P2P MODELS

When Ostrom Meets Blockchain

Exploring the Potentials of Blockchain for Commons Governance

David Rozas[1], Antonio 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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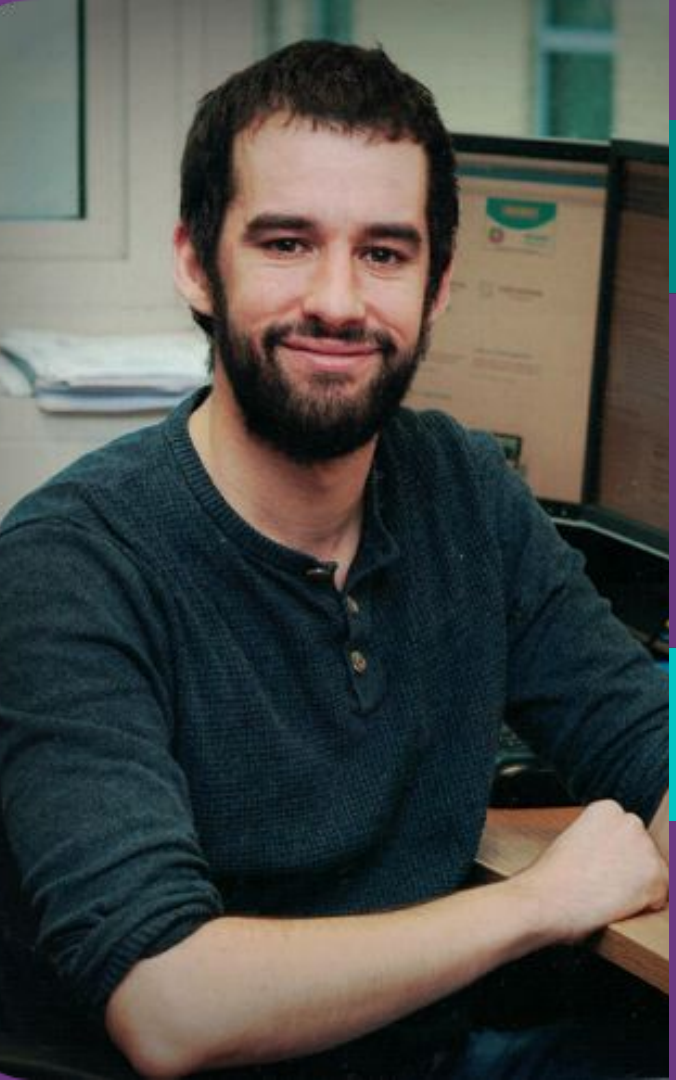


¡Hola!

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. Key concepts around decentralised technologies.

2. The emergent debate on *blockchain-based* governance

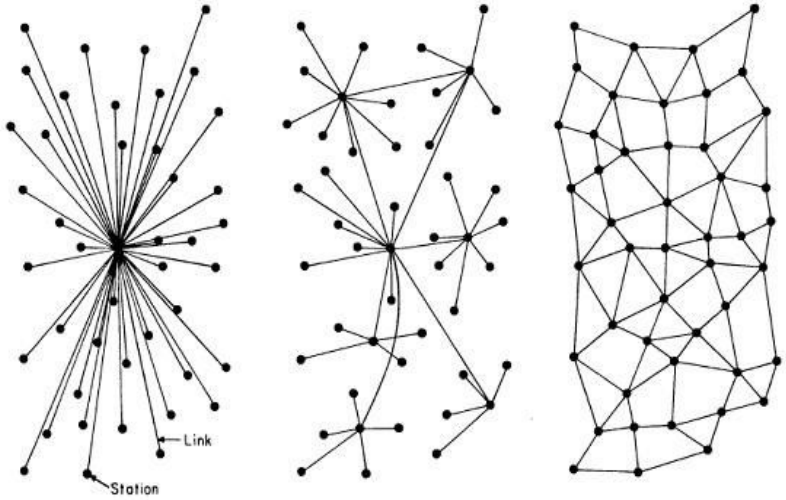
3. Commons-Based Peer Production, commons governance and Ostrom's principles.

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)

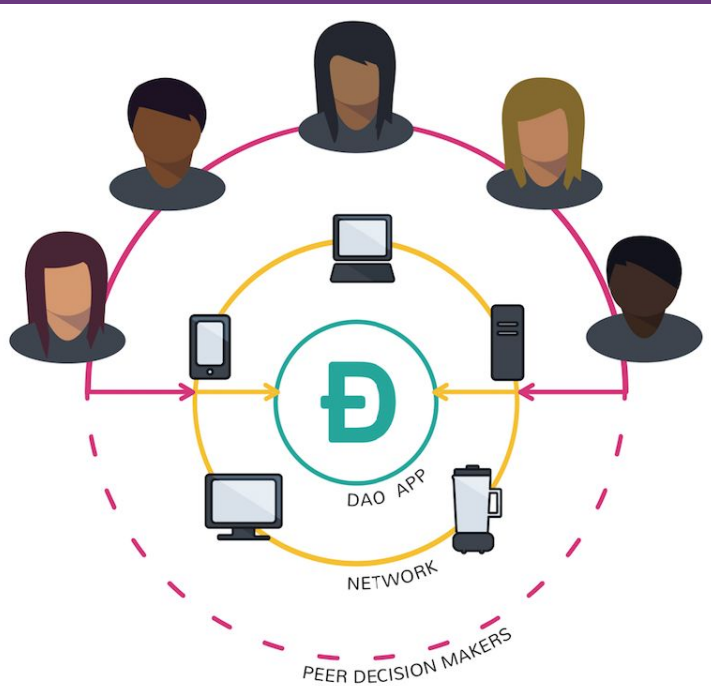
- Snippets of code on the blockchain.
- Decentralised execution.
- Rules automatically enforced without central authority.

DAO
DISTRIBUTED AUTONOMOUS 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 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.

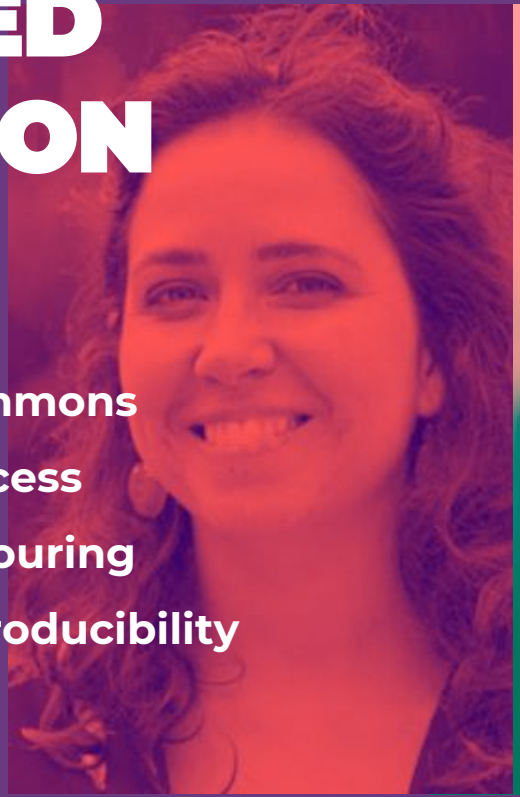
COMMONS-BASED PEER PRODUCTION

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**
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 and Ostrom's 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

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**

BLOCKCHAIN AS SOURCE OF AFFORDANCES*?

I
Tokenisation

II
Self-enforcement and formalisation of rules

III
Autonomous automatisation

IV
Decentralisation of power over the infrastructure

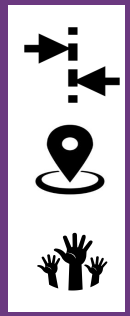
V
Transparentisation

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 or modify a resource).



- Rights more easily and granularly defined, propagated and/or revoked.
- Artefacts as source of explicitation of less visible forms of power and value.

SELF-ENFORCEMENT & FORMALISATION OF RULES

II

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

- Rules for pooling, capping or mutualising.
- Explicitation.
- Autonomy from higher authorities.

AUTONOMOUS AUTOMATISATION

III

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

- 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.

- 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

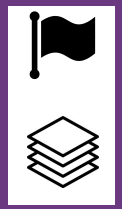
Opening organisational processes and associated data, relying on persistency and immutability of blockchain

- 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.



- Internal interoperability: locally-shaped platforms, autonomously governed, interoperating between them and/or broader level.
- External interoperability: coordination between different colectives.

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			✓			✓

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)

CODIFICATION OF TRUST

Beyond contractual transactions amongst selfish individuals, hobbessian values: “Crypto-leviathan” (Reijers et al. ,2016).

Shift of trust: code is law -> law is code

Filippi and Hassan, 2018),

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.

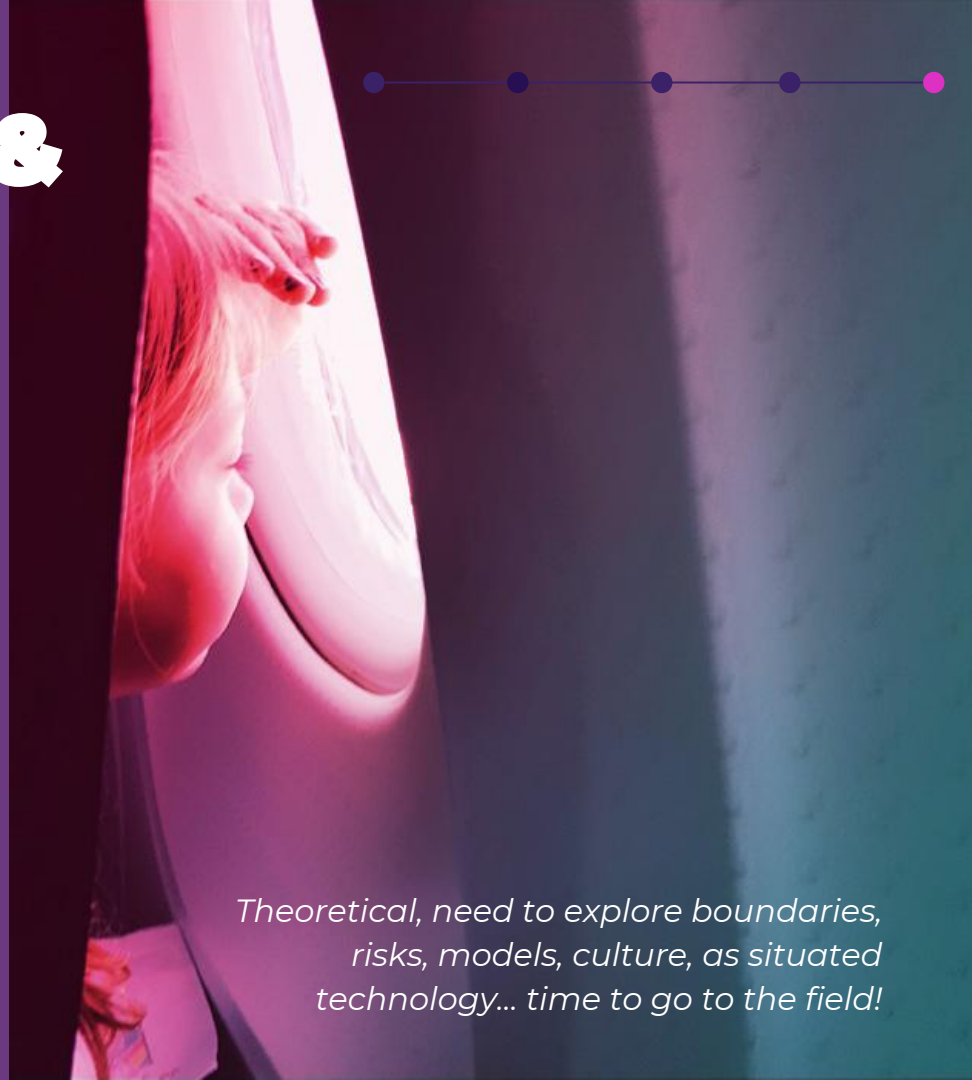
As potential source of affordances (Gibson, 1979; Hutchby, 2001)

WORKING PAPER AT SSRN

5. Conclusion and future work

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!

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

THANKS!

Any questions?

You can find me at:

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

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Slides at https://bit.ly/2DpJ3cU