

A call for decentralized governance of fair ecosystems

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Introduction

Over the past decade, we have seen the rise of many centralized ecosystems. Examples include Facebook, Amazon, Google, WhatsApp, WeChat, Uber, and many more. We call these *centralized* ecosystems because they are controlled (a.k.a. governed) by companies after which the entire ecosystem is named. The controlling party usually takes an intermediate position and plays the role of trusted party. Often this leads to situations such as exceptional profit, high transaction costs for suppliers, and high switching costs so that the controlling company effectively has a monopoly, easily leading to economical disbalance in society. We refer to this phenomenon as value extraction; parties wringing out an ecosystem, rather than that everyone acting in the ecosystem is winning.

Value extraction is not in the interest of societies in general, and also not beneficial for many of the parties in the centralized ecosystem. Some countries react on this trend by fining the controlling actor in the ecosystem. In contrast, we argue that societies should develop decentralized ecosystems, including a fair distribution of decision power over the affected stakeholders in the ecosystem, such that no actor can take a too powerful role. Specifically, the governance of ecosystems should be fair and decentralized. We position blockchain technology as a tool to support decentralized governance, but also argue that with respect to decentralized governance, most blockchain technologies are only in their preliminary phase. To be really useful, blockchain systems should support on-chain governance in such a way that it is comprehensible and transparent to all parties involved.

Ecosystems and platforms

We define an *ecosystem* as a system of economic actors that depend on each other for their economic survival and well-being (Kaya et al. 2020). Any company, not-for-profit organization, or government is part of at least one ecosystem. For example, the energy ecosystem consists of generators, distribution- and transportation companies, parties providing metering services, and obviously end-users, either companies or households consuming energy. The music ecosystem comprises creative entities such as artists and text- and song writers, producers, radio- and television stations, restaurants and bars, intellectual property right societies, and people who listen to music. The above ecosystems are much more complex in reality, both in terms of participating actors as in terms of the products and services offered and requested.

A platform provides the *infrastructure* for an ecosystem. We view the platform as a construct that provides (reusable) products or services to ecosystems. Similarly, a platform may use products or services from other platforms. Take for example Android, the operating system for mobile phones. The Android platform provides services by offering an Application Programming Interface (API) to apps such as Facebook, LinkedIn, Google mail, etc. Part of the services of the Android platform is also directly available to the end user, e.g. the included Chrome web browser. Moreover, the Android platform uses hardware platforms, such as managed by Samsung, Sony, and many Chinese hardware manufacturers. Note that a platform itself is also an ecosystem. In the case of Android, it is very well possible to state the participating actors, and the products and services they offer to each other.

The trend of centralization

Many companies do, or have the ambition to, run a platform, and effectively become the middleman between parties. Over the past decade, we have seen a trend towards *centralized platforms*, which we define as platforms in which a single actor plays a controlling role and, typically, takes a significant amount of the total profit. There are many of such centralized platforms, including Facebook, LinkedIn, Google, Twitter, Uber, Airbnb, Netflix, Amazon, and many more. We have analyzed a number of these centralized platforms and a pattern can be observed. Most centralized platforms have the ambition to have a global market, and in fact want to have a monopoly in that market. To achieve this goal, usually exceptional high investments are needed to take most of the market share. Also, sometimes products or services are offered for cost price or even lower, to attract customers and to destroy the competition. In other cases, suppliers of the platform are encouraged to contribute in return for high fees. After a number of years, when the competition is reduced, customer prices can be increased and supplier fees may be reduced. Once this happens, the platform owner makes a substantial profit (margins > 30% are not unusual), and often the profit is not proportional with the value created. We call such parties *value extractors*, indicating that the earnings are exceptional high in relation to the contribution to the ecosystem.

Value extraction is beneficial for the platform owner, but not always for the customer (he pays a too high price) and suppliers (they are forced to offer their products and service too cheap). It is also doubtful if the monopolistic strategy is beneficial for society as a whole. It may reduce choice for customers significantly, not only in terms of possible sellers, but also in terms of alternative products and services available. In other cases, there is tax avoidance, while the company at hand still benefits from the infrastructure in a country. The centralized platforms also control the terms and conditions of their platform. This may lead to undesired situations too, for example in the case of content-driven platform where censorship lies in wait. All in all, centralized platforms may lead to excesses and ultimately 'digital colonialism'.

What to do about it?

What to do about centralized platforms? The European Union (EU) for example fines large US tech firms. The effects are however doubtful. Although the fines, in absolute terms, are serious, they seem not to harm the fined party that much. We argue that a more positive action is needed, namely the stimulation of so-called *fair decentralized ecosystems and platforms*. With respect to ecosystems, and thus platforms, we make the distinction between the *operation* of the ecosystem and its *governance*. We define governance in an ecosystem as the set of rules a system has to obey, and which are set by another system (Kaya et al. 2020). This needs some clarification. In centralized ecosystems and platforms, there is only one actor in the governing role, namely the platform owner. Perhaps the shareholders govern the platform owner in turn, but this is usually driven by shareholder value, not always in the interest of society, and also a matter of *meta-governance*. As there is only one governing actor, decision making, e.g. about new rules, is easy. A single enterprise such as Amazon or Google simply can employ *hierarchical decision making*; In the end, the CEO decides. In a decentralized setup, there is more than one party in both the *operating* ecosystem (producing the actual economic value), as well as in the *governing* ecosystem. The latter ecosystem defines rules (and perhaps even legislation) the operating ecosystem has to comply to, and monitors compliance. Monitoring may lead to revised rules. If needed, incentives in terms of rewards or penalties can be given to stimulate desired behavior. In terms of decision making, a decentralized ecosystem needs to employ some decision model that takes into account the different interests of the participants. There are many of these decision models possible, including voting with many variations (majority vote, delegated vote, rotating vote, etc.). Equally important however, is the decentralized process

that leads to a decision, e.g. orientation on the subject matter, taking a position, perhaps after consulting others. This usually takes the form of a negotiation process.

We argue that fair ecosystems require *fair decentralized governance*. In other words, if the governance structure is fair and decentralized, the operating ecosystem will be fair too. Inspired on (Graham 2003 et al., Sheng 2009), decentralized governance is fair if it satisfies a number of requirements. First, all affected participants should be actively involved in the decision process. This is not always easy, most often due lack of knowledge, interest, knowledge or time. Consequently, in many democracies, there are elected parties who represent a large group of stakeholders. Second, all participants should be treated equally. This should be safeguarded by a balanced set of rules. Third, information needed to make a decision should be freely, timely, and transparently available to parties in a digestible form. Fourth, the governance process should be timely, meaning that decisions are made within an acceptable timeframe. Fifth, the decision model used should strive for consensus. Sixth, all participants should be accountable for their behavior, e.g. meaning that there is a transparent trace of their actions.

If fair decentralized governance should serve as an alternative for the centralized governance by many US tech firms, governance should not only be defined in terms of parties, rules (and legislation), incentives, decision making procedures, etc., but should also be supported by technology, to cope with the fast-evolving Internet enabling centralized competitors. Blockchain technology is a distributed technology solution that may support decentralized ecosystems. Many blockchain projects have been developed, but only few are successful (Trujillo et al. 2018). We claim that the reason for high failure rate of blockchain projects is that most of them do not remove, or at least reduce, the role of the middlemen. As a distributed technology, blockchain is very expensive, both in terms of design and operation, and hence can only justified by very large benefits. Also, there might be a shift of benefits from the one actor to the other, e.g. by a disruption in the ecosystem. One such a disruption can be the reduction or removal of a centralized platform actor, e.g. a transition of eBay to a fully decentralized market place (OpenBazaar 2019) where matching and price formation is completely decentralized; hence no single enterprise can take the powerful position of deciding upon matches and prices.

In the above example, the operations of an ecosystem are decentralized to avoid that one actor can dominate the ecosystem. However, the rules, e.g. with respect to decentralized matching and price formation, need to be set by someone too, and this is how the real fairness happens. We consider rule setting and checking for compliance as an important task of the decentralized governance ecosystem. Therefore, we state that if blockchain technology is used to support a fair decentralized ecosystem, preferably that same technology should also support fair decentralized *governance*. We have done an analysis of three decentralized blockchain platforms (Jairam et al. 2021), namely Bitcoin, Ethereum, and Tezos with respect to decentralized fair governance. The governance processes of the Bitcoin ecosystem, and to a larger extent the Ethereum ecosystem, involves only a small group of participants, as compared to the number of users in the blockchain technology itself. This is a sign that, although the ecosystem is from an operational perspective is fully decentralized, it is not from a governance point of view. Also, the process to arrive at a decision is at best informal. Tezos (Allombert et al. 2019) is a blockchain platform with on-chain governance, meaning that the governance processes are supported by blockchain mechanisms such as transactions and smart contracts. Such contracts provide a more formal foundation for the expression of governance structures but they are still in an initial phase. Another trend is so-called Decentralized Autonomous Organizations (DOAs). The Effect Network (TEN, <https://effect.network/>) is a DOA that focusses on offering a scalable workforce (e.g. mechanical Turk services) by using the EOS blockchain technology.

These DOAs have implemented decentralized governance as a series of smart contracts on the blockchain, including the required decision-making logic.

Although we think that on-chain governance is the way to proceed, the challenge is to develop governance constructs such that every interested stakeholder can participate and thus can understand. Currently, governance of blockchain-enabled ecosystems requires too much (technical) knowledge of the blockchain programming languages at hand. To solve this, we develop the DECENT (decentralized) governance ontology. It provides a series of intuitive concepts to describe various aspects of decentralized governance. The ontology can be extended with high level modelling languages such as the Business Process Modelling Notation (BPMN) and *e³value* for modelling the economic value aspects of the ecosystem at hand. The ambition is that such semi-formal models can be used to generate smart contracts for on-chain blockchain platforms such as Tezos, or DOAs. By offering graphical conceptual modelling techniques to express governance solutions, we anticipate bridging the gap between technology-oriented smart contracts on the one hand, and business requirements on the other hand.

Conclusion

Many companies strive for a centrally led ecosystem. For the company at hand, this might be beneficial, but as it can easily result in value extraction, it is not in the interest of society. Rather than fining the well-known centralized platforms, a better approach is to develop viable and moreover fair alternatives, organized as decentralized ecosystems, where decision power is well balanced. Blockchain technology can be play an enabling role here, but there is work to do. First, blockchain systems should provide rich support for decentralized on-chain governance. Second, expression of governance structures should be closer to the end-users, rather than requiring in-depth knowledge about distributed systems programming. High-level, graphical modelling languages can help here, provided that automated translation of models in these languages to smart contracts is supported.

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