When Ostrom Meets Blockchain

Exploring the Potentials of Blockchain for Commons Governance

David Rozas[1], Ámbar Tenorio-Fornés[1], Silvia Díaz-Molina[1] & Samer Hassan[1,2]

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[1]GRASIA research group of Complutense University of Madrid, Madrid, Spain.
[2] Berkman Center for Internet & Society (Harvard University), Cambridge, USA.

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OUTLINE

1.

Key concepts around decentralised technologies.

2.

Debate on *blockchain-based* governance: beyond markets and states?

3.

Commons governance, Ostrom's principles and example: community network.

4.

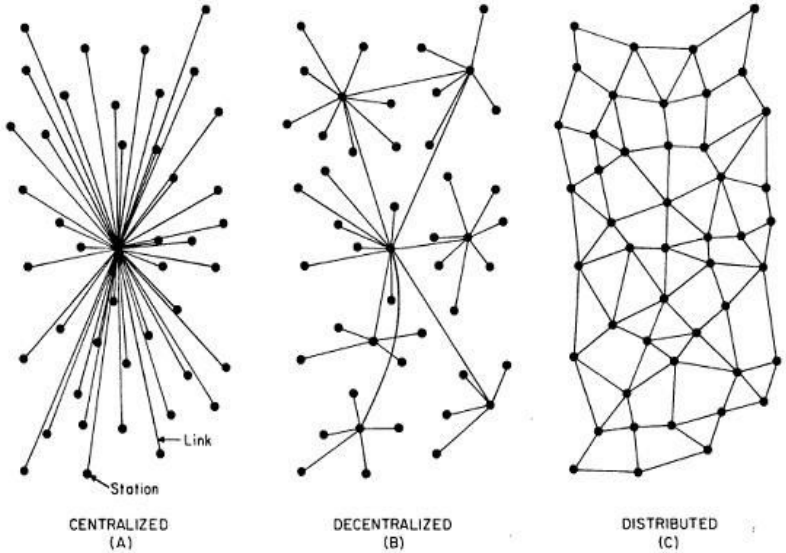
Affordances of blockchain for commons governance.

5.

Conclusion and future work.

BLOCKCHAIN

- Distributed & persistent ledger/database.
- Without a third party.
- E.g. cryptocurrency, such as Bitcoin (Nakamoto, 2008), without banks.
- But more than that!
  - Storing in a decentralised way
  - Executing in a decentralised way



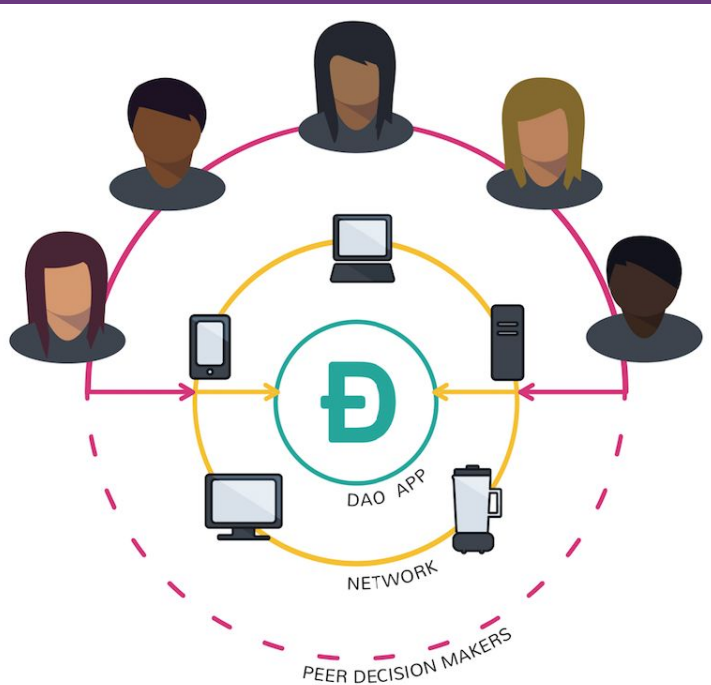
SMART CONTRACT

(Szabo, 1997)

- **Snippets of code on the blockchain.**
- **Decentralised execution.**
- **Rules automatically enforced without central authority.**

DAO
DISTRIBUTED AUTONOMOUS ORGANISATION

- Organisation (partially) controlled by rules implemented in smart contracts.
- DAO members' interactions are (partially) mediated by rules embedded in DAO code.



BLOCKCHAIN BASED GOVERNANCE*

* Governance with/through blockchains... not of!

- **Predominant techno-determinist discourses (e.g. Swan, 2015; Heuermann, 2015; Hayes 2016)**
  - **Over-reductionist with social aspects, such as distribution of power.**
  - **Embed market-driven, utilitarian, individualistic values**
- **Not new... Internet as space for utopia/dystopia (Wellman, 2004)**

BLOCKCHAIN BASED GOVERNANCE*

- Critical stand, but reinforcing traditional institutions (e.g. Atzori, 2015; Atzori & Ulieru, 2017)
  - Central authorities necessary for democratic governance.
  - Blockchain in non-transformative ways (e.g. increase transparency of institutions (Nguyen, 2016), avoid tax fraud (Ainsworth & Shact, 2016)
  - Ignore power for collective action & self-organisation.

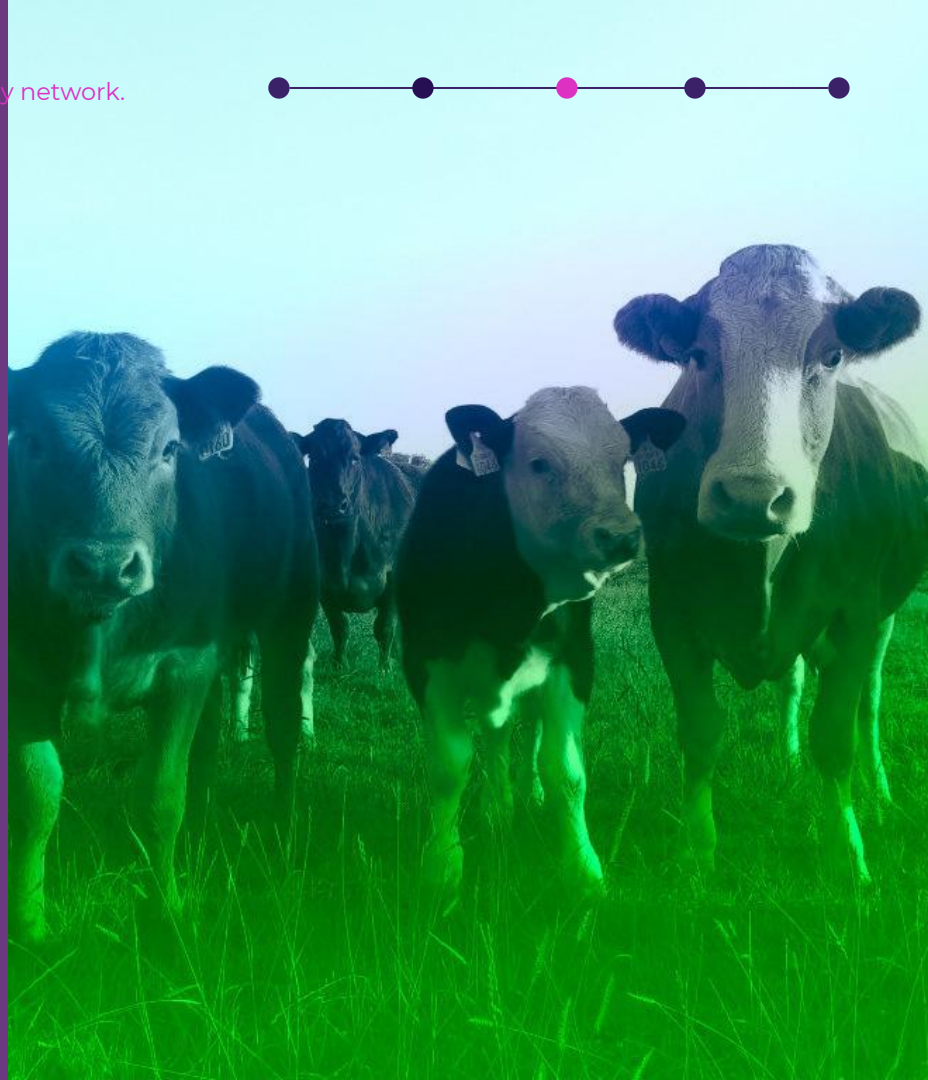
BLOCKCHAIN BASED GOVERNANCE*

- **Perspectives of blockchain-based governance beyond markets & states?**
- **Bringing together literature and commons perspectives.**
- **Blockchain as source of potentialities (and risks) for commons governance (Benkler, 2006; Fuster-Morell et al., 2014)**

- Disclaimer:
  - Theoretical, ongoing empirical work!
  - Focus on potentialities, plenty of tensions and risks

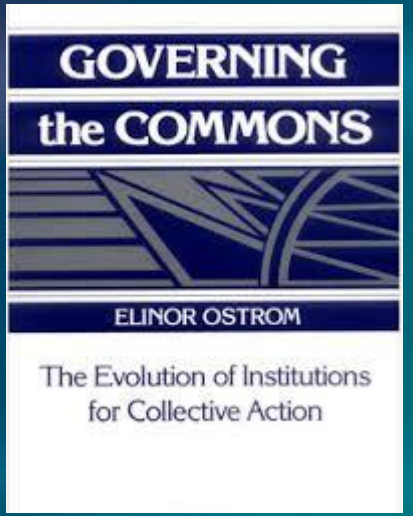
(BREAKING) THE TRAGEDY OF THE COMMONS

- Hardin (1968) states how shared resources are depleted by (homo-economicus) individuals acting out of self-interest.
- Traditional view to avoid this logic — "If I do not use it, someone else will"
- Commons need to be managed by:
  - Private ownership.
  - Centralised public administration.



OSTROM PRINCIPLES
(1990)

1. Community boundaries
2. Rules adapted to local conditions
3. Participatory decision-making
4. Monitoring
5. Graduated sanctions
6. Conflict resolution mechanisms
7. Recognition by higher authorities
8. Multiple layers of nested enterprises



1. **COMMUNITY BOUNDARIES**
2. Rules adapted to local conditions
3. Participatory decision-making
4. Monitoring
5. Graduated sanctions
6. Conflict resolution mechanisms
7. Recognition by higher authorities
8. Multiple layers of nested enterprises

3. Commons governance, Ostrom's principles and example: community network.

1. Community boundaries
2. **RULES ADAPTED TO LOCAL CONDITIONS**
3. Participatory decision-making
4. Monitoring
5. Graduated sanctions
6. Conflict resolution mechanisms
7. Recognition by higher authorities
8. Multiple layers of nested enterprises

1. Community boundaries
2. Rules adapted to local conditions
3. **PARTICIPATORY DECISION-MAKING**
4. Monitoring
5. Graduated sanctions
6. Conflict resolution mechanisms
7. Recognition by higher authorities
8. Multiple layers of nested enterprises

3.

Commons governance, Ostrom's principles and example: community network.

1. Community boundaries
2. Rules adapted to local conditions
3. Participatory decision-making
4. **MONITORING**
5. Graduated sanctions
6. Conflict resolution mechanisms
7. Recognition by higher authorities
8. Multiple layers of nested enterprises

3.

Commons governance, Ostrom's principles and example: community network.

1. Community boundaries
2. Rules adapted to local conditions
3. Participatory decision-making
4. Monitoring
5. **GRADUATED SANCTIONS**
6. Conflict resolution mechanisms
7. Recognition by higher authorities
8. Multiple layers of nested enterprises

1. Community boundaries
2. Rules adapted to local conditions
3. Participatory decision-making
4. Monitoring
5. Graduated sanctions
6. **CONFLICT RESOLUTION MECHANISMS**
7. Recognition by higher authorities
8. Multiple layers of nested enterprises

3.

Commons governance, Ostrom's principles and example: community network.

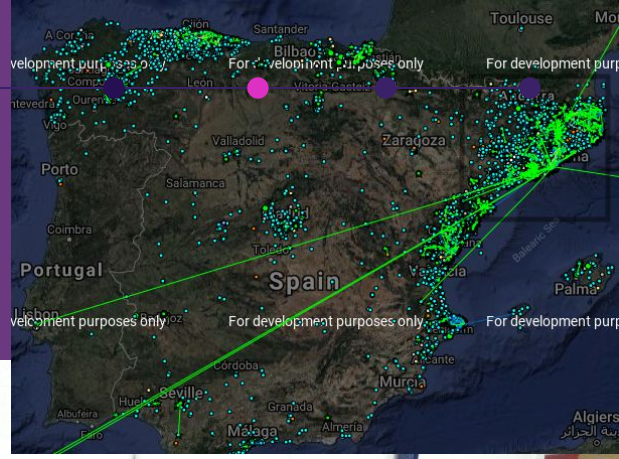
1. Community boundaries
2. Rules adapted to local conditions
3. Participatory decision-making
4. Monitoring
5. Graduated sanctions
6. Conflict resolution mechanisms
7. **RECOGNITION BY HIGHER AUTHORITIES**
8. Multiple layers of nested enterprises

3. Commons governance, Ostrom's principles and example: community network.

1. Community boundaries
2. Rules adapted to local conditions
3. Participatory decision-making
4. Monitoring
5. Graduated sanctions
6. Conflict resolution mechanisms
7. Recognition by higher authorities
8. **MULTIPLE LAYERS OF NESTED ENTERPRISES**

AN EXAMPLE: GUIFI.NET

- Free, open & neutral Community Network (CN): 50k users on a daily basis (Guifi.net, 2020)
- +35k nodes, 65k km links (Guifi.net, 2020)
- Internet Service Provider, infrastructure as a commons.
- Ostrom's principles (Baig et al. , 2015).
- Not only wireless, fiber.



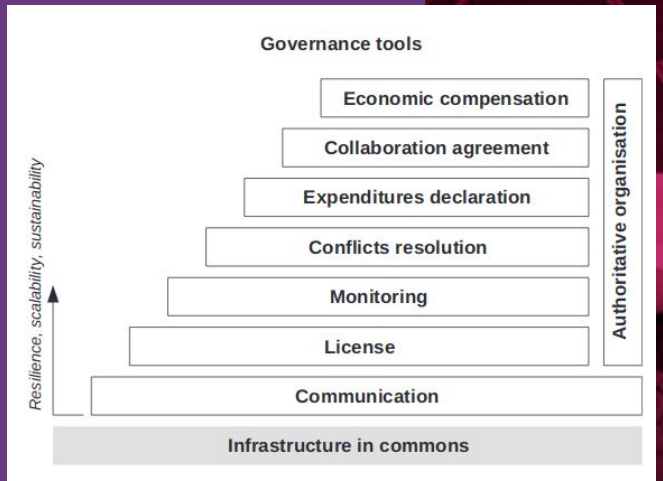
GUIFI.NET SOME ACTORS

- Users/customers.
- Community network hackers & makers.
- Professional operators.
- Formal institution: *Fundació.*

Goufone

GUIFI.NET COMPENSATION SYSTEM

Balances contributions accounted for resource usage of operators, monitored by *Fundació* (Baig et al. , 2015)



- **Examples:**
  - **Operators declare investments and expenditures to maintain infrastructure**
  - **Degrees of "commitment to the commons" monitored by *Fundació***
  - **Meetings for rules according to local conditions**
  - **Sanctions for misuse**

BLOCKCHAIN AS SOURCE OF AFFORDANCES*?

I
Tokenisation

II
Self-enforcement and formalisation of rules

III
Autonomous automatisation

IV
Decentralisation of power over the infrastructure

V
Transparentisation

VI
Codification of trust

* “functional and relational aspects which frame, while not determining, the possibilities for agentic action in relation to an object” (Hutchby, 2001; p.244).
We frame them as potential processes in this analysis.

TOKENISATION

Transforming rights to perform an action on an asset into a data element on the blockchain

TOKENISATION

- Guifi.net: measure and distribute value drawing on tokens (Selimi et al., 2018; Navarro et al., forthcoming)
- Beyond:
    - Rights more easily and granularly defined, propagated and/or revoked.
    - Artefacts as source of explicitation of less visible forms of power and value.

Towards Blockchain-enabled Wireless Mesh Networks

Mennan Selimi, Aniruddh Rao Kabbinale, Anwaar Ali, Leandro Navarro, Arjuna Sathiaseelan

(Submitted on 2 Apr 2018)

Blockchain models for universal connectivity

Leandro Navarro[1,2], Ignacio Castro[3,2], Arjuna Sathiaseelan[2], Emmanouil Dimogerontakis[1], Mennan Selimi[1], and Roger Baig[1,4]

quick mesh project

SELF-ENFORCEMENT & FORMALISATION OF RULES

Encoding clauses into source code, automatically self-enforced, executed without the need for a central authority: smart contracts (Szabo, 1997)

SELF-ENFORCEMENT & FORMALISATION

- Guifi.net:
  - Capping rules for network use. E.g. enforces a bandwidth limit, penalises misuse.
  - Local rules of compensation system more visibly discussed.
  - Autonomy for decision-making for local aspects: Barcelona, Madrid and vice-versa.
- Beyond:
  - Rules for pooling, capping or mutualising.
  - Explicitation.
  - Autonomy from higher authorities.

AUTONOMOUS AUTOMATISATION

Using DAOs (Decentralised Autonomous Organisations) to automatise organisational processes.

AUTONOMOUS AUTOMATISATION

Guifi.net (and beyond):

- **Monitoring and/or graduated sanctions to the DAO.**
- **Exploration of potential conflicts.**
- **Facilitating creation of nested layers:**
  - **Transferring resources amongst nodes DAOs coordinating smaller DAOs.**

DECENTRALISATION OF POWER OVER THE INFRASTRUCTURE

IV

Communalising ownership and control of tools through decentralised infrastructure.

DECENTRALISATION OF POWER OVER THE INFRASTRUCTURE

Guifi.net:

- Main platform of collaboration (www.guifi.net) controlled by *Fundació*.
- Monitoring infrastructure could be decentralised.
- Shape power dynamics for negotiations between *Fundació* and local levels.

Beyond:

- Relationships between technical and social power (Forte et al., 2009, pp. 64-68). As in Wikipedia (Tkacz, 2014; Jemielniak, 2016)
- Facilitates “right to fork”.
- New conditions of negotiation.

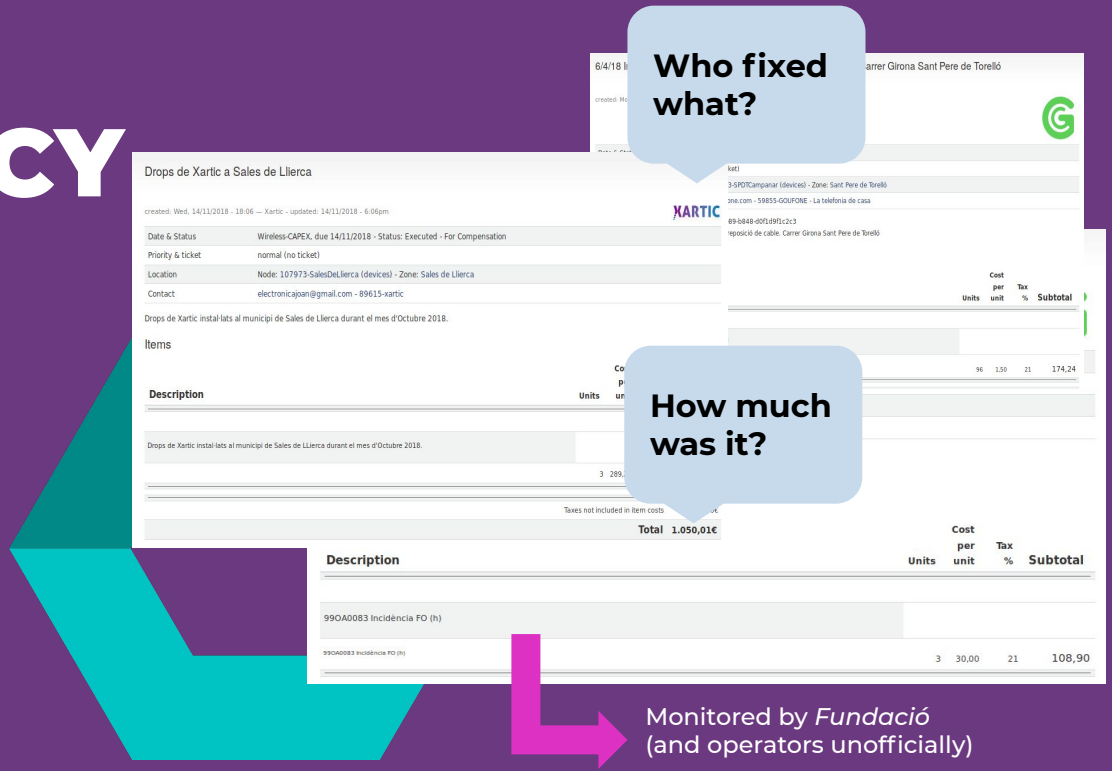
INCREASING TRANSPARENCY

V

Opening organisational processes and associated data, relying on persistency and immutability of blockchain

INCREASING TRANSPARENCY

- Guifi.net:
  - More transparency in maintaining common infrastructure
- Beyond:
  - Long tradition in open and participative processes
  - Scaling up monitoring and conflict resolution



CODIFICATION OF TRUST

VI

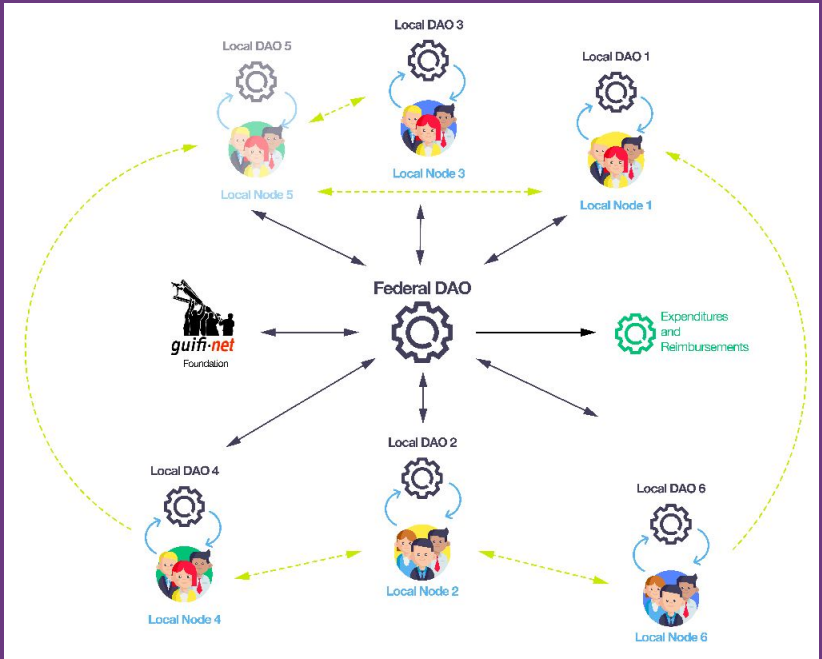
Codifying trust into “trustless systems”: facilitate agreement between agents without requiring a third party, providing *certain* degree of trust.

CODIFICATION OF TRUST

- Aware of techno-determinist market-driven discourses:
  - Focus on contractual transactions amongst selfish individuals, hobbessian values: “Crypto-leviathan” (Reijers et al. ,2016)
  - Shift of trust: code is law?
- Re-interpret “trustlessness” as:
  - Partial, limited property.
  - Integrating social culture and practices -> encoding (certain) degree of trust between nodes: interoperability.

CODIFICATION OF TRUST

- Guifi.net (and beyond):
  - Internal interoperability: locally-shaped platforms, autonomously governed, interoperating between them and/or broader level.
    E.g. local nodes in Guifi.net
  - External interoperability: coordination between different colectives.
    E.g. meta-cooperatives, different notions of value (De Filippi and Hassan, 2015)



Rozas (2020)

SUMMING UP

	(I) Tokenisation	(II) Self-enforcement and formalisation	(III) Autonomous automatisation	(IV) Decentralisation of power over the infrastructure	(V) Increasing transparency	(VI) Codification of trust
(1) Clearly defined community boundaries	✓					
(2) Congruence between rules and local conditions	✓	✓		✓		
(3) Collective choice arrangements	✓			✓		
(4) Monitoring		✓	✓	✓	✓	
(5) Graduated sanctions		✓	✓			
(6) Conflict resolution mechanisms			✓		✓	
(7) Local enforcement of local rules		✓		✓		✓
(8) Multiple layers of nested enterprises			✓			✓

MORE INFORMATION:

When Ostrom Meets Blockchain: Exploring the Potentials of Blockchain for Commons Governance

David Rozas, Antonio Tenorio-Fornés, Silvia Díaz-Molina, more...

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Front. Blockchain, 28 April 2021 | https://doi.org/10.3389/fbloc.2021.577680

Analysis of the Potentials of Blockchain for the Governance of Global Digital Commons

David Rozas[1*], Antonio Tenorio-Fornés[1,2] and Samer Hassan[1,3]

PEER PRODUCTION (AND BEYOND)

Diversity of areas (Fuster-Morell et al. 2016) ...

... and beyond: social economy, platform cooperativism

The platform belongs to those who work on it! Co-designing worker-centric task distribution models

David Rozas
drozas@ucm.es
Universidad Complutense de Madrid
Madrid, Spain

Jorge Saldivar
jasaldivar@ucm.es
Universidad Complutense de Madrid
Madrid, Spain

Eve Zelickson
eve@datasociety.net
Data & Society
New York City, United States of America

PLENTY OF TENSIONS & RISKS TO EXPLORE

TOKENISATION

- Extreme quantification and data fetishism (Sharon & Zanderbengen, 2017)

SELF-ENFORCEMENT & FORMALISATION

- Concentration of power in coders (De Filippi and Hassan, 2018)
- Extreme formalisation, breaking dynamics, *gaming* the platform...

INCREASING TRANSPARENCY

- Opening processes is far more than opening data (Atzori, 2015)
- Right to be forgotten (Khan, 2016; Mayer-Schönberger, 2011)

IN CONCLUSION & FUTURE WORK

1. Bringing together literature on peer production to governance through/with blockchain debate: Ostrom's principles.

2. Identification of potential affordances.

3. Useful categories for empirical analysis, emergence of research questions to be explored

Theoretical, need to explore boundaries, risks, models, culture, as situated technology... time to go to the field!

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THANKS!

Any questions?

You can find me at:

- https://davidrozas.cc
- @drozas
- drozas@ucm.es

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