THE DIGITAL ECONOMIST

Position Paper Series

Centering in on Decentralized Governance

Applying Elinor Ostrom's Design Principles to Blockchain Technologies

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July 9, 2021

The current pandemic crisis has painfully demonstrated how vulnerable and fallible top-down hierarchical systems are. Agility demands more flexible responsiveness among actors. The concept of decentralized governance, though not new, is more relevant than ever. To be sure, it will require real-life implementation, despite incomplete knowledge in some areas, and ongoing fine-tuning. But the time is ripe to leverage the benefits of decentralized structures that can take on different shapes and purposes depending on the need of the hour.

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Executive Summary

Decentralized governance has great potential to optimize security, efficiency, cost-effectiveness and accountability in public, societal and corporate domains. Up to now, however, decentralization has faced insurmountable technological challenges in terms of distributing authority – systems generally revert to a central authority or become dysfunctional.

Thanks to blockchain technology, this is changing. A system of algorithm-based distributed consensus makes it possible to create a non-hierarchical and equal society in which users are incentivized to participate in decision-making and verification processes. As parties using the blockchain do not need to trust a powerful third party to act in their best interests, there is no need for central authorities or intermediaries. Despite these relatively well-known benefits of blockchain-based decentralized governance, it has remained a vision, with few real-life use cases. This is due to a large extent to the inherent difficulty of managing assets whose ownership is not clearly allocated – stakeholders typically do feel responsible for property shared by a plurality (The Tragedy of the Commons). Based on Elinor Ostrom's design principles, this can be overcome and decentralized governance put into practice on a large scale.

The Power of Decentralized Power

A recent Forbes article (Wintermeyer, Lawrence 2020) makes a strong case for a blockchain-based decentralized digital identity. It would allow governments and enterprises to collect, verify and manage citizens' personal data, replacing the fragmented storage systems and databases governed by centralized authorities. A digital identity would serve as a "passport," enabling convenient and secure travel between digital platforms with no need to create a new user account and prove our identity. The author cites a survey of US users, which found that they had an average of 90 online accounts each.

Beyond enhanced ease of use, a blockchain-based decentralized identity system would protect these sensitive data with digital signatures and zero-knowledge proofs, safeguarding the information against theft or loss. In voting processes, these properties could resolve fraud issues and allegations, as digital signatures are completely secure, acting as a timestamped confirmation that a vote has been cast. This proof could be viewed transparently on the blockchain, without identifying the individual. In addition, the record of the vote would be immutable, impossible to change after the fact.

Source: 9to5Mac

A further point the article makes is that a decentralized digital "passport" could prevent many of the difficulties encountered in the disbursement of pandemic-relief funds. In the US, these were partly calculated based on income taxes paid in the past. As different government departments shared individual records, the process became not only inefficient, but may have led to errors in calculating the amount to which an individual was entitled. "A single, blockchain-based identity record could overcome these challenges by providing a single point of truth for departments," the article states.

This is a compelling argument, yet decentralization has so far failed to materialize on a large scale. In the case of Bitcoin, for example, governance is far from the original ideal of decentralization. Transaction submission and validation, as well as protocol updates, are governed in a rather centralized manner. Decision-making power is costly to acquire and exercise, often requiring expertise, reputation, time or money. The higher these costs, the narrower the participation.

These hurdles can be overcome. Decentralized, blockchain-based platforms can be leveraged to allow individuals and communities to redesign their interactions in politics, business and society, with unprecedented disintermediation and freedom from reliance on central authorities. But it won't happen by itself. This process calls for in-depth experimentation and implementation. We cannot expect those in control of value and information to relinquish that control voluntarily.

Tragedy of the Commons

At the heart of the problem lies “The Tragedy of the Commons,” the difficulty of motivating individuals to maintain shared resources in which each stakeholder has a shared interest. In a 1968 article that popularized the term, ecologist Garret Hardin posited that this is due to conflict between individuals’ interests and the group’s interests.

Source: Rand Corporation

Based on this hypothesis, a potential solution can be drawn from Nobel laureate Elinor Ostrom’s work, which demonstrates that commons can be managed sustainably by local communities of peers under certain conditions. Ostrom’s research shows how communities devise ways to govern the commons to assure their survival for their needs and future generations. This requires encouragement of a culture of cooperation rather than pure competition among individuals. Decentralized governance, the restructuring or reorganization of authority to foster co-responsibility between institutions, increases the quality, accountability and effectiveness of governance.

In her work *Governing the Commons: The Evolution of Institutions for Collective Action* (Ostrom, Elinor, 1990), Ostrom identifies the following eight design principles of stable local common pool resource (CPR) management:

1. Clearly defined (clear definition of the contents of the common pool resource and effective exclusion of external un-entitled parties)
2. The appropriation and provision of common resources that are adapted to local conditions
3. Collective-choice arrangements that allow most resource appropriators to participate in the decision-making process
4. Effective monitoring by monitors who are part of or accountable to the appropriators
5. A scale of graduated sanctions for resource appropriators who violate community rules
6. Mechanisms of conflict resolution that are cheap and of easy access
7. Self-determination of the community recognized by higher-level authorities
8. In the case of larger common-pool resources, organization in the form of multiple layers of nested enterprises, with small local CPRs at the base level.

To function in practice, these principles require a certain level of institutional organization. Until recently, the technological challenges of distributing power from the top of a decision-making hierarchy back into the network were insurmountable.

It has now become feasible to overcome the need for a centralized institution through an algorithm-based distributed consensus, and create a non-hierarchical and equal society. Blockchain technology lays the foundation for a global commons – a decentralized and equal governance in which authority is distributed.

Yet existing decentralized governance concepts have so far gained very limited traction.

This lack of adoption represents a failure to realize vast potential. As Alexis de Tocqueville noted in *Democracy in America* (de Tocqueville, Alexis 1835): “Decentralization has, not only an administrative value, but also a civic dimension, since it increases the opportunities for citizens to take interest in public affairs; it makes them get accustomed to using freedom. And from the accumulation of these local, active, persnickety freedoms, is born the most efficient counterweight against the claims of the central government, even if it were supported by an impersonal, collective will.”

In addition, decentralization is expected to bring cost savings, through disintermediation, along with empowerment of participants. The key is that the parties using the blockchain do not need to trust a powerful third party to act in their best interests: many blockchain advocates claim that civil society could organize itself and protect its own interests more effectively with decentralized blockchain-based services to control traditional functions of the state.

But if decentralization fails to materialize, we remain stuck with the problems of power and trust. Even with the best intentions, realization of decentralized governance faces challenges. Bitcoin offers an example of how real-life blockchain governance can stray from the original ideal of decentralization. For transaction submission and validation, as well as protocol updates, enacted governance is considerably more centralized than envisioned. In fact, since blockchain technologies debuted, we've learned that governance is often more centralized in practice since decision-making power is often costly to acquire and exercise. Expertise, reputation, time or money are often required to gain decision-making power. The higher these costs, the narrower the participation, contributing to centralization in practice.

These hurdles can be overcome. Decentralized, blockchain-based platforms can be leveraged to allow individuals and communities to redesign their interactions in politics, business and society, with unprecedented disintermediation and freedom from reliance on central authorities. But it won't happen by itself.

We hypothesize that the central conundrum, "The Tragedy of the Commons," can be overcome based on Ostrom's thinking. Resolution of this central dilemma is essential to large-scale adoption of decentralized governance, which can evolve into the following virtuous cycle:

- Global trust through decentralization
- Simple designs that drive ***adoption by billions*** of people
- Elegant technology that eliminates barriers to prosperity for all

If we can succeed in overcoming the tragedy of the commons and establish the prerequisites for massive global participation, it will open the door further for blockchain-based decentralized systems to gain traction and reach a crucial tipping point. To arrive at this point, however, will require overcoming a number of further obstacles, including the current high costs involved in implementing decentralized governance technology as well as the vested interest of many stakeholders in existing centralized structures.

After this point, nothing will stand in the way of mainstream acceptance. Just as consumers use the Internet, share data and trust in the technology without knowing or worrying about exactly how it works, we envision a day when decentralized governance solutions become part of day-to-day life – only with an immeasurably higher level of data security, transparency and user empowerment than today's Internet can provide.

Turning Decentralized Governance into Reality

If governing is a voluntary task, how much decentralization can be achieved in reality? What are the necessary conditions for decentralization to work in practice and the implications for socioeconomic systems that run on blockchain infrastructure?

Elinor Ostrom's work demonstrates that commons can be managed sustainably by local communities of peers under certain conditions, set up to encourage and enable stakeholders to govern the commons in a manner that ensures their survival for future generations. Commons-based peer production communities are socioeconomic models in which groups of individuals cooperate to produce shared resources without a traditional hierarchical organization.

Source: Wikipedia

Wikipedia is one example of how this can function based on a sense of shared purpose and peer recognition. A further model of functioning decentralized governance is the blockchain-based community enabled by the Steemit social media app. It allows users

to vote for social media content creators, who are in turn rewarded accordingly in the form of tradeable digital assets termed Smart Media Tokens (SMTs). The app is available free of charge, and – as social media users are also content providers – incentivizes collaboration and respect for commonly accessible (online) property. Although far from mainstream, the Steem blockchain currently processes more transactions than Bitcoin and Etherium combined, according to the company's Website

Without sufficient research, however, the concept remains theoretical. It demands in-depth studies of decentralized governance projects that reflect different aspects of Ostrom's work. Ultimately, we need a practical roadmap for conceptualizing and implementing a new form of blockchain-based governance in which hierarchies between the participants in decision-making processes can vanish. If such a roadmap were to enjoy massive global usage as the gold standard for successful decentralized governance projects and, in turn, drive adoption of blockchain-based decentralized solutions, we could reach the tipping point at which they become mainstream. Then – and only then – could societies, businesses and governments begin to realize the full potential of decentralized governance to enable greater financial and political inclusion and participation.

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