

# Blockchains for the Governance of Common Goods

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- 1 Governing the Commons: The Legacy of Ostrom
- 2 Blockchains for the Governance of the Commons: Changing the Paradigm
- 3 Implementation Challenges and Going Forward

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# The Legacy of Ostrom: Rehabilitating the Commons

- **Common-Pool Resources** (CPR) are subtractable goods with high costs of exclusion
- There is a way between the private and the public sector (Ostrom, 1990)
- **Requires efficient and good governance**



Elinor Ostrom

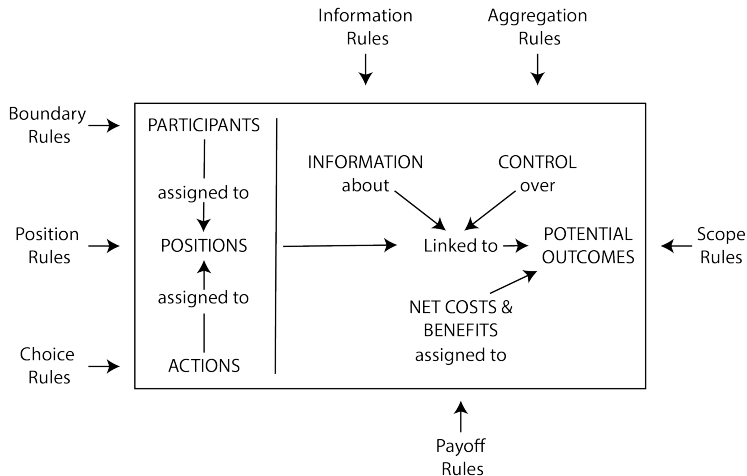
Holger Motzkau 2010, Wikipedia/Wikimedia Commons

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# The Legacy of Ostrom: The IAD Framework

- The **Institutional Analysis and Development** (IAD) Framework provides tools to adequately analyse a CPR governance situation.
- 8 **Design Principles** increasing the probability of sustainable governance including **monitoring and policing**
- There is no one-size-fits-all solution

# The Legacy of Ostrom: The Rules of Governance



Analyzing Governance Rules through IAD.  
Adapted from figure 7.1 of Ostrom, 2005

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- Howell and Potgieter, 2019a analyse governance of blockchain as commons and give hindsight on promising blockchain features
- Rozas, Tenorio Fornés, and Hassan, 2020; Rozas et al., 2018 assess the compatibility of blockchains and the 8 design principles for some commons
- Cila et al., 2020 lays the foundation for our work identifying opportunities and key challenges through a theoretical example.



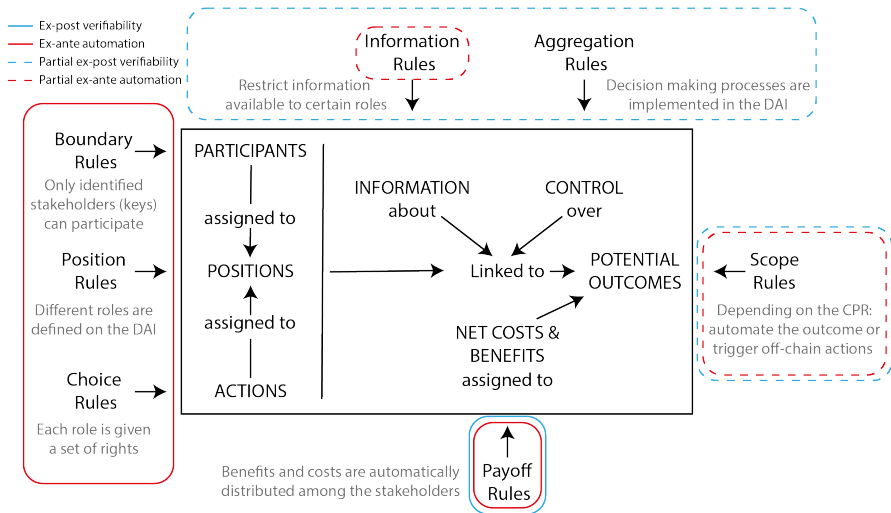
# From *Monitor and Sanction* to *Automate and Verify*

- A paradigm shift aiming at complementing traditional governance methods: automating
- **Ex-ante automation:** is (partially) codifying on the blockchain to ensure full compliance complementing for the need of policing.
- **Ex-post verification** is recording (proof of) information to ensure traceability and verifiability complementing traditional monitoring.

## Potential Benefits

This could **increase confidence** in information and institutions while **reducing the social and economic costs** need for policing.

# Extending the IAD



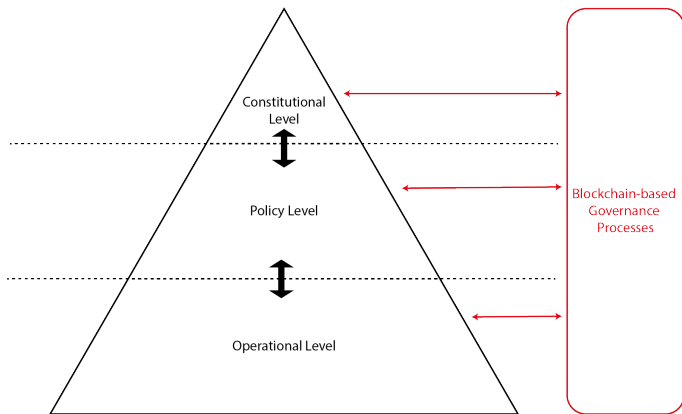
How blockchains can complement the IAD framework

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# Oracles and Human in the Loop

- Cila et al., 2020 particularly raise the dilemma of full automation v. human in the loop
- This extends on work showing limitations of smart contracts (Howell and Potgieter, 2019b) and builds on necessity of system adaptability underlined by Ostrom, Gardner, and Walker, 1994
- Importance of relying on existing networks, in particular through data validation, for instance through multisignatures (*multisig*)

# Governance of the Blockchain: Polycentricity and Decision Layers



Interconnected governance levels is required for governance as Blockchains affect the whole system. Adapted from Cole, 2014 and Ostrom, 2005

# Governance of the Blockchain: Type of Blockchain

We advocate recourse to **consortium blockchain** that have **less risks** of external control and offer more control to agents, **in line with Ostrom's recommendations**.

# Further Research

- Further interdisciplinary research to delineate working conditions
- Field research in line with the Bloomington School Methodology
- Pilot projects: grassroot based design of the tools would increase probability of success



Author Quangpraha — pixabay.com

# Take Home Messages

- We believe blockchains can be used for the governance of Common-Pool Resources
- Relying on blockchain-based tool would yield a change of paradigm and could help address some recurring issues in CPR management
- New challenges brought by technology must be taken into consideration calling for field-based bottom-up design



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# Design Principles

<b>Design Principle 1</b> <i>Boundaries</i> (biophysical and social) are clearly defined.	<b>Design Principle 5</b> <i>Graduated sanctions</i> are applied to rule violators (in increasing levels of intensity).
<b>Design Principle 2</b> <i>Congruence</i> between appropriation and provision rules (for fairness considerations) and fitness to local conditions (for practicality).	<b>Design Principle 6</b> <i>Dispute resolution mechanisms</i> available to participants at low cost.
<b>Design Principle 3</b> <i>Collective choice processes</i> enable most affected individuals to participate in making rules.	<b>Design Principle 7</b> <i>Minimal recognition</i> by “higher” authorities that appropriators have rights to self-organize and devise their own institutions.
<b>Design Principle 4</b> <i>Monitors</i> are accountable to appropriators (or are the appropriators themselves).	<b>Design Principle 8</b> <i>Nested enterprises</i> for appropriation, provision, monitoring, enforcement, conflict resolution, and governance. Graduated sanctions

The 8 Design Principles, adapted from Cox, Arnold, and Villamayor Tomás, 2010