"Ostrom's crypto-principles"? Towards a commons-based approach for the use of Blockchain technologies for self-governance

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Nearly a decade after the publication of the white paper in which Bitcoin and Blockchain came to light (Nakamoto, 2008), there remains a need to understand whether the key technical properties introduced by Blockchain, such as decentralisation, inmutatibility and transparency, do indeed offer transformative capacities. For example, could they foster the experimentation and emergence of new forms of *blockchain-facilitated* governance?

The limits, balances and tensions between the technical and social aspects of these speculative new forms of governance are starting to attract the attention from social science perspectives (Risius & Spohrer, 2017). Two confronting standpoints seem, however, to be dominating the current debate. On the one hand, techno-determinist perspectives, which envisage the emergence of new forms of governance characterised primarily by decentralisation and rely on the idea of "market". For example, they commonly assume that hierarchies between the participants in the decision-making processes seem to vanish thanks to the disintermediation enabled by distributed consensus and trustlessness (e.g Swan (2015), Hayes, (2016)). These accounts, however, tend to ignore the complexity of social organisation. They provide over-reductionist accounts with regards to the distribution of power, failing to acknowledge issues such as the generation of oligarchies (Atzori, 2015, pp. 26-30). On the other hand, there is a critical stand with these techno-determinist perspectives which tends to reinforce the role of traditional central authorities as inherently necessary to enable democratic governance (Atzori, 2015). This reflects the traditional responses against unregulated markets from positions that reinforce the role of the state: envisioning blockchain properties in non transformative ways to more efficiently exert the control required by traditional centralised forms of governance. For example, providing more transparency to central institutions (Nguyen, 2016) or more efficient mechanisms to avoid tax fraud (Ainsworth & Shact, 2016).

In this paper we aim to analyse the extent to which it would be feasible to incorporate principles from self-governance which neither rely on the logics of private markets, as implicitly assumed by these former perspectives, nor on the coercion of traditional centralised institutions, as in the case of these latter accounts. Our aim is to begin to bring together the literature on the self-governance of common goods within this emerging debate on these new forms of *blockchain-facilitated* governance. With that purpose, we develop from traditional studies on the

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organisational aspects of how shared goods or resources might be governed. More specifically, we aim to contribute to this discussion by drawing on the work of the Nobel laureate economist Ostrom (1990   ), whose research showed that under certain conditions common goods can be managed in a sustainable way by local communities of peers, demystifying ``The tragedy of the commons'' (Hardin, 1968). As part of her work, she identified a set of principles (Ostrom, 1990, pp. 82-102) for the successful management and governance of these common goods. Although these principles were originally defined in the context of self-governance of natural goods, they have also been applied and adapted within the development and analysis of self-governance for digital commons (e.g. Viégas et al. (2007), Hess & Ostrom, (2007), Hess, C. (2008), Forte et al. (2009)). Thus, in this paper we aim to reflect on whether the autonomy, transparency and accountability properties of Blockchain could facilitate and foster commons-based approaches for self-governance, contrasting the benefits, limitations and drawbacks. For example, can communities implement mechanisms in a blockchain to distribute power or to resolve conflicts among the participants (Ostrom ,1990, pp. 100-101)? Could blockchain technologies help to scale up self-organisation by providing a "from the bottom-up" approach to define rules at different autonomous levels, rather than relying on a "one-size-fits-all" regulation (Ostrom ,1990, pp. 92-94)? Or, what is the impact of the distribution of the ownership of infrastructures enabled by blockchain technologies on the community governance (Fuster-Morell, 2010)?

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