up) the centralized control of the digital productive infrastructure, and at the bottom (down) the distributed control of it. The horizontal axis relates on one side (left) to an orientation towards profit maximization versus on the other side (right) an orientation towards the commons. Further, on top are the infrastructures with global orientations, and at the bottom the initiatives with more local or “distributed” orientations.

So, the left side can be called “extractive” because it impoverishes the natural and community resources it uses. The right side is the for-benefit side that aims to create common good value either at the local level or at the global level. This latter side we also call “generative” as it seeks to add value to communities and commons, both social and environmental. One of the key aim of many different contemporary transition movements is precisely this shift from predominantly extractive to generative models.

User-oriented technological systems generally can be looked at from two sides. The front-end is the side that users interact with, and is the only side visible to them. In other words, it is the interface with the other users and with the system itself. The back-end, however, is the technological underpinning that makes it all possible. Both are engineered by the platform owners but the latter is invisible to the user. Hence, a front-end that enables a P2P social logic amongst users can often be highly centralized, controlled, and proprietary on the back-end. An invisible techno-social system is thus formed, which profoundly influences the behavior of those using the front-end. It sets limits on what is possible in terms of human freedom and can “nudge” behavior (Thaler & Sunstein, 2009) in desired directions that correspond to the interests of the platform owners and managers.

A truly free P2P logic at the front-end is improbable if the back-end is under the exclusive control and ownership. It does not mean, however, that users of these systems are powerless to use these capacities for their own ends (especially if they are conscious of the limitations of such cognitive capitalist systems).

Following Figure 1, four future scenarios are introduced:

- netarchical capitalism;
- distributed capitalism;
- localized commons;
- global commons.

Each scenario has a descriptive role and outlines tentative political economies with the aim of sparking the imagination and serving as a route map for the future (Miles, 2004). The models of the left are inserted in the general model of contemporary model of capitalism that has been called “cognitive capitalism”. The models on the right could be inserted in a context that has been called “post-capitalist”, as the core of the activity is not geared towards profit-maximization.

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3.2. The extractive model of cognitive capitalism

Cognitive capitalism refers to the process by which information (data, knowledge, design or culture) is privatized and then commodified as a means of generating profit for capital. In this new phase of capitalism, traditional processes of material production and distribution are overtaken by the control of information and networks as the driving force of capital accumulation (see Boutang, 2012; Bell, 1974; Drucker, 1969; for a critical analysis, see Webster, 2006).3

By “netarchical” we mean the hierarchies within the network that own and control participatory platforms. This version of capitalism is characterized by digital platforms that combine P2P elements, which allow people to directly interact with each other, but they are controlled and monitored by the platform owners. The full centralized control of the rest of the infrastructure is used to extract value from these exchanges.

This new form of capital directly exploits networked social cooperation that often consists of unpaid activities that can be captured and financialized by proprietary “network” platforms. It lives from the positive externalities created through human cooperation and the commons. If previous versions of capitalism were hostile to the commons and tried to destroy it, this new version has learned, at least provisionally, to “tame” the commons. But this also means that it has become parasitic and rent-seeking. Netarchical capitalism is rent-seeking capital that has shifted its control mechanisms to controlling the whole network itself and functions one step away from real production.

For example, social media platforms like Facebook almost exclusively capture the value of their members’ social exchange, by monetizing the data and selling the “attention” of their users to advertisers. Crowdsourcing models are based on distributed labor tending to reduce the average income of the producers (for an overview of crowdsourcing’s labor markets and the dark side of the digital labor in general, see the collective book edited by Scholz, 2012). There is no creation of commons by communities, but rather a competition between workers and producers, to get clients on the demand side. Uber, AirBnB, Kickstarter and TaskRabbit are also examples of the netarchical model.

In CBPP, productive communities consciously create commons, whereas in the so-called “sharing economy” there are distributed market (P2P) exchanges taking place over private platforms, whose owners extract a toll from the exchanges. The process is controlled by the owners of the platforms, who extract value (rents or fees) from these processes. The sharing concept here is no more than a marketing ploy.

Further, the bottom-left quadrant, which includes examples like Bitcoin and some of the emerging initiatives that are based on Bitcoin’s distributed ledger called the “blockchain”, can be characterized as “distributed capitalism”. These more distributed developments embrace the idea that “everyone can become an independent capitalist or trader”, and they aim to

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3 Of course, we should be aware of Federici’s and Caffentzis’ remark (2007, p. 70) that notions like “cognitive labor” and “cognitive capitalism” represent “a part, though a leading one, of capitalist development and that different forms of knowledge and cognitive work exist that cannot be flattened under one label”.

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create individual autonomy from both big business and the state. Under this model, P2P infrastructures are designed to allow the autonomy and participation of many players, but the main focus is still profit-maximization. The design of Bitcoin is quite exemplary in that context, as its deflationary design means that early buyers or producers of the virtual coin, can sell them to latecomers at a premium, without the necessity of productive work. Bitcoin is similarly extractive towards nature because of its enormous appetite for energy.

More generally, each system geared towards the competition for scarce resources, will favor winners over losers and, over time, lead to the same oligarchy as netarchical capitalism. Distributed capitalism is ideologically different and is based on a different techno-social paradigm, but the unequal distribution of influence within networks lead to the same place as where netarchical capital is starting from. This is already true for both the ownership of Bitcoin mining capacity, and the ownership of the coins themselves. Generally speaking, such projects are driven by an underlying vision that society is just a sum of autonomous individuals, who simply create contracts with each other. There is no real society and no collectivity in these visions. Further, the projects related to this vision of distributed capitalism (also called “anarcho-capitalism”) lack any counter-measures that can prevent the creation of inequality and oligarchy (Boehm, 2001).

Moreover, many forms of the left quadrants are hybrid and should not be considered “wholly negative” because they also allow the further growth of P2P sociality, in which autonomous forms of production and exchange are widely available to an ever-larger user base. Paradoxically, capitalism itself strengthens non-capitalist and post-capitalist forms of self-organization and value creation. Examples are how the popular forces of resistance and even revolution self-organized during the Arab Spring, but also various CBPP communities have made inventive use of netarchical platforms and distributed systems to organize themselves and their projects. For example, a community-supported fishery in Ostend, Belgium uses Facebook to connect fishermen and their clients. Therefore, there are netarchical platforms that build P2P infrastructures and create some positive conditions that should be critically utilized towards a more inclusive and autonomous network society.

Another example is the case of IBM and its coalition with various commons-based projects in the realm of software. IBM profits on the use value produced through CBPP. Nevertheless, its involvement has catalyzed the enhancement of the outputs and contributed to the sustainability of many CBPP projects offering chances for paid labor.

In addition, moving to the distributed capitalism scenario, Bitcoin is important as a signpost, since it is the first global “post-Westphalian” currency based on “social sovereignty”. It actually shows that alternative currencies could scale and exist as a workable alternative. The blockchain, associated with Bitcoin as a distributed database, eliminates the need for a trusted third party. The transparent and distributed nature of the blockchain theoretically could help small and large communities to reach consensus and implement novel forms of self-governance. These potentialities introduce various opportunities and challenges worth enough to investigate and experiment with. An enduring weakness with blockchain-based applications is their high energy usage and thus environmental cost.
3.3. The generative model of commons-based peer production

Let’s now move to the right quadrants where several promising social movements and CBPP projects can be located. If the left side showed predominantly extractive, rent-seeking behavior vis a vis P2P exchanges, then the right side shows a positive engagement with the commons and communities, i.e. a generative relationship.

In both the bottom and top right quadrants, the “civic” element predominates, either in the form of a local community, or in the form of a global open design community that mutualizes its knowledge. Both use digital platforms, but the difference lies in how they instrumentalize the digital commons that they use.

In the localized commons model, the global digital commons are used to strengthen and organize the local. In the global commons model, the networks are used to directly organize at the global level, to deploy activities directly at the global level, and to project power at that level. For example, the priority of the Transition Town movement (localized commons quadrant) is towards local transitioning, and their use of global digital commons is at the service of their local goals. Conversely, the goal of Wikipedia (global commons quadrant) is to create global and universal knowledge resource, just as the aim of GNU/Linux is to create a global alternative to proprietary operating systems.

The main vein of our critique to localized commons initiatives is twofold (Kostakis et al., 2015). First, many localization communities (e.g. several ecovillages) produce a digital commons (e.g. novel permaculture techniques) while working to meet their needs. But, because of their local focus, they have loose connections with each other; they do not produce a global commons; and thus they fail to contribute to the formation of a global counter-power. There are many global issues that cannot be solved at the local level, and there are many local solutions that can be thwarted by hostile global power dynamics. For example, a local fisheries commons can easily be thwarted by industrial fishing fleets operating outside of the national nautical zones.

Localization is part of the answer, it is necessary, but not sufficient. Such initiatives could deploy their own efforts at translocalization and transnationalization. For example, they could federate both at the local and transnational level around their domain of activity, such as provisioning systems (e.g. food or shelter). The cities could function as “partner cities” enabling the deployment of these local systems while they create transnational coalitions themselves, and support global open design communities that mutualize the development of common infrastructure.

Our approach is in no way hostile to localized commons initiatives. We have to co-construct the new generative mode of production and allocation at all levels. Localized projects can interconnect at all levels, including the local territorial level, and local structures can create transnational infrastructures (such as for example, a global coalition of cities). Our argument is rather that these local initiatives vitally and structurally need global complements to be effective. But we have also a deeper argument, in which the local is a key dimension of a commons-centric society.
In line with degrowth and localization narratives, we are living the endgame of neoliberal material globalization based on cheap energy, labor and transport, which necessitates relocalization of production. The value-creation communities of the global commons approach might be locally based but are globally linked. Out of that, there may come new forms of socio-economic organization, which are substantially more community-oriented. This approach sees no contradiction between global open design collaboration, and local production/manufacturing: both can occur simultaneously, so the localized reterritorialization can be accompanied by global networks of enterprises. The various digital commons, based on shared knowledge, code and design, will be part of these new global knowledge networks, but closely linked to relocalized implementations.

To distinguish this approach from both localized communities and global neoliberal material networks, we could call it “cosmo-localization” (Ramos et al., 2017), whereby what is light (non-rivalrous; e.g. knowledge) becomes global and what is heavy (rival; e.g. manufacturing equipment) remains local (Kostakis et al., 2016; 2017). The global design communities and the local production communities could create commons-oriented entrepreneurial coalitions: participatory business ecosystems that work for a community and its commons.

Participating enterprises are vehicles for the commoners to sustain global commons as well as their own livelihoods. This approach does not take social regression as a given, and believes in a more frugal abundance for the whole of humanity. This means maintaining a maximum amount of wellbeing services and infrastructures, but with a lower load on natural resources and the environment. Our claims for the sustainability potential of commons-based products and practices currently rest on thin empirical foundations, but there are some positive dynamics that cannot be neglected (Kostakis et al., 2016; 2017).

CBPP communities are not motivated to follow a planned obsolescence approach to design and engineering. In addition, local manufacturing technologies (from 3D printers and laser cutters to drills, low-techs and crafts) offer possibilities for on-demand manufacturing resulting in less transportation of the raw materials. While the potential of such models is still debatable regarding scale, when customization and scope are needed they can be instrumental. Moreover, CBPP communities tend to mutualize their productive resources (e.g. shared manufacturing infrastructure in makerspaces) and thus benefit in tandem.

Wikihouse, Open Source Ecology, Farm Hack, L’Atelier Paysan, RepRap, OpenBionics, are only some empirical cases where the digital commons converge with local manufacturing technologies creating sophisticated products (from houses, tractors and other agricultural machines to prosthetic robotic hands and 3D printers). These communities develop, share and improve design as a global digital commons, while the actual manufacturing takes place locally through shared infrastructures, often with local conditions in mind.

We envision a transition to a paradigm that would include new decentralized and distributed systems of provisioning and democratic governance, escaping the pathologies of the current political economy and constructing an ecologically sustainable alternative (Bollier, 2014). To achieve such a transition, the global commons scenario suggests that we should work on building both global and local political and social infrastructures.
Of course, CBPP cannot instantly substitute all production processes or that centralized infrastructures (such as water supply) are useless. CBPP is a proto-mode of production and, thus, currently unable to perpetuate itself on its own outside capitalism, to a full mode of production. Central to this discussion are, on the one hand, the concept of the “ethical market” that would include commons-oriented enterprises; and on the other hand, the partner state that would enable and empower direct social-value creation by providing support for the basic infrastructures, and focus on the protection of the commons sphere (Orsi, 2009; Bauwens & Kostakis, 2015).

To create a fully-functioning economy that is commons-centric and based on CBPP communities, it is necessary to tackle the flow of value, which is now “extracted” by netarchical capital. Contributors of global and local communities must create their own commons-oriented entities, so that the surplus can be used for creating livelihoods, insure social reproduction of the commoners, and re-investing in the P2P-based production networks. Capital accumulation must be replaced by “cooperative accumulation”\(^4\), which is re-invested in the growth of the commons-based productive communities and their entrepreneurial coalitions. This strategy was used successfully to grow cooperative networks such as Mondragon, Spain, but also to create the vibrant cooperative economy of Emilia-Romagna, Italy.

Nevertheless, the aim here is to use cooperativism for strengthening the emergence, expansion and dominance of CBPP. Moreover, It is an illusion that such a development of the commons forces can be done with a hostile state. A successful commons transition strategy requires to tackle the issue of political organization and on influencing the state form head on. Proposing a more coherent strategy for a commons transition is the aim of section 4.

\(^4\) The concept and practice of cooperative accumulation is detailed and discussed by Mike Lewis in an email discussion of September 2013, which is recorded at: https://wiki.p2pfoundation.net/Cooperative_Accumulation.
4. A P2P/commons transition strategy

How to be an anti-capitalist in the 21st century? Erik Olin Wright (2015) eloquently writes:

Give up the fantasy of smashing capitalism. Capitalism is not smashable, at least if you really want to construct an emancipatory future. You may personally be able to escape capitalism by moving off the grid and minimizing your involvement with the money economy and the market, but this is hardly an attractive option for most people, especially those with children, and certainly has little potential to foster a broader process of social emancipation. If you are concerned about the lives of others, in one way or another you have to deal with capitalist structures and institutions. Taming and eroding capitalism are the only viable options. What you need to do, is participate both in the political movements for taming capitalism through public policies and in socio-economic projects of eroding capitalism through the expansion of emancipatory forms of economic activity.

We largely agree with Wright’s point of view and suggest ways that simultaneously tame and erode capitalism. We, however, do not have the same confidence that the era of violent social and political revolutions is over. Such revolutions are organic events and the result of an unwillingness of elites to accommodate the necessary system change.

For us then, eroding capitalism points to the necessity of creating a prefigurative commons-centric economy within existing capitalism. The post-capitalist future requires commoners as the agents of change, and to have commoners, we need to expand the sphere of the commons. Taming capitalism predates that we do not have a permanent and radical hostility to the state, which has to be “tamed”. This has been the strategy of all successful social movements to date, and that includes the labor movement, universal suffrage movements, women’s and gay rights movements, etc. This also means finding synergies and convergences among the prefigurative forces that create the new economy, and finding political expressions for them, so that they can act in alliance with other emancipatory social and political forces.

One of the consequences of a multimodal approach is that allies should be found amongst the forces representing the other modes of production and allocation. This implies uniting the forces which support the commons, which support generative and ethical markets, and which support the development of an enabling and empowering state.

4.1. Pooling resources wherever possible

One of the essential features of P2P technologies is the liberation from the limitations of time and space. This means that an ever larger number of people is not bound to their territory, which includes territory in the virtual sense (e.g. organization or enterprise). This is now possible both for immaterial and material production. Workers can develop contributory lifestyles, and add and withdraw from paid and unpaid projects throughout their lives.
CBPP communities, and their contribution-based technical systems of production, can generally be characterized as open contributory systems (though, as said, they have some filtering membranes in place to guarantee high quality contributions and contributors). This means that people can freely contribute to one or more commons of their choice.Pooling is, therefore, at the heart of CBPP.

Pooling both immaterial and material resources are priority. This capacity to pool productive knowledge is now one of the most important characteristics to obtain both “competitive” and “cooperative” advantage (depending on the orientation of the productive entity towards profit-maximization or for-benefit generative goals). Pooling – or in other words “the commons” – should be at the heart of the productive and societal system.

4.2. Introducing reciprocity

The mutual coordination within CBPP that takes place through open signalling can operate for the production of digital commons, because these goods are nonrival. But what about material production? Since rival physical goods can be depleted (that includes human labor), and they are in need of regeneration, a different modality of allocation is needed. This is why although we have a “cybernetic communism” at the heart of the capitalist system in the production of immaterial goods (Barbrook & Cameron, 2015), we need another mechanism for material production. Instead of the practice of the “communist” principle behind pooling (“from each according to their ability, to each according to need”), in material production we may need a reciprocity principle: “to each according to their contribution”.

This is why we propose the model of an “open cooperative”, i.e. an entity that would be legally and statutorily bound to creating commons and shared resources. Open cooperatives would internalize negative externalities; adopt multi-stakeholder governance models; contribute to the creation of immaterial and material commons; and be socially and politically organized around global concerns, even if they produce locally (Bauwens & Kostakis, 2016). In short, open cooperatives argue for a synergy between the CBPP movement and elements of the cooperative and solidarity economy movements. The difference with traditional cooperatives is that open cooperatives pool their immaterial resources, creating thus a multifaceted digital commons for other open cooperatives and for-benefit associations. As explained in 4.4, this cooperative advantage could help expand the commons sphere while subordinating capitalism.

Perhaps a good way to understand these multi-modalities of the new post-corporate entities is to look at the functioning of the medieval guild system. Externally they were selling their goods on the marketplace (but even that was subjected to “just pricing” practices), but internally they were fraternities and solidarity systems. This is a good historical analogy to understand the double logic of the new entities connected to the commons. In a commons-centric economy, this could be achieved through open participatory systems that would connect producers and consumer/user communities, through mutual solidarity, as we know for example form the model of consumer-supported agriculture. We thus propose models that intertwine contributors with various roles, in one solidarity ecosystem.

Further, to the degree that these entities can use open contributory accounting systems, parts of the management of material production could be moved towards mechanisms of mutual
coordination and pooling, which require a different sort of distributed collaborative planning (e.g. Sensorica).

Physical resources and means of production could also be pooled themselves. Commons-based forms of property could be implemented that are neither state property nor necessarily individual private property. Think about “commons funds” to which all contributors participate and co-own. These processes would create the linkages between the still scarcity-based distribution of physical resources, which need to be re-generated and therefore require reciprocity; and non-reciprocal general pooling, for resources that need not to be regenerated. To the degree that physical resources become more abundant, these resources could move to more abundance-based commons-centric models.

In conclusion: a distinction is made between commons-centric models that are appropriate for rival resources, and commons-centric models that are appropriate for non-rivalrous resources. These models should be seen as polarities, with possibilities to move in one or another direction using hybrid combinations. While some communities may want to commonify their physical resources and eventually move to full non-reciprocal sharing modalities, other communities may wish to increase demands for specific reciprocity.

4.3. From redistribution to empowerment and predistribution

As was explained, the CBPP ecosystem has its productive communities; coalitions of entrepreneurs; and the “management” or “governance” institution, that of the for-benefit associations. For instance, the nonprofit foundations of free and open-source communities often manage and enable the infrastructure of cooperation. They defend the use of open licenses, sometimes provide training or certification, but generally their task is to enable and empower the cooperation. Unlike the post-democratic dynamic of the polyarchic contributory communities, these for-benefit institutions generally function with formal democratic procedures, such as elections.

In this context, these for-benefit associations operate as mini-states of the CBPP ecosystems. Hence, moving from the observation of the existing practice at the micro-level, to the vision of a full social form, we observe that there is room/need for the “state form”:

- a productive civil society contributing to the commons;
- a predominantly generative market that creates added value around the commons;
- a partner state, whereby public authorities play a sustaining role in the direct creation of value by civil society, i.e. they sustain and promote CBPP.

Something more than a redistributionist welfare state is necessary, which would go beyond accepting the supremacy of capital and disciplining the capitalist market players from the outside. We need a state that would create the conditions for the creative autonomy of its contributing citizens. This would require pre-distribution of resources rather than post-facto redistribution.
The partner state would ideally be the guarantor of civic rights, but also of the contributory equipotentiality of all citizens. It would empower and enable the direct creation of value by civil society at the scale of a territory, by creating and sustaining infrastructures for CBPP ecosystems. Without such a territorial function, the productive communities would have unequal access to resources and capabilities, leading to a still unequal society. In our vision, such a state form should be one that would gradually lose its separateness from civil society, by implementing radical democratic and even rotational procedures and practices.

A partner state approach would not be opposed to the welfare state model, but rather should transcend and include it. It would retain the solidarity functions of the welfare state, but de-bureaucratize the delivery of its services to the citizen. The social logic would move from ownership-centric to citizen-centric. The state should be de-bureaucratized through the commonification of public services and public-commons partnerships.

Public good institutions are necessary in the face of rising individualistic political philosophies, such as anarcho-capitalism that only see individuals making contracts with each other. Society exists, and needs its specific forms of expression. The state is one of them. And the state imaginary we argue for, synchronized with the special characteristics of the digital technologies, could be that of the partner state.

A partner state approach is seen prefiguratively in some urban practices, such as the Bologna Regulation for the Care and Regeneration of the Urban Commons or the Barcelona En Comú citizen platform.

The Bologna Regulation is based on a change in the Italian constitution allowing engaged citizens to claim urban resources as commons, and to declare an interest in their care and management. After an evaluation procedure, an “accord” is signed with the city specifying how the city will support the initiative with an appropriate mix of resources and specifying a joint “public-commons” management. In Bologna itself, dozens of projects have been carried out, and more than 140 other Italian cities have followed suit. This regulation is radical in giving citizens direct power to emit policy proposals and transform the city and its infrastructure, as an enabler for this⁵. The key is the reversal of logic: the citizenry initiates and proposes, the city enables and supports.

Moving about 1000 km from Bologna to the west, Barcelona has become a reference point for CBPP. The city has a great diversity of grassroots initiatives, from the commons-oriented crowdfunding platform of Goteo and the Cooperativa Integral Catalana to Guifi.net, a free/open telecommunications community network. Barcelona is not a city in reform from the top down; it is a city in transformation from the bottom up. This is how the Barcelona En Comú (BeC) citizen platform emerged, took power and currently governs in minority in the City of

⁵ More info: [https://wiki.p2pfoundation.net/Bologna_ Regulation_for_the_Care_and_Regeneration_of_Urban_Commons](https://wiki.p2pfoundation.net/Bologna_Regulation_for_the_Care_and_Regeneration_of_Urban_Commons). Further, the Rome-based LabGov has initiated and documented commons-oriented multi-stakeholder governance models in various Italian initiatives: Co-Bologna, Co-Mantova, Co-Battaglia, Co-Palermo, and more.
Barcelona. The activist-level praxis matured into a political force attempting to share its hard-won knowledge and experience internationally\(^6\).

In mid-March 2016 Barcelona hosted the Commons Collaborative Economies event (called “Procomuns”), centered on producing public policy proposals for the commons economy. The event, which drew a huge, diverse crowd from 30 countries, produced a joint statement and a series of policy recommendations targeted toward the Barcelona City Council, the European Commission and other local governments.

BeC holds 11 seats out of 41. Within the small space between simple legislation and doing nothing at all, BeC attempts to embrace cooperatives and citizen activism despite the many limits and problems at the government level. A new, hybrid participatory process combining in-person and digital input has been developed for city residents to collaborate in municipal debate and decision making (called “decidem.barcelona”). This hybrid process is also being used by other cities in Spain, and is being promoted to cities internationally.

The BeC platform has been built step by step, acknowledging every little victory that adds up to something (previously) unimaginable. And finding the appreciation for the small steps is part of the change.

4.4. Subordinating capitalism

Under capitalism, the market mechanism is dominant and infects all the other modalities, i.e. everything tends to be commodified. Capitalism is an extractive, profit-maximizing relationship. It exploits workers and now profits from the free labor of free and open-source software and open design workers or from the communication on social media. It has a similar extractive relation with nature and the environment.

The market, however, would continue to exist in a commons-oriented society. The market would shift from being predominantly extractive to predominantly generative. First, this means that the market will serve the commons. CBPP participants are struggling to create a direct livelihood simply by contributing to the pool of digital commons. They must pass through either the state (payment by the state, for example in public universities and publicly-funded science, or subsidies for culture and non-profits) or the capitalist market. State support could take the form of the basic income, along with other already known models of support.

But commoners must also create a new type of market entity that would allow them to contribute to the commons. As we explained above, commoners create entrepreneurial coalitions that create products and services for the market and serve as a conduit to generate income for the continued construction of the commons. What role could the capitalist market have in a commons transition?

We argue for commons-based reciprocity licensing, which has been called “copyfair” as a play on the copyright and copyleft (for a discussion of reciprocity in relation to licensing see Vieira & De Filippi, 2014). Copyfair allows commons-contributing entities to use the common material

for free, but non-contributory for-profit market entities have to pay for a license for the right to commercialize the certain commons. In this approach, the free sharing of knowledge is preserved, i.e. the universal availability of immaterial commons, but commercialization is made conditional on reciprocity. The Peer Production License, proposed by Kleiner (2010), exemplifies this line of argument.

So, reciprocity is created between the sphere of the capitalist market and the sphere of the commons. This simultaneously allow for the entities participating into the ecosystems of commons-oriented entrepreneurial coalitions to pool their immaterial (and even material in the long run) resources and benefit in tandem.

The key logic of modernity was expressed by the ideals of freedom, equality, and fraternity. First, CBPP allows for free universal choice of one’s productive activity. Second, the principle of pooling, allied with the continued pre- and redistributive practices of the partner state, stands for equality. Third, reciprocity and the ethical relations between peers and commoners in participatory ecosystems represent solidarity. In this context, the transition towards a commons-centric economy and society represents a realization of the as yet unfulfilled project of the modern age, but which integrates the advantages of previous social models.

4.5. Organizing at the local and global level

Our central political recommendation is that progressive coalitions at the urban, regional and nation-state level should develop policies that increase the capacity for the autonomy of citizens and the new economic forces aligned around the commons. Simply initiating left-Keynesian state policies will not be sufficient and will probably be met with stiff transnational opposition from the financial oligarchy. These pro-commons policies should be focused not just on local autonomy, but also on the creation of transnational and translocal capacities, interlinking the efforts of their citizens to the global commons-oriented entrepreneurial networks that are currently in development.

We suggest that progressive coalitions should focus on post-capitalist construction first and foremost. Except in rare locales, the current progressive movements are still wedded to the old industrial Keynesian models. But as they discover the limits of this strategy, openings towards commons-supportive policies may emerge. What follows from the above analysis is that the current commons-oriented forces must also focus on the creation of translocal and transnational capacities.

So, what could we do? There is a rapid increase in the number of civic and cooperative initiatives outside of the state and corporate world. Most of these initiatives are locally oriented, and that is absolutely necessary. We know that today there are movements that operate beyond the local and use global networks to organize themselves. A good example may be the Transition Town movement, and how it uses networks to empower local groups.

But this is not enough. We propose the creation of translocal and transnational structures that would aim to have global effects and change the power balance on the planet. The only way to achieve systemic change at the planetary level is to build counter-power, i.e. alternative global governance. The transnational capitalist class must feel that its power is curtailed, not
just by nation-states that may organize themselves internationally, but by transnational forces representing the global commoners and their livelihood organizations.

We favor commons-oriented entrepreneurial coalitions that strengthen commons and their contributory communities and create an economy for them. These generative, translocal, and transnationally operating coalitions already exist. Amongst the best known are Enspiral (originally based in New Zealand); Sensorica (originally based in Montreal, Canada); Las Indias (mostly based in Spain but with many hispanic members from Latin America); and Ethos VO (based in the UK). We believe this new type of translocal organization is the seed form of future global coalitions of generative entrepreneurs.

In this context, the commons-oriented entrepreneurial coalitions could locally be represented by the territorial Chambers of Commons, first proposed by David Ronfeldt as a way to emulate the Chamber of Commerce\(^7\). Hence, local Chambers of Commons could lobby on commons issues, advance the monitoring of commons matters, congregate interested actors, and shape a commons sector. We advocate for the creation of such chambers to give voice to the ethical market and the entrepreneurial coalitions that are co-creating commons and livelihoods for commoners.

Moreover, again at the local level, the pro-commons associations could be represented in Assemblies of the Commons. The Assembly of the Commons could help empowering civic power around the commons. It could bring together all those who contribute and maintain common goods and serve as a forum to exchange experiences and bring commonality into diversity. For example, the Assembly of the Commons could organize events around commons topics; support those social and political forces that bring forward an agenda for the commons; promote and engage in public-commons partnerships. It would be fraternally connected to the Chamber of the Commons, as well as to other assemblies. In this way, they all together could operate at a larger scale and form regional, national, transnational federations.

In addition, global federations of commons-oriented entrepreneurial coalitions could be created. This initiative would aim at connecting the already existing entrepreneurial coalitions, so that they can learn from each other, but also at developing a collective voice. We see that as a global equivalent of the proposal for the Chamber of the Commons.

These developments of commons-specific social institutions could emerge in parallel with more traditional political expressions of the commons mentalities. We have already seen the emergence of political parties, the Pirate Parties, which are expressions of the filesharing communities that were repressed through copyright legislation, which led to their politicization. The 15M movement in Spanish cities gave birth to the en Comú coalition in Barcelona, which raised to power and has specific references to the commons, e.g. the development of a commons-oriented economy.

In addition to these specific and more direct expressions of commons-oriented political forces, we claim that the acceptance of a commons agenda could be the basis for new progressive

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\(^7\) See David Ronfeldt’s discussion about the Champer of the Commons here: [http://wiki.p2pfoundation.net/Chamber_of_the_Commons](http://wiki.p2pfoundation.net/Chamber_of_the_Commons).
coalitions with already existing political forces. With the Pirates expressing digital culture, the Greens expressing the natural commons, and the new emerging left parties representing a new (post-)industrialism, we foresee the emergence of majoritarian coalitions in which the commons is a binding element.

We must build “counter-hegemonic” power at the global level. This continuous meshworking at all levels is what will build the basis to create systemic change: power to change, at the level where the destructive force of global capital and its predation of the planet and its people can be countered.

This has been done before. According to Kojin Karatani (2014), the reason our current market society came about is that Europe, being at the margins of Empire, was never able to consolidate centralized power, allowing independent cities where the merchants could exist and expand their power. This social force became dominant after the fall of the absolute monarchs. So the market forces had already a long history behind them before social and political revolutions made the market form dominant. Capitalism won because the pro-capitalist forces already existed.

But commoners do exist. We use digital commons, and rely on physical commons. Commoners should follow the same multi-modal strategy, i.e. prefiguratively build their power and influence at all levels. Of course, just as laborers did, for this we have to develop a consciousness that we are commoners. Anyone participating and co-constructing shared resources without exploiting them is in fact a commoner. It is a question of how people see the “relative weight” of the commons modality in their lives as well as whether commons become part of their social imaginary of a desired future.

Because the world is multimodal, it does not make sense, and it is impossible, to create a “totalizing” commons world. We, however, could aim for a commons-centric society where market forces and state functions are “disciplined” at the service of the commons. Like capital did before us (Karatani, 2014), we must build our strength within a multimodal world.

4.6. Summary of our proposals

Here is a summary of our proposals for a multimodal transvestment strategy as well as for organizing locally and globally.

The first step is to fight against the extractive activities of profit-maximizing entities towards the commons and its allied economic entities. Commoners should use transvestment strategies that would transfer value from the capitalist market modality to the commons modality. We thus propose that:

- Commoners mutualize digital (e.g. commons of knowledge, software and design) and even physical resources (e.g. shared manufacturing machines): We need pooling wherever it is possible.

- Commoners establish their own economic entities and create livelihoods for the productive communities: We need open cooperatives.
• These economic entities use commons-based reciprocity licensing to protect from value capture by capitalist enterprises: We need *copyfair*.

• Open cooperatives are organized in participatory business ecosystems that generate incomes for their communities: We need *commons-oriented entrepreneurial coalitions*.

This leads us to the second step that is to build a counter-power at the city, regional and global level. We thus advocate for:

• The creation of local institutions that give voice to the commons-oriented enterprises that build commons and create livelihoods for commoners: We need *Chambers of the Commons*.

• The creation of local or affinity-based associations of citizens and commoners, bringing together all those who contribute, maintain or are interested in common goods, material or immaterial: We need *Assemblies of the Commons*.

• The creation of a global association that connects the already existing commons-oriented enterprises, so that they can learn from each other and develop a collective voice: We need a *Commons-oriented Entrepreneurial Association*.

• The creation of global and local coalitions between political parties (e.g. Pirate Parties, Greens, New Left) in which the commons is the binding element: We need a *Common(s) Discussion Agenda*.

**4.7. A last word**

We propose an integrative strategy for a broad societal transition that differs from the classic left narratives of previous centuries. Why would this strategy be effective?

First, it is consistent with the historical record that shows that political revolutions did not precede deep reconfigurations of social power, but completed them (Karatani, 2014). The development of a new movement or class and its practices precedes the concluding social revolutions that made their power and modalities dominant. There is a convergence of data that supports the prefigurative existence of a growing number of commoners⁸, who could form the basis of a historical subject at the forefront of this transition.

Moreover, very important are the changing cultural expectations of millennial and post-millennial generations, and their requirements for meaningful engagements and work, which are hardly met by the current regime. The precarization of work under neoliberalism drives the search for alternatives, and the cultural force of P2P self-organizing and corresponding mentalities fuels the growth of commons-oriented networks and communities.

Also, CBPP is a model that could create a context of truly sustainable production. It is almost impossible to imagine a shift to sustainable circular economy practices under the current proprietary regime. The thermodynamic efficiencies needed for sustainable production could

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⁸ See De Moor, 2008; 2013; Creative Commons, 2017; Bollier, 2014.
be found in the systematic applications of principles inherent in the commons-centric economy.

Finally, the crisis of the left itself, which are now relegated to the management of the crisis of neoliberalism itself, points to the vital need of renewing the strategic thinking of the forces that aim for human emancipation and a sustainable life-world.

We believe that a strategy for a multi-modal commons-centric transition offers a positive way out of the current crisis, and a way to respond to the new demands of the commons-influenced generations. The commoners are already here; so are the commons and the prefigurative forms of a new value regime.
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