Cuando Ostrom se encuentra con blockchain: explorando las potencialidades de blockchain para la gobernanza procomunal

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

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

This work was partially supported by the project **P2P Models** funded by the European Research Council ERC-2017-STG (grant no.: 759207)

¡Hola!

My name is David Rozas (@drozas)

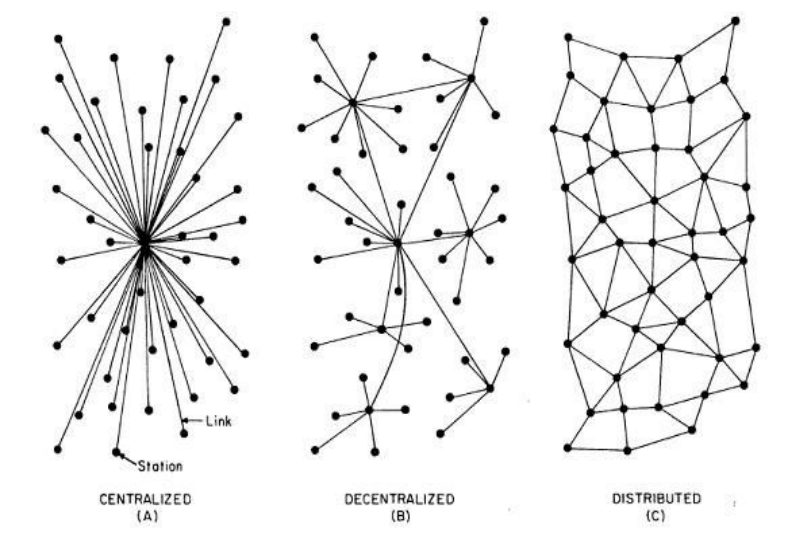
Postdoc researcher @p2pmod. ½ computer scientist, ½ sociologist. Trying to bring together the social and the technical to foster Commons-Based Peer Production.

Outline

- Key concepts around decentralised technologies
- Debate on *blockchain-based* governance: beyond markets and states?
- Commons governance, Ostrom's principles and example: community network
- Affordances of blockchain for commons governance
- 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!

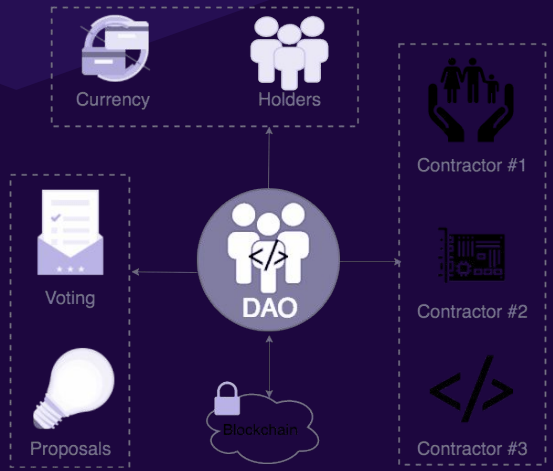


Smart contract (Szabo, 1997)

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

Distributed Autonomous Organisation (DAO)

- 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*

- 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)

* Governance with/through blockchains… not of!

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**

- <u>Radically different to “Silicon Valley” sharing economy</u>

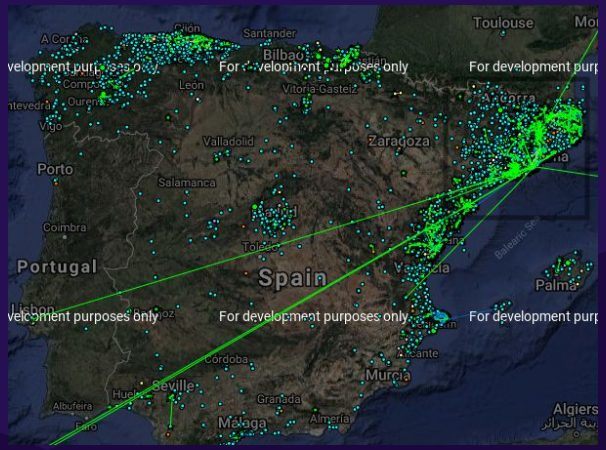
(Breaking) the tragedy of the commons

- 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”, manage commons through
  - Private ownership
  - Centralised public administration

Ostrom's (1990) principles

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)
- +35k nodes
- Internet Service Provider, infrastructure as a commons
- Ostrom principles (Baig et al. , 2015)
- Not only wireless, fiber

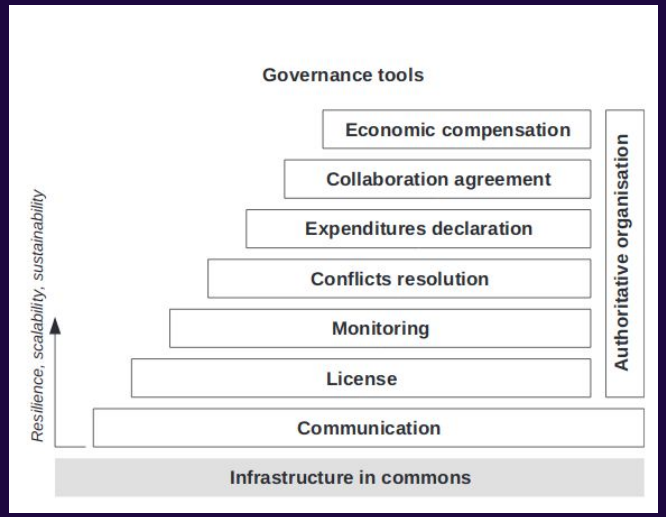
Guifi.net: some actors

- 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)

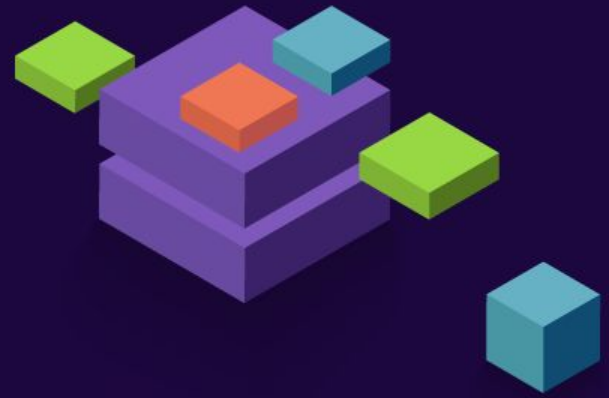


(Baig et al. , 2015)

Blockchain as source of affordances*?

1. Tokenisation
2. Self-enforcement and formalisation of rules
3. Autonomous automatisation
4. Decentralisation of power over the infrastructure
5. Transparentisation
6. 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.



1. 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

2. 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

3. 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

4. Decentralisation of power over the infrastructure

Communalising ownership and control of tools through decentralised infrastructure

Power over infrastructure

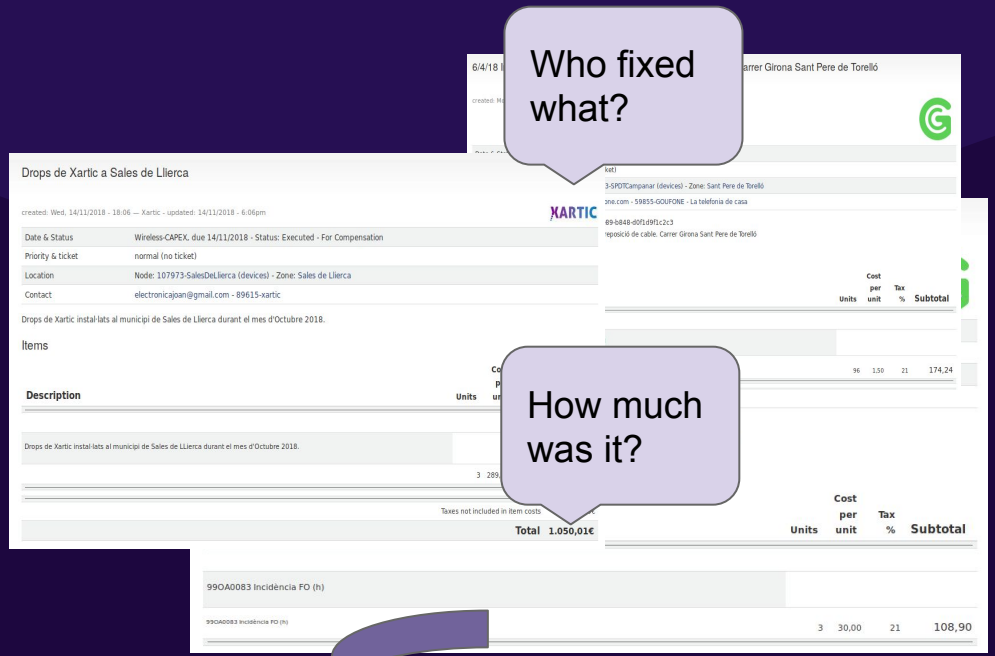
- Guifi.net:
  - Main platform of collaboration (www.guifi.net) controlled by *Fundació*
  - Monitoring infrastructure could be decentralised
  - Shape power dynamics for negotiations between *Fundació* and local levels
- Beyond:
  - Relationships between technical and social power (Forte et al., 2009, pp. 64-68). As in Wikipedia (Tkacz, 2014; Jemielniak, 2016)
  - Facilitates “right to fork”
  - New conditions of negotiation

5. Transparentisation

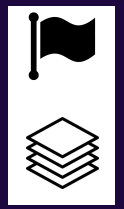
Opening organisational processes and associated data, relying on persistency and immutability of blockchain

Transparentisation

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



6. Codification of trust

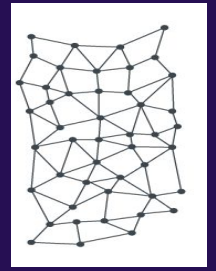


Codifying trust into “trustless systems”: facilitate agreement between agents without requiring a third party, providing *certain* degree of trust

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



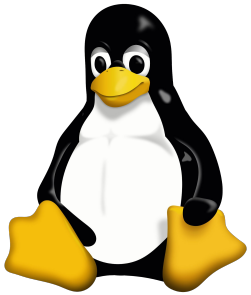
- Guifi.net (and beyond):
  - Internal interoperability: locally-shaped platforms, autonomously governed, interoperating between them and/or broader level
    E.g. local nodes in Guifi.net
  - External interoperability: coordination between different colectives
    E.g. meta-cooperatives, different notions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

Summing up

	Tokenisation	Self-enforcement and formalisation	Autonomous automatisation	Decentralisation of power over the infrastructure	Transparentisation	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) ...



P2PU

amara

... and beyond: social economy, platform cooperativism

SMartib

cleta

Plenty of tensions & risks 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

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

- Bringing together literature on peer production to governance through/with blockchain debate: Ostrom's principles
- Identification of potential affordances
- 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!

References

- Ainsworth, R. T., & Shact, A. (2016). Blockchain (Distributed Ledger Technology) Solves VAT Fraud. SSRN Electronic Journal. https://doi.org/10.2139/ssrn.2853428
- Atzori, M. (2015). Blockchain Technology and Decentralized Governance: Is the State Still Necessary? SSRN Electronic Journal. https://doi.org/10.2139/ssrn.2709713
- Atzori, M., & Ulieru, M. (2017). Architecting the eSociety on Blockchain: A Provocation to Human Nature. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2999715
- Baig, R., Roca, R., Freitag, F., & Navarro, L. (2015). Guifi. net, a crowdsourced network infrastructure held in common. Computer Networks, 90, 150-165.
- Bell, G., et al. "Designing culturally situated technologies for the home." CHI'03 extended abstracts on Human factors in computing systems. ACM, 2003.
- Benkler, Y. (2006). The wealth of networks: how social production transforms markets and freedom. Yale University Press.
- De Filippi, P. and Hassan, S. (2015), Measuring Value in Commons-Based Ecosystem: Bridging the Gap between the Commons and the Market (January 31, 2015). Lovink, G., Tkacz, N. (eds.) The MoneyLab Reader. Institute of Network Cultures, University of Warwick, 2015. Available at SSRN: https://ssrn.com/abstract=2725399
- De Filippi, P. and Hassan, S. (2018). "Blockchain technology as a regulatory technology: From code is law to law is code." arXiv preprint arXiv:1801.02507
- Forte, A., Larco, V., & Bruckman, A. (2009). Decentralization in Wikipedia Governance. Journal of Management Information Systems, 26(1), 49–72. https://doi.org/10.2753/MIS0742-1222260103
- Fuster-Morell, M. (2010). Governance of Online Creation Communities: Provision of infrastructure for the building of digital commons (Doctoral dissertation, European University Institute). Retrieved from http://cadmus.eui.eu//handle/1814/14709
- Fuster-Morell, M., Berlinguer, M., Martíinez, R., Salcedo, J. L. et al. (2014). Theoretical synthesis: Final theoretical synthesis of WP1, including research reports on data collection. Deliverable 1.2. P2PValue. Retrieved from https://p2pvalue.eu/wp-content/uploads/legacy/files/u28/D1231July_TheoreticalFindingsA%20(1).pdf
- Gibson, J. J. (1979). The ecological approach to visual perception: classic edition. Psychology Press.
- Hardin, G. (1968). The Tragedy of the Commons. Science , 162 (3859), 1243–1248. doi:10.1126/science.162.3859.1243
- Hayes, A. (2016). Decentralized Banking: Monetary Technocracy in the Digital Age. In Tasca, P., Aste T., Pelizzon, L., & Perony, N. (Eds.), Banking Beyond Banks and Money (pp. 121–131). Cham: Springer International Publishing. https://doi.org/10.1007/978-3-319-42448-4_7
- Hess, C. (2008). Mapping the New Commons. Governing shared resources: connecting local experience to global challenges. International Association for the Study of the Commons, University of Gloucestershire. doi:http://dx.doi.org/10.2139/ssrn.1356835

References

- Hess, C. & Ostrom, E. (2007). Introduction: An Overview of the Knowledge Commons. In C. Hess & E. Ostrom (Eds.), Understanding Knowledge as a Commons: From Theory to Practice (Chap. 1, pp. 3–26). MIT Press.
- Heuermann, C. (2015) Governance 2.0: a Hayekian approach to (r)evolutionary self-governance by cryptocurrencies (Bachelor thesis). University of Konstanz. Retrieved from https://staatenlos.ch/wp-content/uploads/2015/12/Final_Thesis_BT_CH.pdf
- Hutchby, I. (2001). Technologies, texts and affordances. Sociology, 35(2), 441-456.
- Jemielniak, D. (2016). Wikimedia movement governance: the limits of a-hierarchical organization. Journal of Organizational Change Management, 29(3), 361-378
- Jonhston (2014), http://www.johnstonslaw.org/ accessed on 29th May 2018
- Khan, J. (2016). To What Extent Can Blockchain Be Used as a Tool for Community Guidance. Edinburgh Student L. Rev., 3, 114.
- Mayer-Schönberger, V. (2011). Delete: The virtue of forgetting in the digital age. Princeton University Press.
- Nakamoto, S. (2008) Bitcoin: a peer-to-peer electronic cash system, http://bitcoin.org/bitcoin.pdf, retrieved 16 Feb 2018.
- Ostrom, E. (1990). Governing the Commons: The Evolution of Institutions for Collective Action. Cambridge University Press.
- Quan-Haase, Anabel. Technology and society: Social networks, power, and inequality. Oxford University Press, 2012.
- Reijers, W., O'Brolcháin, F., & Haynes, P. (2016). Governance in Blockchain Technologies & Social Contract Theories. Ledger, 1, 134-151.
- Selimi, M., Kabbinale, A. R., Ali, A., Navarro, L., & Sathiaseelan, A. (2018). Towards Blockchain-enabled Wireless Mesh Networks. arXiv preprint arXiv:1804.00561.
- Sharon, T., & Zandbergen, D. (2017). From data fetishism to quantifying selves: Self-tracking practices and the other values of data. New Media & Society, 19 (11), 1695-1709
- Swan, M. (2015). Blockchain: Blueprint for a New Economy. Sebastopol, CA, USA: O'Reilly.
- Szabo, N. (1997). Formalizing and securing relationships on public networks. First Monday, 2(9).
- Thierer, A. (2016). Permissionless innovation: The continuing case for comprehensive technological freedom. Mercatus Center at George Mason University
- Tkacz, N. (2014). Wikipedia and the Politics of Openness. University of Chicago Press
- Viégas, F. B., Wattenberg, M. & McKeon, M. M. (2007). The Hidden Order of Wikipedia. Online Communities and Social Computing: Second International Conference, OCSC 2007, held as part of HCI International 2007, Beijing, China, July 22-27, 2007, Springer, 445–454. doi:10.1007/978-3-540-73257-0-49
- Wellman, B. (2004). The glocal village: Internet and community. Idea&s: The Arts & Science Review, 1, 26-29

¡Gracias!

Any questions?

You can find me at:

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

Slides at https://bit.ly/2Flj5Uy