P2P MODELS

When Ostrom Meets Blockchain

Exploring the Potentials of Blockchain for Commons Governance

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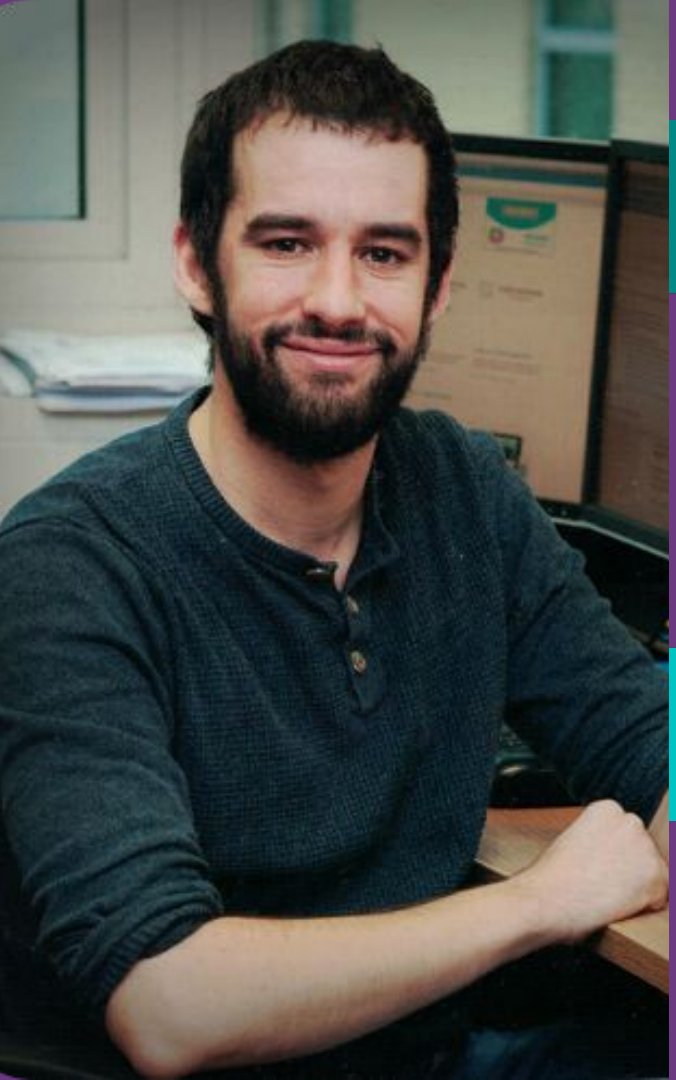


¡Hola!

I'm David Rozas (@drozas)

Postdoc researcher @p2pmod. ½ computer scientist, ½ sociologist. Trying to bring together the social and the technical to foster Commons-Based Peer Production.

OUTLINE

1.

P2PModels & 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.

P2P MODELS

SHARING ECONOMY

Infrastructure: Centralized Monopolies

Today's Collaborative Economy is dominated by **large centralized platforms**, which concentrate massive amounts of user data. **Surveillance is the business model** of the Internet.

Governance: Disempowered Communities

The Collaborative Economy **platforms mediate the interaction** of large communities. However, these **users have no say** in the way they relate to each other: only the platform owner decides how the platform evolves.

Economy: Concentration of Profits

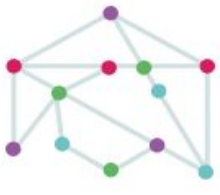
These **major industry players concentrate any profit** generated, appropriating the value created by the communities, since **users are rarely rewarded** for their work.

P2P MODELS

THE PROJECT (5 years ERC)

We aim to harness the potentials of **blockchain technology for the commons**, specifically to:

Provide a **software framework to build decentralized infrastructure for Collaborative Economy organizations** which minimizes dependencies from central authorities.



Enable democratic-by-design **models of governance for communities** to ensure higher levels of equality and inclusion.

Enable **value distribution models** which improves **economic sustainability** of both contributors and organizations.

THE PEOPLE

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Principal Investigator

Silvia Díaz Molina
Feminist Anthropologist

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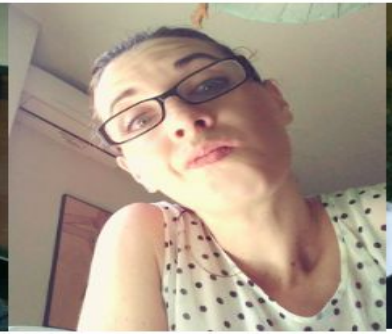


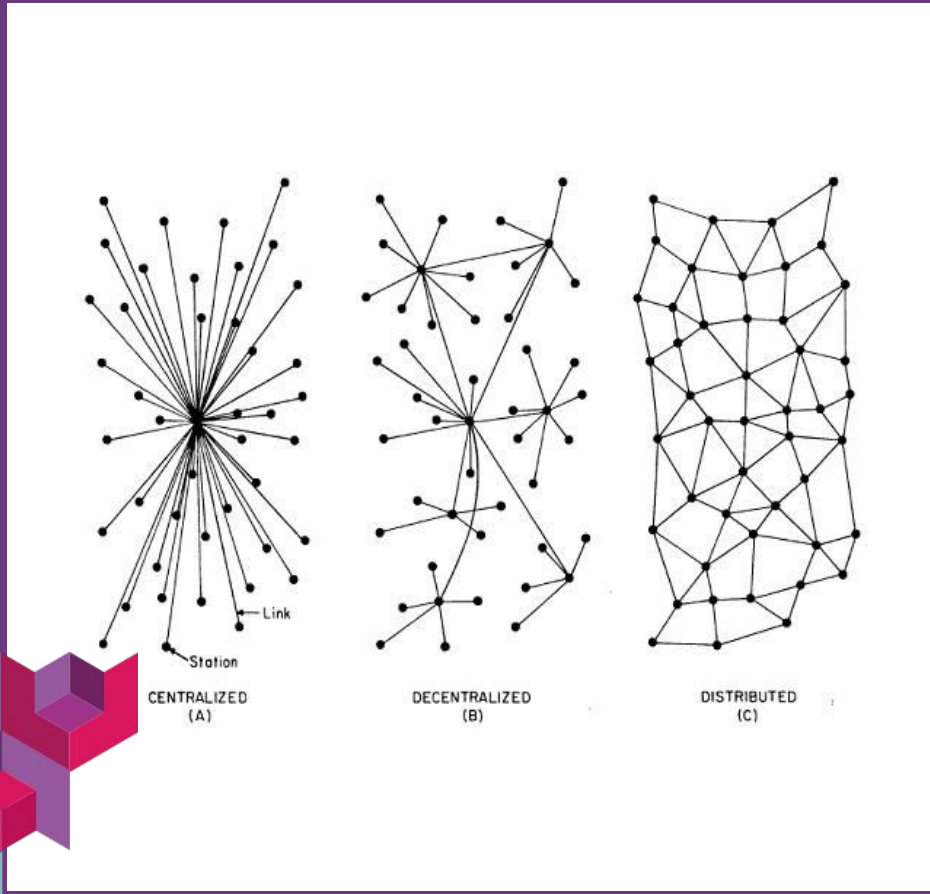
Elena Martínez
UX Sorceress

Antonio Tenorio
Governance Alchemist

Sara Gil
Project Manager

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)

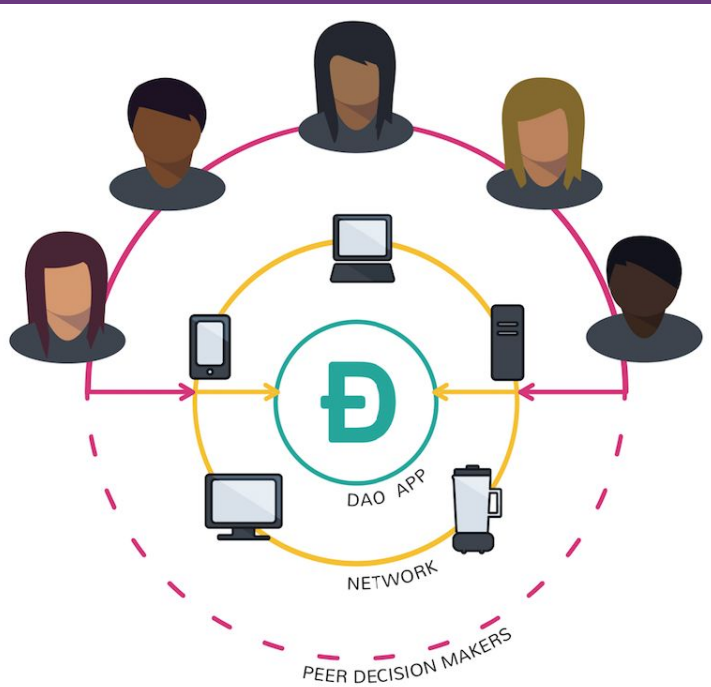
- Snippets of code on the blockchain.
- Decentralised execution.
- Rules automatically enforced without central authority.

DAO
DISTRIBUTED AUTONOMOUS ORGANIZATION

- Self-governed organisation controlled by rules implemented in smart contracts.
- Analogy with legal organisation.

  Legal documents (bylaws), define rules of interaction amongst members.

  DAO members' interactions are 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 value

- 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, starting empirical work!
  - Focus on potentialities, plenty of tensions and risks

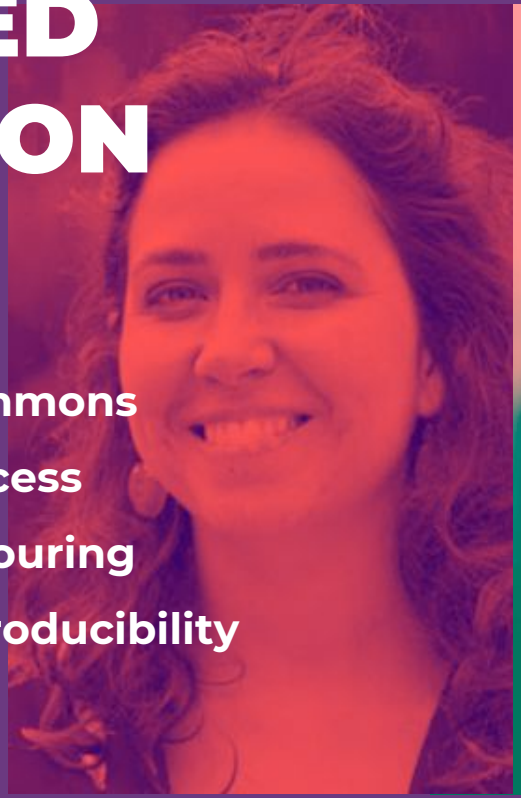
COMMONS-BASED PEER PRODUCTION

Mode of production (Benkler, 2006)

characterised by (Fuster-Morell et al., 2014)

- ✓ **Collaborative process**
- ✓ **Peer-based**
- ✓ **Commons process**
- ✓ **Favouring reproducibility**

> *Radically different to "Silicon Valley" sharing economy*



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

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**
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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

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

1. Community boundaries
2. Rules adapted to local conditions
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6. **CONFLICT RESOLUTION MECHANISMS**
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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
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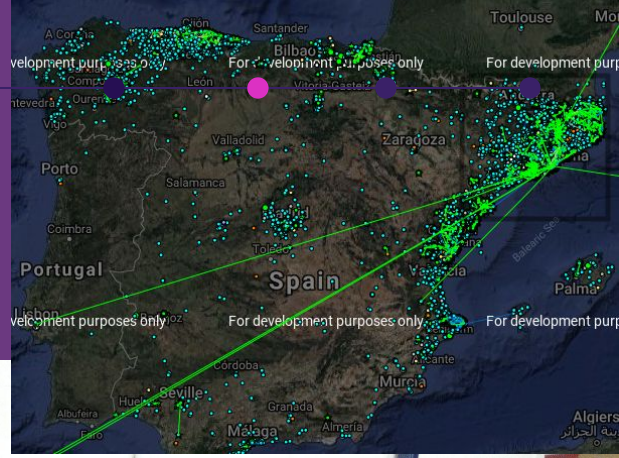
7. Recognition by higher authorities
8. **MULTIPLE LAYERS OF NESTED ENTERPRISES**

AN EXAMPLE: GUIFI.NET

- Free, open & neutral Community Network (CN).
- +35k nodes.
- Internet Service Provider, infrastructure as a commons.
- Ostrom principles (Baig et al. , 2015).
- Not only wireless, fiber.



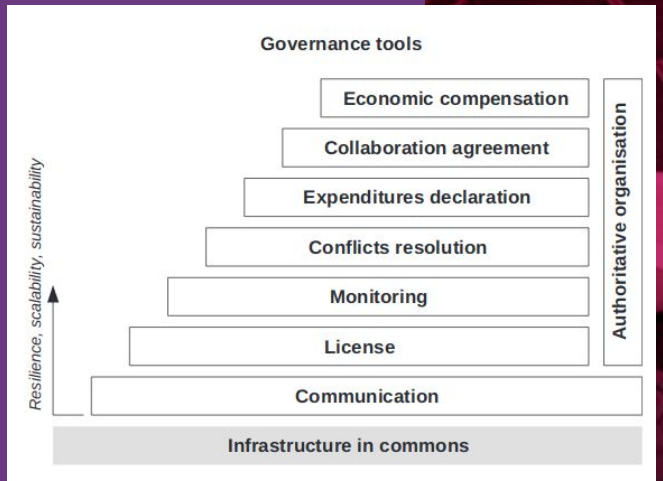
GUIFI.NET SOME ACTORS

- 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)



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 processes in this analysis.

TOKENISATION

Transforming rights to perform an action on an asset into a data element on the blockchain (e.g. access reports in medical field).

TOKENISATION

- Guifi.net: measure and distribute value drawing on tokens (Selimi et al., 2018)
- 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)

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 in Barcelona by those in Barcelona, 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.

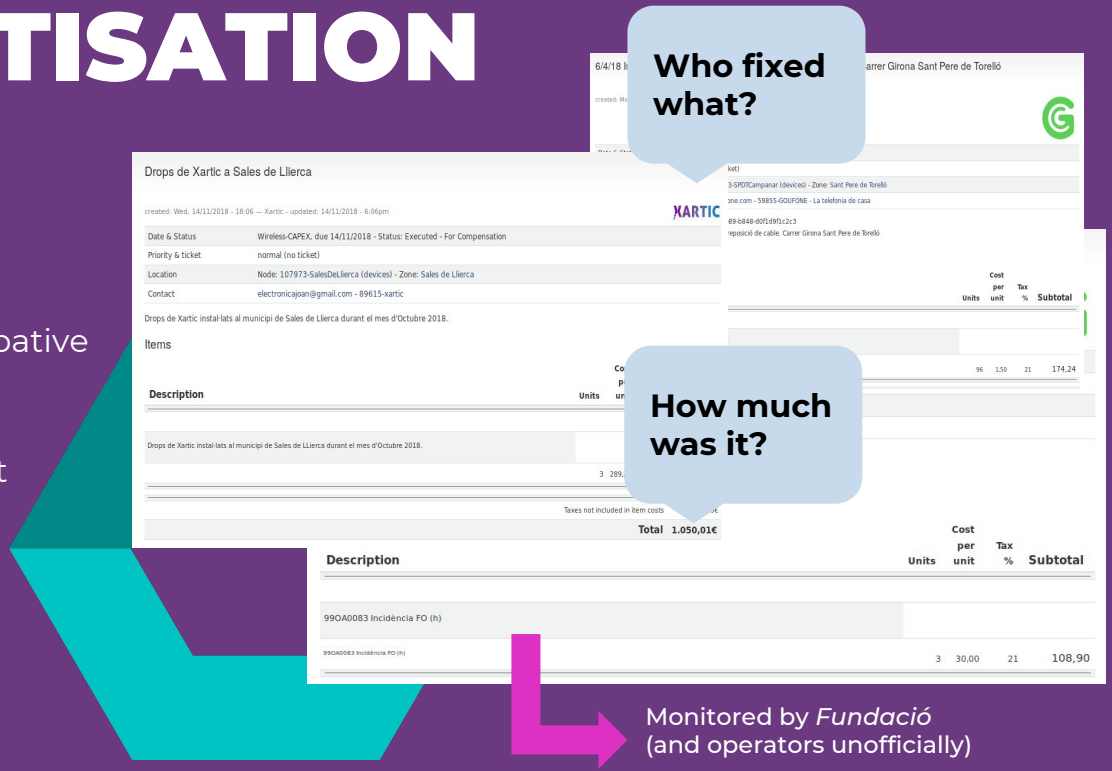
TRANSPARENTISATION

V

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

TRANSPARENTISATION

- 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)

SUMMING UP

	(I) Tokenisation	(II) Self-enforcement and formalisation	(III) Autonomous automatisation	(IV) Decentralisation of power over the infrastructure	(V) Transparentisation	(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			✓			✓

PEER PRODUCTION (AND BEYOND)

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

ARDUINO

WIKIPEDIA
The Free Encyclopedia

P2PU

amara

guifinet
Xarxa Oberta Lliure i Neutral

... and beyond: social economy, platform cooperativism

coop57 SCCL

SMartib

cleta

SOM energia

PLENTY OF TENSIONS & RISK TO EXPLORE

TOKENISATION

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

SELF-ENFORCEMENT & FORMALISATION

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

TRANSPARENTISATION

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

BLOCKCHAIN-BASED GOVERNANCE: OUR APPROACH

Situated technology:

focus on situational parameters, aware of cultural context, making visible the invisible, incorporating social meanings. (Bell, Genevieve, et al. 2013)

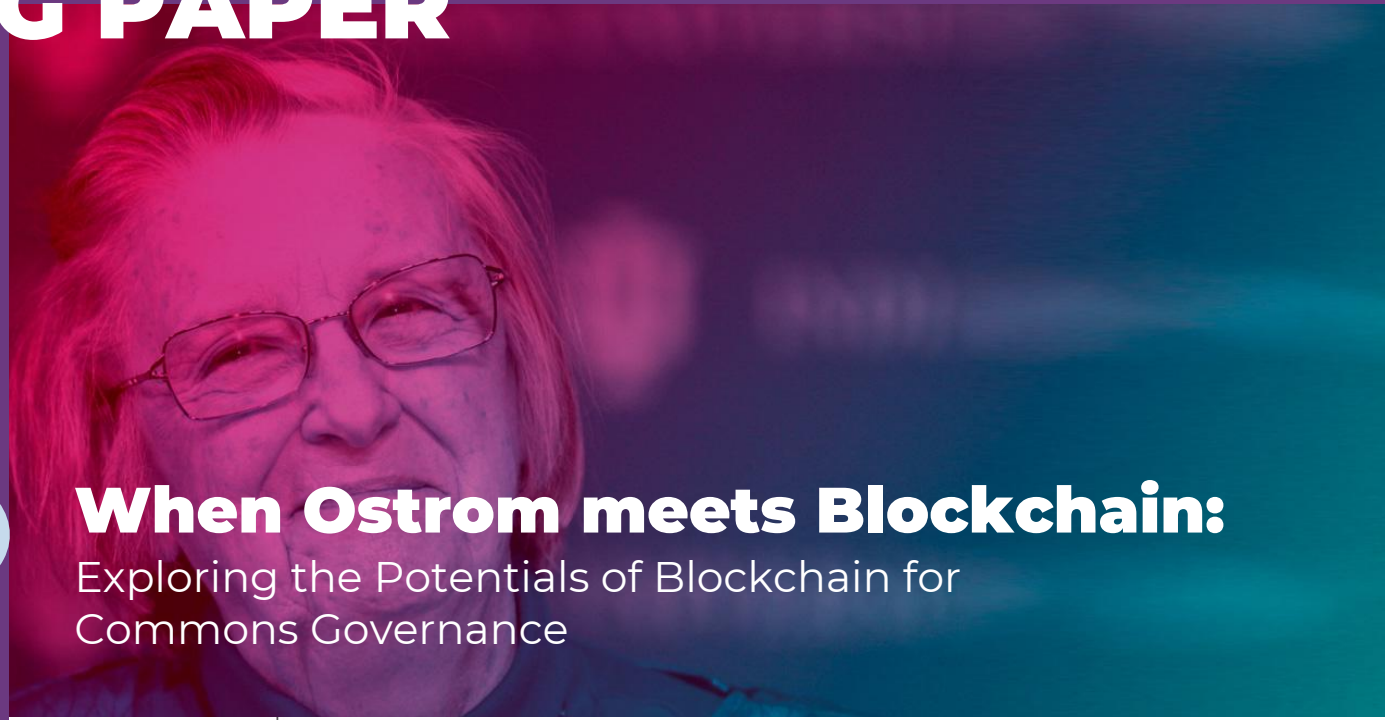
Mutual-shaping (Quan-Haase, 2012)

- Critical with technological determinist perspectives & limitations.
- Social shaped character of blockchain.
- But understood as possible agent of change.

As potential source of affordances (Gibson, 1979; Hutchby, 2001)

WORKING PAPER AT SSRN

Advice on target (JCR-indexed) journals welcome!



SSRN
Tomorrow's Research Today

Rozas, David and Tenorio-Fornés, Antonio and Díaz-Molina, Silvia and Hassan, Samer, When Ostrom Meets Blockchain: Exploring the Potentials of Blockchain for Commons Governance (July 30, 2018). Available at SSRN: https://ssrn.com/abstract=3272329 or http://dx.doi.org/10.2139/ssrn.3272329

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. Emergence of research questions and useful categories for empirical exploration.

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

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THANKS!

Any questions?

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P2P MODELS | economy governance infrastructure

Slides at https://bit.ly/2UIb9Xg