Ostrom's crypto-principles

Towards a commons-based approach for the use of Blockchain technologies for self-governance

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Hi!

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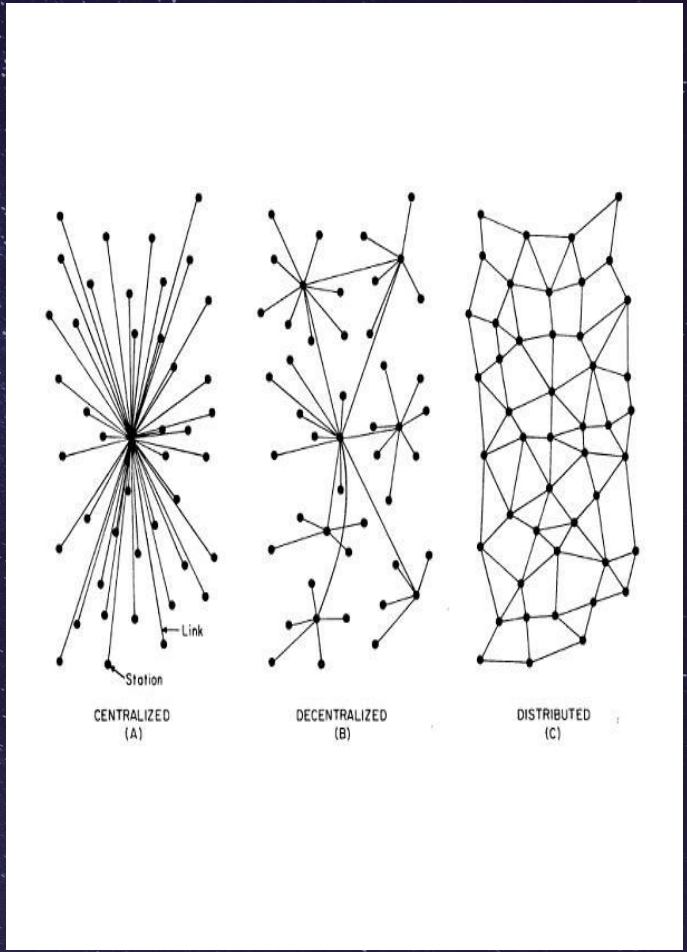
Postdoc researcher @p2pmod. ½ computer scientist, ½ sociologist. Trying to bring together the social and the technical to foster Commons-Based Peer Production.

Outline

- Introduction: blockchain & commons
- Blockchain governance
- Blockchain affordances for collective action?
- Conclusions

Blockchain

- Distributed database
- **Without third party**
- E.g. Bitcoin (Nakamoto, 2008),
- without banks
- **But much more...**



Commons-Based Peer Production (CBPP)

ARDUINO

WIKIPEDIA
The Free Encyclopedia

P2PU

amara

But not just digital...

guifinet
Xarxa Oberta Lliure i Neutral

Platform cooperativism

coop57 SCCL

som energia

Commons-Based Peer Production (CBPP)

- **Mode of production characterised by**
  - Collaborative process
  - Peer-based
  - Commons-process
  - Favouring reproducibility

- **Opposite to “Silicon Valley”**

Benkler, 2006
Fuster-Morell, 2014

Blockchain-facilitated governance*

- Predominant **techno-determinist** views (e.g. Swan, 2015):
  - Over-reductionist with social aspects (disintermediation -> hierarchies vanish)
  - Market-driven, utilitarian, rational choice, etc.

- **Critical** stand, but reinforcing traditional institutions (e.g. Atzori, 2015):
  - **Central** authorities necessary for democracy
  - **Non-transformative**
  - Ignore power for **collective action** & self-organisation: CBPP communities

* Through / with… not of!

Blockchain-facilitated governance

- Beyond markets and states

- Ostrom's principles:
  - Communities successfully governing communal resources vs "Tragedy of the commons" (Hardin ,1968)
  - Originally natural resources, later digital commons (e.g. Hess & Ostrom, 2007; Hess, 2008; Fuster-Morell, 2010; Viégas, 2007; Forte, 2009)

Ostrom's (1990) principles

1. 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

Blockchain-facilitated governance: our approach

- **Situated technology:** aware of cultural context, 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)

Blockchain as source of affordances?

1. Tokenisation
2. Self-enforcement and formalisation of rules
3. Transparentisation
4. Codification of trust

*Aiming to frame them as **processes***

1 Tokenisation

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

Tokenisation

- Escape from techno-determinist views:
  - “Everything that can be decentralised will be” (Johnston, 2014)
  - Atomic interactions to aggregate/disaggregate access rights at individual level
  - Aware of limits, tensions, effects

Tokenisation

- Explore potential of tokenisation for collective action
  - **O_1**(boundaries): emergence of autonomous spaces, more granular and easily propagated (e.g. Wikipedia, free software)
  - **O_2** (congruence) & O_3(alteration): negotiations remain as social processes, but artefacts as source of **explicitation** of less visible forms of power
  - **O_3** (alteration): facilitate (or not!) the alteration by participants

2 Self-enforcement and formalisation of rules

Encoding **clauses into source code** in a manner which is automatically self-enforced and executed without the need for a central authority, in the form of smart contracts (Szabo, 1997)

Self-enforcement and formalisation

- Code is law
- Several risks:
  - *Ex-post* to *ex-ante* norms (De Filippi and Hassan, 2018)
  - Concentration of power in those coding the rules, lack of reflexivity (De Filippi and Hassan, 2018)
  - Extreme formalisation, breaking dynamics, *gaming* the platform

Self-enforcement and formalisation

- O_4 & O_5(monitoring & sanctions):
  - Rules regarding the allocation of common resources (pooling, capping or mutualising)
  - E.g.: capping rule in open agriculture or social insurance pool to mutualise risks

- O_7(local jurisdiction):
  - Enforcement of local rules is acknowledged by the higher authorities / other nodes
  - E.g.: Iberian coop with nodes in Barcelona and Madrid

3 Transparentisation

process of **opening** the organisational **processes** and the associated **data** by relying on the persistency and immutability properties of blockchain technologies

Transparentisation

- Aware of techno-determinist discourses
  - Opening processes is far more than opening data (Atzori, 2015)
  - Right to be forgotten… in a persistent database (Khan, 2016; Mayer-Schönberger, 2011)
  - In-chain, off-chain?

Transparentisation

- CBPP communities have long tradition to make processes as open and participative as possible (e.g. discussion pages in Wikipedia, issues list in FLOSS)

- O_4 (monitoring) &O_6(conflict resolution): useful means to carry out and scale up processes of monitoring & conflict resolution mechanisms?

- Affordance to **track, audit and communally fiscalise** actions

4 Codification of trust

Codifying trust into “**trustless systems**” developed under a blockchain. Trustless systems are those which facilitate **agents** to enter into an **agreement**, without requiring a third party, to provide a certain degree of trust between them

Codification of trust

- Aware of commonly in techno-determinist market-driven views:
  - Shift of trust: code is law?
  - Focus on contractual transactions amongst selfish individuals, hobbessian values (“Crypto-leviathan” (Reijers et al. ,2016))

Codification of trust

- Re-interpret “trustlessness” as
  - Partial, limited property
  - Source of affordances for interoperability between nodes: O_7 (local jurisdiction) & O_8 (multiple layers)

- **Internal:** locally-shaped platforms interoperating between them and/or at a broader level. E.g. nodes in cooperatives

- **External:** between different CBPP communities. E.g. second level cooperatives, exchange of value (De Filippi and Hassan, 2015)

In conclusion...

	Tokenisation	Self-enforcement and formalisation	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				✓

In conclusion...

- Bringing together literature on CBPP to governance through blockchain debate: Ostrom
- Identification of potential affordances for collective action
- Emergence of research questions

Need to explore: boundaries, models, culture, as situated technology… time to go to the field!

References

- Atzori, M. (2015). Blockchain Technology and Decentralized Governance: Is the State Still Necessary? SSRN Electronic Journal. https://doi.org/10.2139/ssrn.2709713
- Bell, Genevieve, 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, Primavera and Hassan, Samer, 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, Primavera, and Samer Hassan. "Blockchain technology as a regulatory technology: From code is law to law is code." arXiv preprint arXiv:1801.02507 (2018).
- 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., Martíınez, 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/D12 31July 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

References

- 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
- 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.
- Hutchby, I. (2001). Technologies, texts and affordances. Sociology, 35(2), 441-456.
- Jonhston (2014), http://www.johnstonslaw.org/ accessed on 29th May 2108
- 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.
- 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).
- 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

Thanks!

Any questions?

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