Platform Cooperativism Consortium

INSTITUTE FOR THE COOPERATIVE DIGITAL ECONOMY

DAOS AND PLATFORM COOPERATIVES

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LESSONS FROM THE COMMONS

A Report by

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About the Institute for Digital Cooperative Economy

The Institute for the Cooperative Digital Economy (ICDE) is the research division of the Platform Cooperativism Consortium. Established in 2019, its research covers the emerging cooperative digital economy, which is a relatively unexplored domain in fields like anthropology, political science, sociology, history, law, and economics. The cooperative digital economy is rapidly expanding and is closely linked to labor and cooperative studies. The ICDE's work also focuses on finance, entrepreneurship, and organizational studies in business schools, as well as governance and corporate structure, which are critical subjects in law schools.

At the ICDE, we recognize that scholars, technologists, artists, community organizers, and cooperators equally contribute valuable insights to the development of a more just and equitable digital economy. Therefore, the Institute's mission is to provide applied and theoretical knowledge, education, and policy analysis to bridge the research gaps in the emerging cooperative digital economy. Learn more at https://platform.coop

1.
INTRODUCTION

The year 2022 has seen energy prices soar across the world due to the war in Ukraine. This shock came immediately after the COVID-19 lockdowns precipitated an economic crisis which, as always, has disproportionately affected the poorest who dedicate a larger share of their income to energy. Historically, it is in periods of crisis that people turned to other forms of social and production organizations, such as cooperatives, to rely on solidarity to secure their basic needs. Turning away from extractivist capitalism has become even more urgent because of the environmental (climatic and biodiversity) crises that it has contributed to— exemplified by the ever more numerous and intense heat waves, forest fires and floods. This requires us, particularly in the Global North, to fundamentally change our production and consumption habits.

In this regard, exploring and promoting alternative forms of social cooperation and production is crucial, and cooperatives provide a time-proven framework to support economic activities in a more fair manner. The role of information technologies in the creation and development of new forms of organizations is ambiguous. On the one hand, the boom of communication technologies has contributed to the generalization of the gig economy and the culture of instant consumption (with same-day deliveries for instance), and at the same time, has reinforced economic inequalities with the richest people on the planet coming from this sector. Moreover, the environmental impact of IT is significant, both in terms of materials (such as rare earth), and of energy consumption. On the other hand, the internet and other information technologies have also permitted to foster collaboration, to share knowledge and to enable participation in diverse contexts.

This dichotomy is particularly striking in the blockchain world. Blockchains are peer-to-peer networks that can support novel forms of interactions. In particular, they allow us to invent new forms of constitutional settings relying on algorithmically programmed and automated sets of rules. However, despite these promises and the existing attempts to build new tools for economic activities on the blockchains, the bulk of the development efforts on blockchains concern financial activities that result in profit-oriented businesses with little-to-none positive social impact and extremely high inequalities indicators.

How we can harness the innovation of blockchains for fairer use is an important question that has sparked important research. This work has developed in many directions, because potential use cases of blockchains permeate many domains of the society.

This report focuses on the link between blockchain-based tools, and in particular Decentralized Autonomous Organizations (DAOs) and the platform cooperativisms movement. It builds on parent research on proximities between DAOs and the 'Commons.' The reason to do so is because DAOs, Commons and platform cooperatives are all ways of adopting a complex set of participatory rules to sustainably manage a resource and allow it to thrive. While the characteristics of the resources and the communities may differ, this report contends that there are strong synergies to be developed between these three practices.

This report extends the work I have started in my Ph.D. in which I explored how the governance of the Commons could benefit from the innovation of DAOs, and how blockchains governance could learn from the tradition of the Commons. In this report, the links woven between these two worlds are extended to the case of platform cooperatives. This process will distinguish the aspects of Commons-based governance that are applicable to platform co-ops and the specificities of the latter. Doing so, it will also outline some conditions under which recourse to blockchain-based platforms may prove useful for co-ops and the cases where it is more likely to bring complexity.

The remainder of the ICDE report is structured as follows: the next sections uncover the links between the Commons, cooperatives and DAO-enabled governance and briefly discuss the existing literature on the matter. The following section applies lessons from existing research on the link between the Commons and DAOs to co-ops which delineate situations where recourse to such tools may be relevant while mentioning the ensuing risks. The final section also discusses the points where co-ops differ from the Commons and how this affects the potential benefits of blockchain-based platforms. The conclusion situates these results in the current context, and links them with ongoing research.

2.

CONTEXT: DEFINITIONS, RULES, AND GRAMMARS

Before discussing platform co-ops, DAOs and Commons, it is important to define what we are discussing and provide definitions. This section provides a common vocabulary to discuss DAOs, platform-co-ops and the Commons with a strong focus on the community and the active process of governance and participation. It does so by historically situating research and practices in these three domains.

Decentralized Autonomous Organizations

Defining DAOs requires firstly describing what blockchains are. They were invented in 2008 to provide a decentralized network to allow monetary transactions without the oversight of a centralized institution such as a bank. Beyond the technical innovation behind this invention, it offered a new type of substrate that triggered the development of many new applications on this network.[1]

A technical description of how blockchains work is beyond the scope of this document; it suffices to say blockchains can be understood as decentralized computers. There can be understood as computers because they can store data and execute complex programs. They are decentralized in the sense that everyone who participates in the network has a version of the computer and there is a strongly secure protocol that guarantees that no one can manipulate the state of the computer. Therefore, everyone has the same data, executes the same programs which result in the same outcomes. The key features of blockchains is that they are immutable, transparent, and can securely automate the execution of complex programs. Readers willing to know more about blockchains can turn to the work by Swan (2015).[2]

Among these programs, Decentralized Autonomous Organizations are traditionally defined as "blockchain-based system that enables people to coordinate and govern themselves mediated by a set of self-executing rules deployed on a public blockchain, and whose governance is decentralised".[3] In this report, we will adopt a more community-focused definition where the DAO is comprised of:

1. A community
2. A set of self-executing rules to help coordination and governance of a resource; and
3. A resource, that can be either a financial fund, a external resource or social bonds

Reframing DAOs in such a way allows us to emphasize that the specificity of the DAOs compared to other blockchain-based programs come from the active participation of the community in the management of a resource rather than relying on fully automated or top-down hierarchical organization.

The Commons

While the Commons are traditionally defined as goods with alternative consumption (one's usage reduces the other's) where exclusion is difficult, this definition focuses too much on the resource, largely ignores the governance process and misses whole types of Commons.

Through decades of theoretical, experimental and empirical study, Elinor Ostrom and the Bloomington School provided us with a rich corpus to better understand, define and promote every type of Commons. This new approach focuses more on the governance process and Commons are defined as resources facing a governance challenge that a community has solved through collective and participatory decision-making. Ostrom et al. clarified the two possible types of governance problems:

- Appropriation problems appear when there is a challenge in the allocation of the production of resources.
- Provision problems appear when the challenge concerns the maintenance of the stock of the resource.[4]

Commons can face both appropriation and provision problems at the same time, and communities across the world have devised collective rules to face them. Following the work of Bollier who puts the focus on commoning rather than on the resource itself, this report uses a three-pronged definition of Commons. Commons are made of

1. A resource,
2. A community, and
3. A set of collective and participatory rules to govern the resource.[5]

Platform Cooperatives

According to the Platform Cooperativism Consortium, "Platform cooperatives are businesses that sell goods or services primarily through a website, mobile app, or protocol. They rely on democratic decision-making and shared platform ownership by workers and users."[6]

They are a variation of traditional cooperatives, an organizational model that relies on a voluntary and participatory association to provide a service or produce a good. Co-ops were created about 200 years ago in opposition to profit-first private firms and imply a worker-owner structure to promote solidarity and rely on social values.

Just as with DAOs and Commons, platform co-ops cannot be solely defined by the code of the platform they use nor by the service they provide. Indeed a similar platform providing similar services could be used by a privately owned company thus missing the specificity of platform co-ops. Consistently with the previous paragraphs, I adopt a definition of platform co-ops made of:

1. A community of worker-owners,
2. A platform (the resource), and
3. A set of governance rules to manage the platform and the legal structure of the co-op.

A Common Grammar

This rapid overview of what DAOs, Commons and platform co-ops allows to underline the similarities between these organizational structures and the essential role of active community participation relying on a set of both formal and informal rules. These rules have been studied and discussed and present numerous similarities.

For instance, Ostrom identified a set of 8 Design Principles presented in Table 1.[7]

These principles, while not prescriptive, are often associated with sustainable governance and the causes for failures in overcoming the challenges may be explained by unmet principles. They are accompanied by a set of 7 types of rules, or questions, that allow to describe governance processes for the Commons.

DP1 Clearly defined community boundaries 1a. Clear and locally understood boundaries between legitimate users and nonusers are present. 2b. Clear boundaries that separate a specific common-pool resource from a larger social-ecological system are present.	**DP5 Graduated sanctions** Sanctions for rule violations start very low but become tougher if a user repeatedly violates a rule.
DP2 Congruence between rules and local conditions 2a. Appropriation rules are congruent with local social and environmental conditions 2b. Appropriation rules are congruent with provision rules; the distribution of costs is proportional to the distribution of benefits	**DP6 Conflict resolution mechanisms** Rapid, low cost, local arenas exist for resolving conflicts among users or with officials.
DP3 Collective choice arrangements Most individuals affected by a resource regime are authorized to participate in making and modifying its rules.	**DP7 Local enforcement of rules** The rights of local users to make their own rules are recognized by the government
DP4 Monitoring 4a. Individuals who are accountable to or are the users monitor the appropriation and provision levels of the users 4b. Individuals who are accountable to or are the users monitor the condition of the resource.	**DP8 Mutilple layers of nested enterprises** When a common-pool resource is closely connected to a larger social-ecological system, governance activities are organized in multiple nested layers.

Table 1: Ostrom's 8 Design Principles[8]

Platform co-ops, on their behalf, pledge to abide by the 7 Rochdale Principles as defined by the International Cooperative Alliance:

1. Voluntary and Open Membership
2. Democratic Member Control
3. Member Economic Participation
4. Autonomy and Independence
5. Education, Training and Information
6. Cooperation among Cooperatives
7. Concern for Community[9]

These principles, created for all types of co-ops, are complemented with an engagement to have a fair use of information technology in platform

co-ops. This includes respecting privacy, using open-source softwares when possible, and working closely with creative commons for instance.

Finally, DAOs do not have such a formalized set of rules but because they are developed on blockchains they also respect some key features: notably transparency, automation of decision-making processes and decentralization of decision-making processes with decision often relying on (weighted) voting. Rozas et al. identified 6 affordances that link DAOs and Commons-based governance: tokenization, self-enforcement and formalization, autonomous automatization, decentralization of power over infrastructure, and codification of trust. Their work suggests that DAO-based governance can supplement the governance of the Commons. This report further extends their research to analyze whether and how DAOs can serve as platforms for co-ops.[10]

The relevance of this methodology comes from the fact that a common language and grammar of governance process can be used to design and analyze both Commons and platform co-ops, a kinship that has been identified for a long time.[11]

It is thus relevant to which of these affordances can be used to implement the Rochdale Principles. Note that these modalities can either be classic (encoding into a DAO a rule that is commonly found in other co-ops) or could allow for new modalities, such as regenerative funding (see below). Figure 1. presents this visually. On the left hand side are represented the 8 Design Principles, and the color blocks are the affordances identified by Rozas et al. On the right hand side are the Rochdale principles, and their associated affordances.

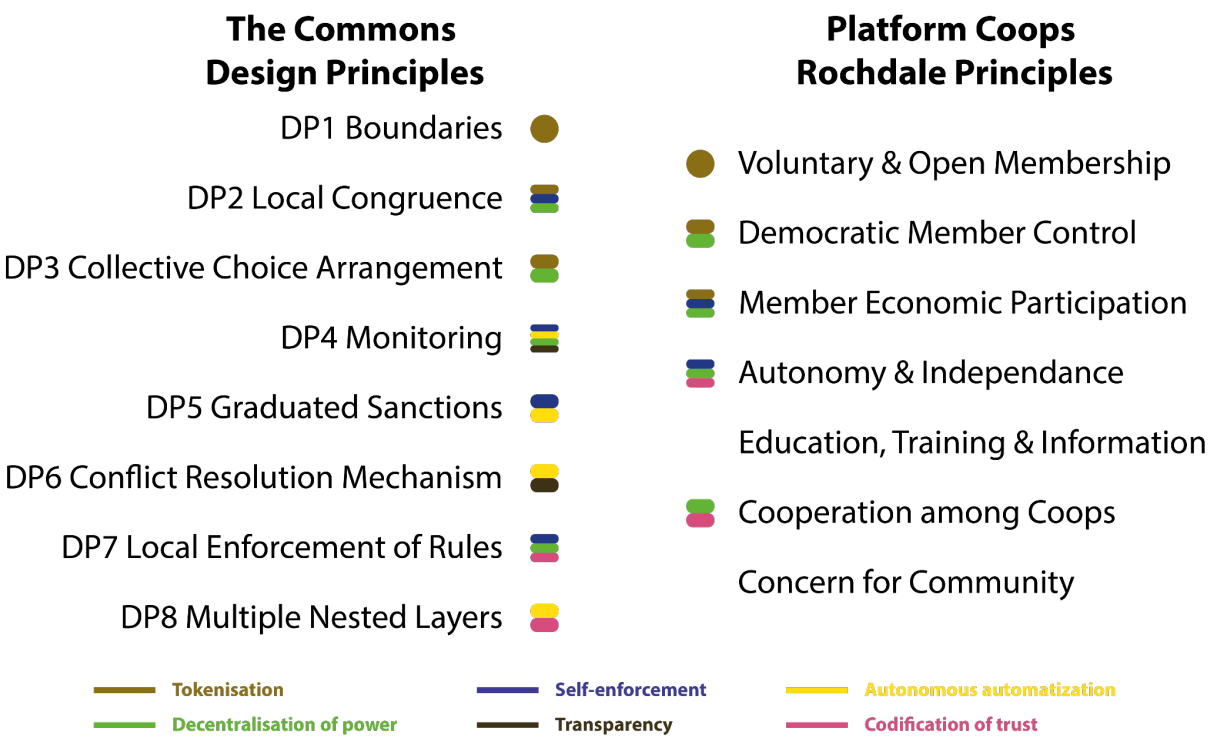


Figure 1: Commons, Platform Coops and DAOs Affordances

There are various conclusions we can draw from this figure. On the one hand, 5 of the 7 Rochdale Principles (number 1,2,3,4, and 6) can be implemented thanks to an affordance of blockchains. Moreover, we can see that there are similarities between the affordance profiles of some Design Principles and Rochdale principles. For instance, DP2 and Rochdale Principles RP3 can both be implemented through the affordances of tokenization, self-enforcement, and decentralisation of power. The same goes for DP1 and RP1, DP3 and RP2, and for DP7 and RP4. Conceptually, we can also bring together the Commons nestedness principle, and the Rochdale cooperation among co-ops principles. While they only share the codification of trust affordance and differ on the other, they are close as they both specify how the community should interact with other communities and be part of a broader network of co-ops and Commons.

These links are summarized and presented in Figure 2, these links are represented by the new gray links. This suggests extending the discussion of the modalities of such an implementation to the case of DAO-based platform co-ops. The next section initiates this discussion. Building on the work presented in my Ph.D., it identifies 5 questions that DAO-co-ops raise and that are already partly answered for the case of Commons governance. This discussion extensively builds on the work of Cila et al. who identified dilemmas caused by DAO-based governance.[12]

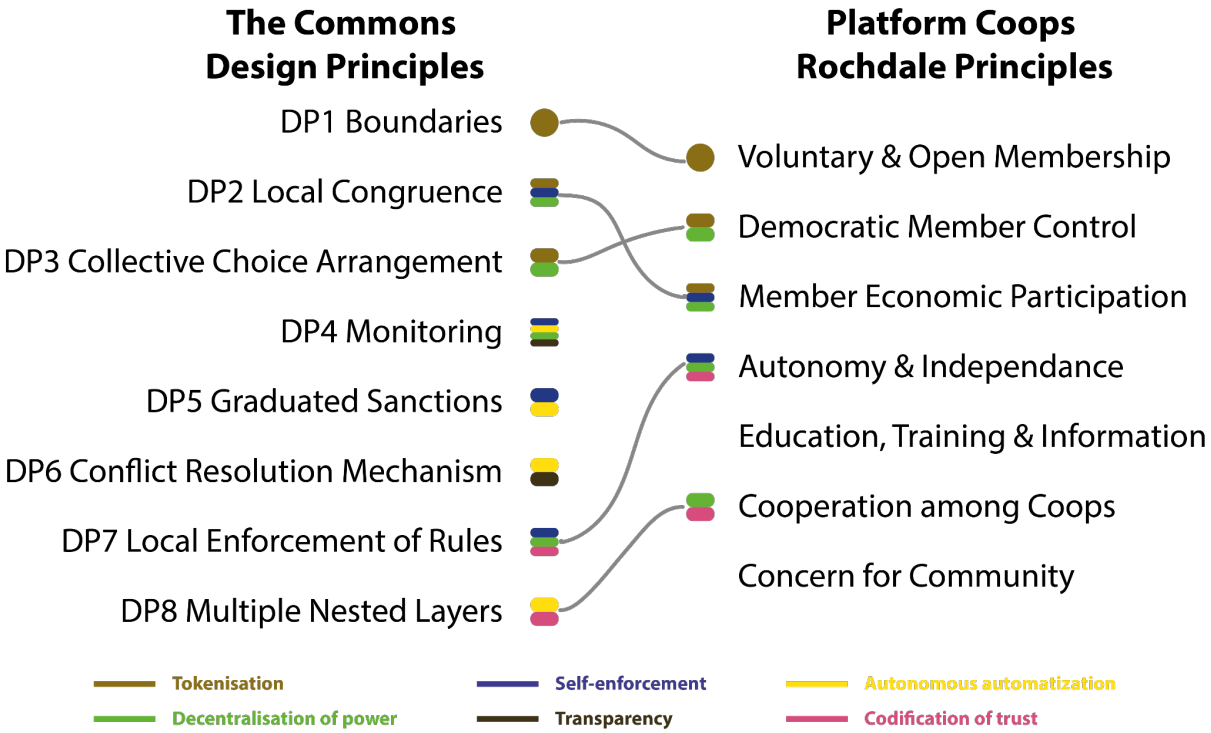


Figure 2 Conceptual Similarities Between the Design Principles and the Rochdale Principles

Contrary to Commons Design Principles, I do not find that every Rochdale principle (consider RP5 and RP7) can be implemented over a DAO. This suggests either that no co-op can be implemented on a DAO or that the Rochdale Principles as phrased traditionally should be reconsidered in the case of DAO co-ops. In any case it underlines the limitations of the analogy and hints at the specific question raised by co-ops and how they diverge from the Commons. The section 4 identifies these questions and discusses them in terms of blockchain affordances and governance dilemmas

Link with existing literature

While not adopting this institutional approach, other scholars and practitioners have already underlined these links. In particular, Nabben et al. thoroughly compared DAOs and platform co-ops, inviting further research on the matter.[13] However, while rich, their approach did not include the issue of the Commons. Most research on the topic takes place outside of the classic academic environment. Numerous blogposts can be found that provide insightful comments and feedback from practitioners. Among them, a medium post by Joan Westenberg, or a paper by Austin Robey put the emphasis on the two-way relationship that exists between Coop and

DAO, which is close to my approach in my Ph.D.[14] What comes out of the existing work is that there are strong synergies to be found between DAOs and platform co-ops. This work takes it as a premise and characterizes further the benefits communities willing to organize themselves as co-ops could derive from DAOs.

Similarly, work linking the Commons and platform co-ops is plentiful but, to the best of my knowledge, the three-pronged institutional work carried out in this manuscript is new. Building on this proximity allows us to quickly summon up resources to advance topical field of research.[15]

3.

LESSONS FROM THE COMMONS

Previous work has demonstrated that recourse to blockchain-based platforms such as DAOs can allow communities to achieve Ostrom Design principles through new modalities of governance processes implementation. These modalities build on the aforementioned affordances and modify some elements of traditional elements of the Commons. Extending this discussion to platform co-ops can contribute to answer two questions:

1. What are the novelties that DAOs allow for or, in other words, what are the governance challenges that DAOs can help face?
2. How is this different from traditional platform co-ops governance and habits?

This section does this through the discussion of 5 questions.

Confidence to restore the conditions for trust?

Recent work has built on Luhmann's distinction between trust and confidence (2000) to characterize blockchain-based governance.[16] On the one hand, trust concerns situations in which someone understands that a risk exists, and it is possible that the person (or system) that one trusts will betray them. On the other hand, confidence refers more to a state of rational expectations. Failure (of the system) may happen but no intentional betrayal. De Filippi et al. show that blockchains provide a "confidence machine", a tool that, through automation, transparency and auditability, provides a framework for extremely high predictability and confidence. In other papers written with co-authors we contend that while this confidence alone is not enough, it can facilitate interpersonal trust and thus restore the social bonds necessary to Commons governance by reducing (though not eliminating) the risks of betrayal.[17]

However, this comes at the cost of relying on a complex IT system that relies on experts to run. Moreover, Cila et al. remind us that while recourse to algorithmic governance can bring certainty and stability, it also implies a trade-off between human and algorithmic governance that has to be explicitly embraced by the worker-owners should they decide to use a DAO.[18] This aspect does not relate to one of the Rochdale principles but rather to a higher degree, referred to as the constitutional level in the theory of the Commons. It is a component that makes it easier to establish agreed-upon constitutional rules in which participants have enough confidence to engage in cooperation. For instance, this could be useful in low-trust environment or in loosely connected communities.

In the case of platform cooperatives, this could apply at large scales where co-owners do not know one another, and wish to formalize the rules of their cooperation and automate them. As discussed below, this may prove useful for the implementation of representation systems and for pay-offs.

The Bundle of rights

Schlager and Ostrom showed that the governance of Commons relied on a continuum of rights that was more complex than private property or the numerus clausus. Rather, they are better defined by a "bundle of rights" with 5 fundamental rights: access, withdrawal, management, exclusion and alienation (see Figure 2). In private property, all these rights are conferred to the owner but the reality of property rights for the management of a Commons or a co-op can be more complex.[19]

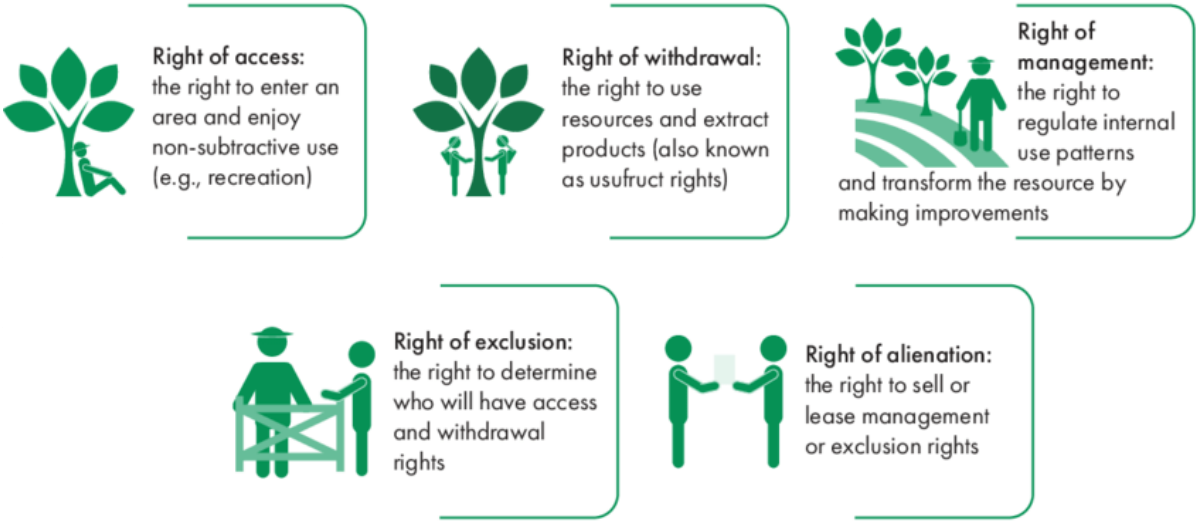


Figure 3: The Commons' Bundle of Rights[20]

In the context of platform co-ops, this continuum of rights is relevant to explore new organizations. For instance, in traditional companies, investors who own the financial capital often own the company. In the case of co-ops, the notion of property and ownership are more complex. Bollier suggested that the Commons could benefit from appearing "Private from the outside, commons on the inside," and DAOs offer a solution to do just this for the Commons.[21] This may be necessary for Commons to fit in a legal category and not be subject to enclosures. Contrary to the Commons, co-ops already have a legal status in many countries and therefore this need may be less stringent. Yet this opens new possibilities for co-ops. Under a unique status of a DAO-coop, a large variety of rules (ranging from

unique private property to direct democracy for any decision related to the coop) and by-laws could be implemented, allowing worker-owners to experiment for new forms of governance within a single legal environment.

Voting systems and decision-making paradigms

Many DAOs offer decision-making tools such as voting platforms. Interestingly, the computational capacity of blockchains make it possible to implement many voting systems or rely on different aggregation methods. While co-ops are traditionally based on one person/one vote paradigm, DAOs have recently experimented with processes such as Quadratic Voting.[22] Token-based voting induces risks of plutocracy, alternatives that allow to adequately take into account the intensity of preferences than direct voting can be tested. For instance, my work on Liquid Democracy shows that a DAO implementation would be well suited to the size and the scope of platform cooperatives.[23] Notably, this may prove useful in the context of very large scale DAOs where participation is relatively low, delegation (per topics) could increase total participation and improve representation. Alternatively, Quadratic Voting with an equal, preset amount of tokens to distribute depending on the topics (eventually mixed with Liquid Democracy), could also respect the equality principle of co-ops while resulting in different outcomes. Similarly with the bundle of rights to which this element is closely related, this enables new modalities of implementation of the second Rochdale Principle (democratic participation).

The question of scales

Blockchains, by design, scale up very well and this is also true of DAOs. Indeed, the protocols are size-independent and anyone with an internet access, anywhere in the world, can participate in a DAO. The formalization of the set of rules can ensure consistency in different contexts and provide unity in various legal settings. Moreover, as mentioned above, it is easy to delegate votes on blockchains which could theoretically facilitate decision-making in large groups. However, my research on Liquid Democracy indicates that this intuition has numerous shortcomings. Indeed, the aggregation of preferences and large-scale governance have intrinsic difficulties that technology cannot solve alone. As with the question of trust and confidence, DAOs can facilitate and trigger new forms of institutional arrangements for co-op to experiment but require a well-designed off-chain governance process that builds on shared social values and a trust (and relies on DAOs for confidence).

John Duda proposed an an extensive review of existing structures for scaling that discusses the existing solutions.[24] Many of them could easily be encoded over DAOs such as the replication, the mission hub (with an algorithmically locked mission) and maybe the most promising, the finance hub, to leverage the financial ecosystem of blockchains to fund co-ops

(more on this below!).

Scaling up or replicating platforms could be enabled by the possibility to fork[1] an existing DAO-coop. Because the code of DAO is openly readable on the blockchain, anyone could copy it and reproduce the model elsewhere. If a diverse enough ecosystem of DAO-co-ops develop, it could serve as a form of ready-made customizable co-op models library, making it quite easy for communities to set up a co-op. This relates to the sixth Rochdale Principle on cooperation among co-ops. Scaling up and forking DAOs on the same blockchain environment make it easier for them to coordinate and cooperate. A DAO-platform network (DiscoCoop) had proposed something similar could be considered as a new template for cooperation among co-ops.[25]

The values dilemma

Cila et al. specifically raise awareness on the management dilemmas when governing a Commons through a blockchain-based tool., These dilemmas are:

1. Economic value vs. Social value
2. Quantified vs. Qualified values
3. Incentivisation vs. Manipulation
4. Private vs. Collective interests[26]

The first three dilemmas refer mostly to the question of digitization and quantification of qualified values (such as shared beliefs, common mission, etc). It is now well known that the way information is quantified and recorded heavily influences behaviors through incentivisation mechanisms. While this can be a powerful tool to achieve quantifiable goals, it can also lead to a lost sense of belonging and make co-ops closer to other forms of co-ops. This issue is particularly stringent as the blockchain ecosystem is strongly associated with financial, for-profit practices.[27] However explicitly addressing these dilemmas can result in positive action and the acknowledgement of underlying premises which ultimately results with fairer working practices. In that regard, the example of DiscoCoops that actively seeks to reward care work is particularly interesting.

1 Forking a blockchain is splitting the blockchain into two different ones that then have different futures

In line with the points discussed above, it is also recommended to include backdoor safety mechanisms or human-based dispute resolution mechanisms to account for the likeliness of bugs and unforeseen situations.[28] As for the aspect of trust/confidence, this element concerns a larger constitutional environment rather than one specific principle. It refers to the values that form the social contract cementing cooperation among member owners

Thus, what we've learned from the Commons is that using DAOs as platforms to coordinate or provide a service for co-ops does make it easier for co-ops to work in situations relative to traditional platforms or cooperative organizations. Blockchains and DAOs have affordances that are suited to the implementation of co-ops, in particular, the capacity to transparently and safely automate decentralized governance processes, bringing confidence in the system. The flexible implementation of rights and tokenization, combined with innovative voting systems allows for the experimentation of new governance methods which could bring more participation, better account of the intensity of preferences or reduce the costs associated with scaling up as all the processes are already encoded within a single platform. However, recourse to such platforms implies trade-offs and dilemmas and bring complexities. In the case of Commons, I recommended not to use DAOs in situations where existing, simpler solutions existed. In the case of platform co-ops, things may be a little different. DAOs make it possible to experiment new forms of governances and facilitate the implementation of new modalities of some of the Rochdale Principles but do not necessarily apply to all of them. Moreover, there might be some advantages for co-ops to adopt DAO models even if other simpler alternatives could work, notably for funding reasons. The analogy with the Commons thus ends here and the following section explores the specificities of platform co-ops.

4.

THE CASE FOR DAO CO-OPS

While the overlap with the Commons provided insightful elements, platform co-ops have specificities. Notably Figure 1. indicated that the Rochdale Principles #5 (Education, Training and information) and #7 (concern for community) do not have an equivalent in Ostrom's Design Principles. Moreover, the financial aspect is different for platform co-ops and Commons where the resource often necessitates less funding. This section investigates these specificities.

The Rochdale Principles and DAO Co-ops

As mentioned above, it would seem that DAO co-ops do not allow to implement the two Rochdale Principles that rely deeply on the community (RP5 Education, Training and Information, and RP7 Concern for Community). We must thus draw one of the two following consequences: it is either impossible to solely rely on a DAO to meet the 7 Rochdale Principles, or these Principles have to be adapted to the case of web3. Before discussing these two alternatives, let me insist once more that this refers to a very important element of blockchains and DAOs. As technological innovations, they offer a substrate to develop new tools and offer new perspectives of collaboration, however they are nothing more than very sophisticated mediums of communication and automation and cannot substitute for what makes the gist of human relationship, notably trust and concern for community. It is therefore paramount to explicitly consider, at the design stage, how social protocols will support them or, in other words, how to ensure that the community remains at the core of the co-op project.

Achieving the other Rochdales Principles

When studying the implementation rules of the Commons, we underlined that the information rule was the one that was the less likely to be affected by a blockchain-based implementation.[29] This is also the case for RP5&7. In line with the previous conclusion, DAO-based platform should devise a off-chain training and information program to strengthen their communities. What a DAO allows for is to dedicate certain funds to finance training (in the form of colored coins for instance), and therefore incentivize training for member-owners. It can also reward certain behaviors such as content/knowledge production as mentioned above in the case of DisCoCoops. However, the most significant contributions of blockchains in the world of platform-co-ops are not to be expected in these principles.

A careful articulation between off-chain processes to promote education, training and concern for community and on-chain DAO rules must thus be designed. In this regard, I contend that, in co-ops with a strong community focus, the automation brought by DAOs should always require human

validation. A common mechanism to validate data or transactions in the blockchain world is multi-signature, where at least k people out of n (with arbitrary conditions) are required to endorse an order before it is executed. This would allow for a collective oversight of the automated process ensuring the adequation with the broader purpose of the co-op (such as community empowerment).

Oftentimes, DAOs use reputation or badge systems to incentivize certain off-chain behaviors. Although this may sometimes prove useful, it may frame behaviors and result in undesirable practices such as reward hacking in what is known as Goodhart's law. This is a frequent problem in behavioral economics, when the introduction of a reward system tends to alter the system it was designed to reward. This issue is discussed more thoroughly in the case of DAO-based Commons by Cila et al. (2020)

Overall, in the case of workers-owners with a strong community focus, moving the whole co-op infrastructure on a DAO may not be beneficial. This is not to say that DAO cannot be useful for such co-ops but rather that their scope should be limited and integrated into a broader institutional environment. The following sub-section explores how this could allow to benefit from funding sources. Before turning to this point, let us discuss briefly the case of more loosely connected co-ops.

Towards Web3 Rochdale Principles?

The term 'cooperative' covers an unimaginably large realm of realities. So far, most this report has focused on the case of worker-owned cooperatives, however, consumer-cooperatives also exist and have slightly different challenges. For instance large consumer co-ops such as Co-op in England have more than 17 million owners (about 30% of England's population) and the governance and goals of such a large-scale co-op differ from those of a small worker-owner co-op.

The previous section has shown that DAOs allows to imagine new institutional models and, in this case, the way the Rochdale principles are phrased may not be suited to these DAO-co-ops. Let us distinguish two different types of DAO-enabled co-ops:

- The first one concerns co-ops made of communities that would have engaged in a co-op independently of the technology at hand and for which DAOs are facilitators. It is used because it is the most handy tool but could be replaced by another technology.

- The second is the case where the nature of the co-op is intrinsically linked to the DAO. In these cases, the rationale behind the co-op is to use an automated, distributed technology. This is likely to happen to digital free-lancers for instance, or for a web3-oriented co-op.

So far, the elements discussed in this report applied indifferently to both these cases but we must now consider them differently. For the former type of co-ops, the conclusions of the previous subsection apply. However, for the latter, the RP5&7 would need to be rephrased. The community is brought together by DAO and wishes to organize as a co-op. The classic sense of community must be reconsidered and all the principles may need to be revised. This requires a collective effort but we can already point out to some of the elements that could come in such a revision:

- RP1 Voluntary and open membership: Pseudonymity on a blockchain may make this principle irrelevant. However, the question of dencetralized identities raises many challenges. A phrasing encompassing these questions may be relevant.
- RP2 Democratic member control: this element does not require much change.
- RP3 Member economic participation: the possibility to create different sorts of tokens modifies the traditional sense of economic participation. If several tokens of the same DAO are valued, this principle should include all the tradable assets associated with the DAO.
- RP4 Autonomy and independence: interestingly this principle may not be relevant in the case of DAO-co-ops as, by definition, DAO are autonomous. However, the Guidance Notes to the Co-operative Principles state that co-ops must be “controlled by their members”. As DAOs can have a form of algorithmically predetermined governance, a new RP4 may need to frame the scope of algorithmic governance.
- RP5 Education, training, and information: this principle not hold in the case of DAO-co-ops. Members may still be encouraged to engage in outreach but the possibility of pseudonymity makes it hard to apply. Rather than a principle, this could be phrased as a recommendation.
- RP6 Cooperation among cooperatives: It may be relevant to insist that, when possible, DAO-co-ops should contract with other DAO-co-ops, creating a network of co-ops on blockchains. Otherwise, mak-

ing sure that an off-chain company is a coop, requires an oracle. The role of the ICA could be extended to provide such an oracle.

- RP7 Concern for community: I believe this principle to have no counterparts..

Coming up with this web3 version of the Rochdale Principles is tricky because it is a fine line between trying to include some of the legitimate DAO-co-ops projects and denaturing the spirit and the core values of coop. It is not immediately clear that such a revision should be undertaken if it leads to the massive legitimization of DAO projects, regardless of whether they really make an impact on the owner's lives.

Lessons from the Co-ops

At the recently held 2022 PCC Conference, in the panel dedicated to DAO governance issue, we were asked whether we knew of any ongoing projects that we could recommend as a model. Interestingly, while we did mention a few projects, we all said that it was too early to really provide an answer. This is indicative of our mandate to act with caution as there are no satisfying examples to base to revision of the Principles on. Conversely, co-op governance is a time-proven process that can help design DAO organization. The aforementioned panel was entitled Can Coops Solve DAO's Governance Issues? which suggests that the way to go is not to rephase the RP ex-ante but rather to draw inspiration from the existing one to design efficient and fair DAOs.[30]

With enough hindsight on these projects, the way to go with the revision may appear more clearly. We also closed the panel by insisting that DAOs were not a panacea that would help develop more co-ops. Rather, people should be wary of this technology and only use it if it can bring a substantial improvement over more standard technologies. As we noted it elsewhere, DAOs are a pharmakon, "it can be a remedy or a poison".[31]

In my research on the Commons, I showed the relationship between DAOs and the Commons worked both ways and that while blockchains could enable new modalities for the implementation of the governance rules following the Design Principles but the converse knowledge transfer was also important. Experience from the Commons can really inform governance of blockchains, both at the infrastructure and at the DAO level. Figures 1. and 2. indicate that there are similarities between governance processes

of the Commons and co-ops, which shows that DAOs can also benefit from lessons from the Coops. This leads to a three-way relation-ship depicted in the Figure 4.

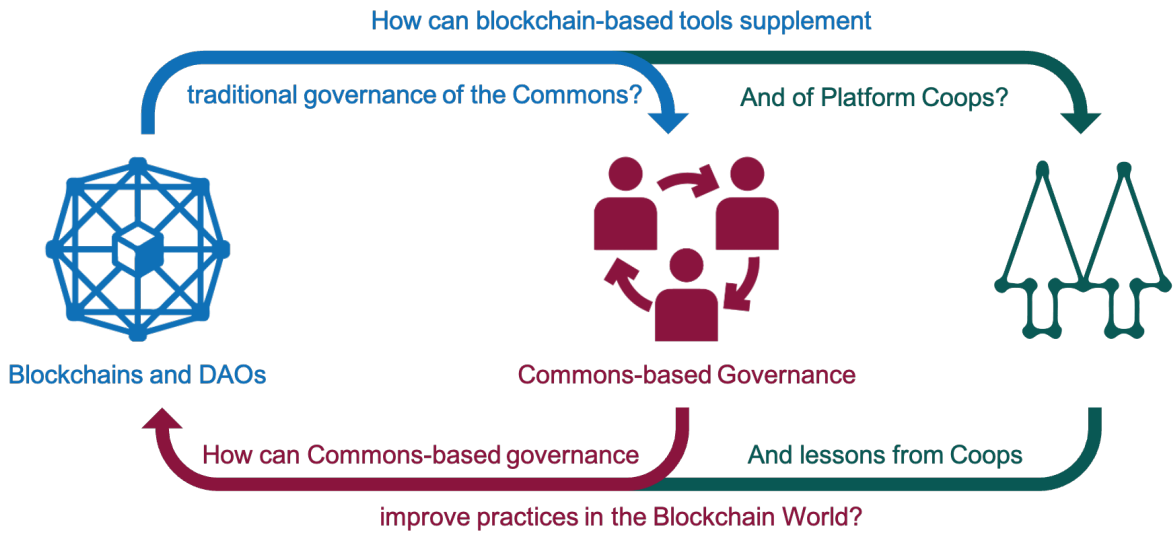


Figure 4: A Two-Way Knowledge Transfer

Contrary to the Commons, co-ops have a financial purpose that make them closer to the spirit of DAOs. In my previous research, I noted that the Commons came short of providing a framework for the management of financial assets in DAOs. Co-ops could, in turn, be more relevant in this case. The dilemmas mentioned earlier would still apply but co-ops provide a framework to solve the management dilemmas listed in the section 3. In such a way, co-ops can act as the missing link to help resolve the dilem-mas that appear when managing Commons with DAOs.

Exit to worker communities

Another interesting opportunity offered by DAOs is to make 'exit to com-munities' or rather 'exit to workers' easier and rely on hybrid forms of gov-ernance. For instance, this could be in the context of workers organizing to take over a firm that had to declare bankruptcy. This practice is particu-larly frequent in Argentina where it is called "recuperación de empresas" and more than 400 companies are listed as being recuperated by their workers in the form of cooperatives.[32]

DAOs are particularly well-suited to redistributing the rights and the own-ership to token holders. However this is made complex by the fact that the original company must have already been pegged to a DAO which seems unlikely.

Rather this could lead to new hybrid forms of companies. As mentioned above, it is sometimes difficult for co-ops to attract funding in the early stages. One could imagine a company that would start in a somehow centralized way but that automatically exit to workers after some time (or after any given conditions). This would prevent the initial CEO holding onto its power while benefiting from initial investment for instance.

This approach may diverge from the original co-op principles and certainly requires further consideration but illustrates the new constitutional arrangements allowed by the recourse to DAOs. It is also a direction to consider in the exploration of web3 co-op principles.

Before reaching the conclusion of this report, there is a final point to discuss: the opportunity to access funding through decentralized markets and crypto-currencies. The previous sections addressed the affordances of blockchains from a technical standpoint and focused on their technical specificities. The access to funding relates more to current trend rather than on the technology.

Funding and harnessing the DeFi Manna

Because they are owned by their members, it is hard to get traditional funding for co-ops. While traditionally firms offer shares for capital investment, co-ops cannot do this and are less attractive to investors in search of profit than other companies. Parallelly, the capitalization of blockchains has briefly reached a staggeringly large €2.8 trillion in November 2022 before stabilizing slightly below €1 trillion after a dramatic drop.[33] Although rather unstable, this market value provides largely untapped financing opportunities.

This illustrates how attractive blockchain-based projects are to investors. While this may not be a “intrinsic” reason for a co-op to use a DAO, if it helps secure funding and kickstarts the project, it may be a sufficient one.

Moreover, DAOs, tokens and crypto-currencies offer funding opportunities of their own. Crowdfunding and investment are at the origin of history of DAOs (see the infamous example of theDAO (DuPont, 2017)) and this practice remains common in the DAO ecosystem. In particular, there are increasingly more projects that aim at redistributing the benefits of Decentralized Finance (DeFi) to fund public goods. The most famous one is GitCoin, and some of this money could go in funding co-ops around the world. One particularly interesting project is Regenerative ICOs. A recent

'Proof of Concept' on the matter received an ERC PoC Grant[2] to develop a platform to fund cooperatives through capped investments and 'Initial Coin Offerings' that deliver debt tokens that get burned after being paid back and do not provide governance rights to the DAO. This prevents uncapped profits on initial investments, reduces the risks of capital centralization. The creators of the Proof of Concept suggest that while capped investments have generally failed in the existing legal systems because of red-tapism, and important constraints that will not be reproduced in smart-contracts that can bring secure funding through automation.

However, the crypto crisis of the fall of 2022 indicates that, as appealing as it may seem, this funding opportunity is particularly subject to the context and subject to dramatic changes which have led to massive losses and bankruptcies. Caution should thus be exercised to avoid this risk and preserve the autonomy and independence of co-ops (RP4).

2 An ERC PoC Grant is a grant dedicated to bringing results of academic research closer to the the market in order to make theoretical findings more operational. In this regard, the Regenerative ICOs are currently under development to be launched and used rather than to remain an abstract idea.

5.
CONCLUSION

This report contributes to better our understanding of the potential of using blockchain-based tools as platforms for cooperatives. While this is a topical issue in the co-op environment, many questions remain open. In particular, while it is now widely accepted (and experimented) that DAOs can be platforms for co-ops, the new modalities of governance they allow for are not perfectly identified.

As platform-co-ops share many features, this report builds on these similarities to extend the conclusion of existing research on DAO-based governance of the Commons to platform co-ops This approach is justified in the second section that shows that not only do Commons and co-ops share very close definitions but also best practices principles (Ostrom Design Principles and the Rochdale Principles). An institutional framework is then adopted to carry out the comparison. In the third section, the analysis of five elements indicates that a DAO implementation of co-ops could facilitate coordination in a low trust environment, and allow for the experimentation of innovative constitutional arrangements. The features of these arrangements are assessed against the Rochdale principles. The risks inherent to the use of complex IT systems are also recalled.

However, the lessons from the Commons only have a limited scope for there are elements of co-ops that distinguish them from Commons. In particular, the fifth and seventh Rochdale principles don't have equivalent in the Design Principles per se and require dedicated attention. One of the significant difference comes from the fact that, in the literature on the Commons that it builds on, the Commons and the DAO are two separate entities and blockchain-based tools are a support to govern an external resource. In the case of DAO-co-ops, the resource and the governance tools are both the DAO which brings both challenges and opportunities. Discussing these modalities makes it apparent that the traditional understanding of what a co-op is may not apply to DAOs. The question of the evolution of the Rochdale Principles in Web3 is also largely addressed in the section 4. It also illustrates how worker-owners can potentially use this DAOs to tap into blockchain-specific funding opportunities while preserving their ownership of the cooperative.

In the end, we can summarize the results of this three-pronged study of the DAOs, the Commons and co-ops in the following way:

- There is a structural similarity between the governance systems of the Commons and of co-ops which both rely on modalities implemented to match principles.
- This similarity implies that the existing work on the relationship between the Commons and DAOs can be extended to co-ops. In

particular, it allows us to identify the blockchains affordances that can be used to meet the Rochdale Principles. It also allows us to see that some principles cannot be achieved solely through the implementation over a DAO which stands in contrast with the results for the Commons.

- This indicates DAO-co-ops form a distinct form of co-ops that is not perfectly described by the traditional definition of co-ops. This raises the question of whether new principles are required.
- Yet, the lack of an existing satisfactory ecosystem of DAO-co-ops to base this revision on hints that we are still somehow far off such a work. On the contrary, it is already clear what the experience of co-ops can bring to help solve the governance challenges DAOs face.
- Lessons from the cooperative world could also help mitigate the dilemmas that are likely to emerge when managing a Commons with a DAO. As co-ops are experiences in sharing value and aligning behaviors to promote social welfare, it could be beneficial.

These lessons are visually summarized in the Figure 5. below.

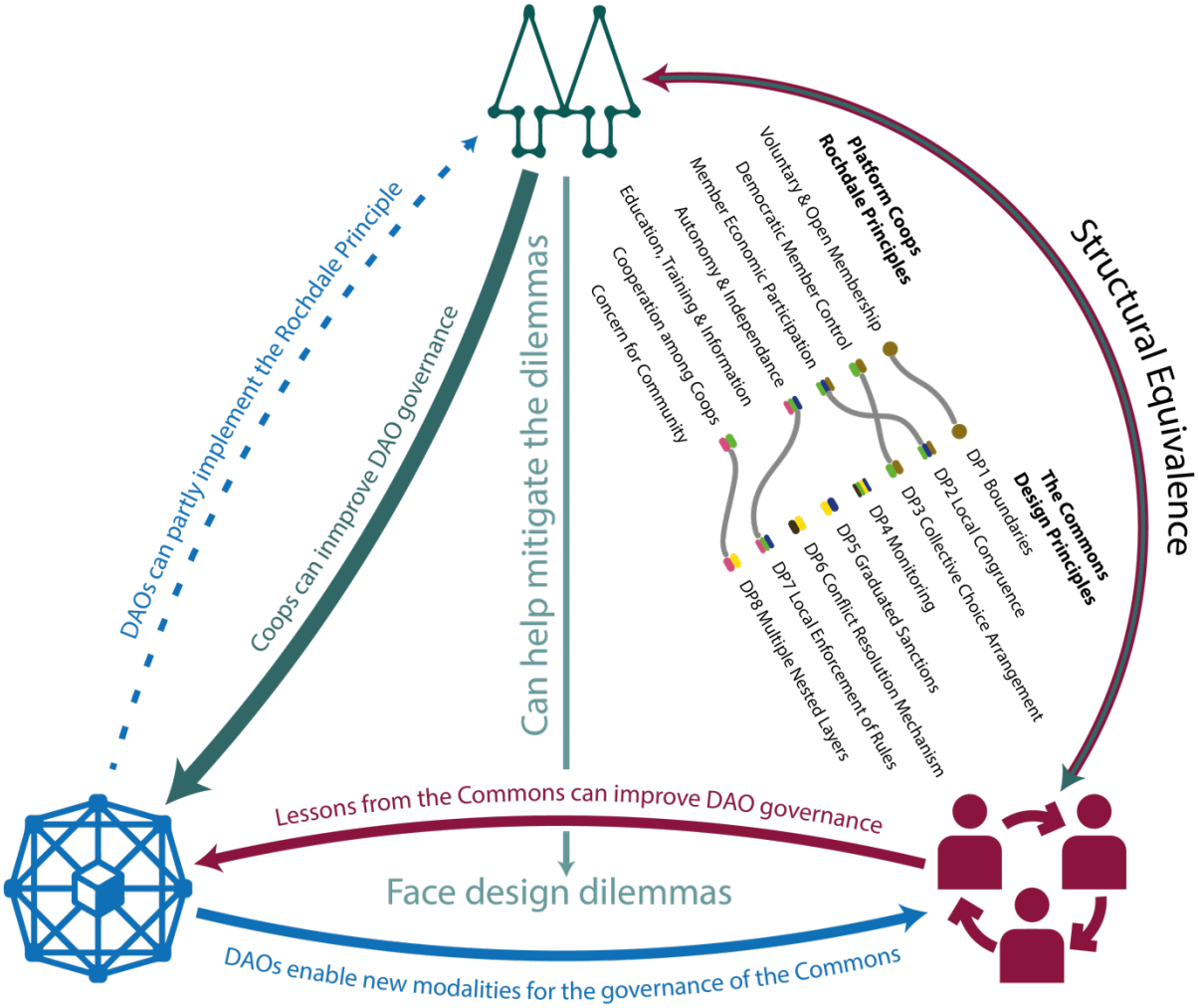
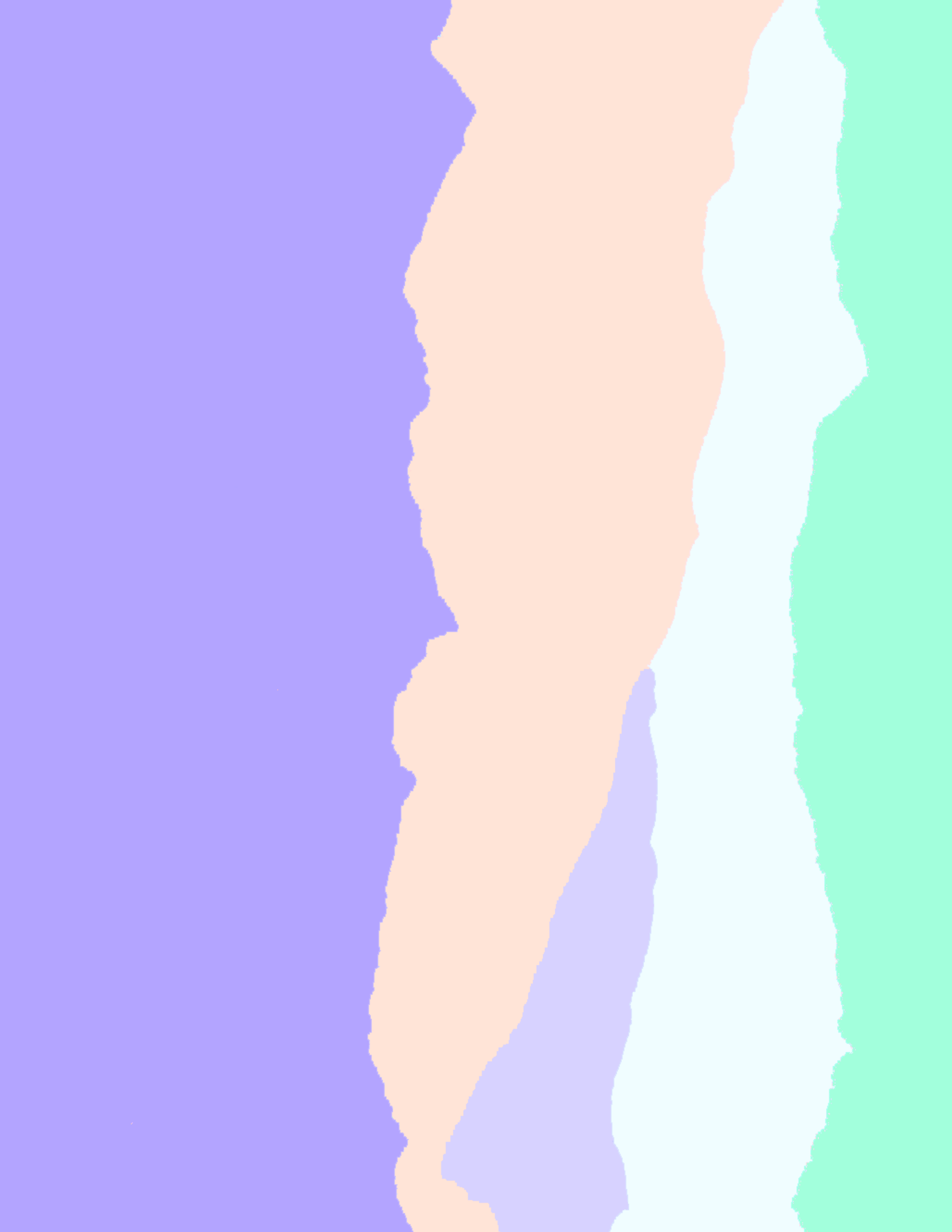


Figure 5. Interaction between the Commons, Coops and DAOs

Generally speaking, this report should only be considered as one brick in the large research program. Notably, I have mentioned the legal questions surrounding the status of DAOs, an essential question to understand whether DAOs are likely to be widely used. This is an active research question with, for instance, the work of the COALA group providing insightful elements.[34] Another element that we mentioned and that requires much more thought is the two-way relationship between DAO governance and platform co-ops. Co-ops have been around for over 200 years and have found ways of solving coordination and governance issues that could benefit DAOs. While this report has mostly focused on using DAOs as platform of co-ops, similarly important work awaits us in the other direction.

Finally, this report remains rather theoretical, and the natural next step would a practical case-study. Considering how new this is, there is little doubt that we will see initiatives and experiments flourish in the next few months that will provide invaluable knowledge and contribute to promote the model of cooperatives as an alternative to extractive capitalism.



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