

The Challenges of Distributed Administrative Systems

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IN 2019 THE COPYRIGHT AGENCY CONDUCTED A PILOT USING BLOCKCHAIN TECHNOLOGY for the administration of resale royalties for Indigenous artworks. The Copyright Agency is one of over a dozen collecting societies in Australia, each of which collects particular kinds of royalties on behalf of producers. When an artwork is resold in Australia through a gallery or auction house it must be reported to the Copyright Agency, whereon the artist or their beneficiary receives five per cent of the resale price of eligible artworks (Department of Communications and the Arts). Over the decade since the scheme commenced, the Copyright Agency has handled over 20,000 resales of work by over 1900 artists or rights holders. 64 per cent of the artists receiving royalties are Indigenous and they have received 38 per cent of the royalties paid.

The pilot was intended to test the automation of some of the collecting society's functions, as well as investigate how distributed registries are built and maintained. I encountered the Copyright Agency prior to the pilot when they were still learning about blockchain and later at a forum where they presented the results of their proof-of-concept to other cultural sector organisations. The Copyright Agency's Judy Grady reported that the pilot succeeded insofar as the technology worked (Grady). The main challenge she identified was achieving coordination among the network of entities providing data.

Experiments such as that conducted by the Copyright Agency are different from both the established processes of bureaucracies and the so-called 'public' blockchains (including Bitcoin) which enable individuals to exchange value without formal intermediaries. These applications typically involve the automation of processes within existing institutional arrangements, addressing the governmental functions of an organisation and the network of entities and individuals who interact with it. Such examples show the challenges of automating institutional actions from existing ways of doing and the reordering required for distributed systems to work. Adam Hayes has argued in relation to Bitcoin that in order to know whether blockchain matters we need to investigate how it structures social interactions (Hayes 51). In the case of these agency-led experiments, that involves looking at how distributed technologies flatten hierarchical processes, require cooperation across a network, and reveal the capacities of those involved.

Aspirational Infrastructures

The late wheelchair-using comedian Stella Young once said 'I became an atheist when I heard there was a stairway to heaven'. She was pointing out the fundamentally relational nature of infrastructures, and how they become defined by what we do with them (as theorised by Star). The technological transformation of administrative and governmental activities has been documented in the histories of infrastructures, including railroads (Weber), passports (Torpey) and bureaucracies (Tilley; Foucault). These technologies were used to strengthen links between the centre and the periphery—physically through the movement of troops and tax collectors, and administratively by defining the membership of the state. Sociologists and anthropologists have also examined the operation of computing infrastructures in order to understand how systems and standards shape rules and practices (Star and Ruhleder; Busch). There is also a 'poetics of infrastructures' (Larkin) in that infrastructures can be developed with aesthetic dimensions that are separate to their technical function, which enable us to understand what is possible in society. Some computing systems, such as those built using open source code, alter the way that innovations are developed and how resources are allocated (Benkler, Kelty).

The documentation, innovations and debates emanating from the blockchain community are overt on the aspirational dimensions of this new infrastructure. Blockchain presents an alternative design for information sharing in an adversarial environment without the need for a central controller (Rauchs et al.). Instead, economic incentives are used to secure blockchains against attack. The aspiration inherent is that the distributed design will also work to decentralise power.

In addition, blockchain developers posit that the fabric of social coordination, including institutions and firms, can be automated (Buterin). One of the earliest thinkers and contributors to blockchain technology, Nick Szabo, has written of the need for innovations in ‘social scalability’, by which he means ‘improvements that move function from mind to paper or mind to machine, lowering cognitive costs while increasing the value of information flowing between minds, reducing vulnerability, and/or searching for and discovering new and mutually beneficial participants’ (Szabo).

At the core of these designs is the concept of cooperation. We rely on organisations and institutions when we can’t trust the actions of another but need to work with them to get something done. Institutions exist because we find it impossible to trust the other party if they are not known to us personally or if there are unequal power relationships at play. Distrust has therefore been useful in society in that it has driven us to create structures that help limit exploitation and protect those who cannot protect themselves (Cook, Hardin and Levi).

Blockchain is one such structure. It was designed to perform the tasks of institutions using code, including the creation and maintenance of registries for property, identity and other social facts that enable markets and governments to function (Berg, Davidson and Potts). The distributed design of blockchains means that we can trust the ledger has not been tampered with, reducing if not eliminating the processes, roles and firms that have been built to carry out those functions. While that may read like economic theory, it can and should also be treated as an empirical data point—a design decision that has led to the creation of specific protocols. The unknown is not what blockchain technology is, or even what it is for (there are countless ‘use cases’), but how it structures the actions of those who use it.

Data Capacities and Distributed Systems

What can we know from these modest attempts to use blockchain for existing governmental processes? Latour writes that we need to pay attention to the ‘heterogenous set up of elements that allow circulation to occur’ (32) and not confuse what circulates once everything is in place with the setups involved. Only then can we see the associations that need to be ‘knitted together’ for a thing to work.

From what is being reported from experiments such as the Copyright Agency’s, it is clear that the usual machinations of compliance, accountability and record-keeping do not seamlessly transition into distributed architectures. For instance, the Copyright Agency learnt that to use blockchain for their scheme they needed to link data in a secure and chronological order. That required distinguishing

between the primary sale versus the resale of the work, including when it was acquired (a royalty is not payable if the seller acquired the work before 9 June 2010). The technology itself was easy to implement; the problem was 'social coordination' (Grady).

If one gallery did not participate then the Copyright Agency was left with an incomplete record. In addition, how could the Agency ensure that the information provided by all within the supply chain, including galleries and auction houses, was correct? The Copyright Agency does not perform the role of authentication, but it needs assurance that what is being added to a ledger is correct in order to fulfil its role.

The issue of networked capacities and how they are developed is therefore important. In areas including anti-money laundering, public-private partnerships such as the Fintel Alliance (established by AUSTRAC) are using data-matching and machine learning to share data in a privacy-preserving manner. These are not blockchain-based systems, but they do indicate that consortia for data-sharing can occur in highly regulated fields and under the threat of criminal offences and fines. Can blockchains help coordinate governmental actions in the absence of penalties?

While resale royalties exist through legislation, the domain they deal with is one where data practices are less controlled. Unlike financial data, which is subject to various restrictions (including the immanent Consumer Data Right), many creative industries businesses would not even meet the threshold that defines what companies must conform to the Australian Privacy Principles. When it comes to data practices, failures often arise from outdated technologies and poor management and governance (Productivity Commission). IT security experts seek technical and automated solutions because it reduces human error and corruption. Blockchain technology may result in better data practices not because the technology is more trusted, secure or private, but because participation requires organisations to lift their game.

A further question of cooperation that arises is the extent to which those who deal with governmental functions are willing to look beyond their own immediate needs and create administrative infrastructures that benefit the system in other ways. For instance, in 2011 the Resale Royalty Right for Visual Artists Act 2009 and accompanying Scheme were amended so that only artistic works valued over \$1000 need to be reported to the Copyright Agency. The change was in response to industry feedback that items valued under \$1000 (including crafts and souvenirs) are rarely resold, creating an unnecessary administrative burden (Department of Communication and the Arts). And yet for Indigenous arts some

means of identifying the originality of a work under that threshold is beneficial, potentially decreasing the market for fake Indigenous goods.

While the Copyright Agency didn't seek to address this problem, their partner in the blockchain project, Desart (the peak arts body for over 30 Central Australian Aboriginal Art centres), is addressing this and looking into the use of digital labelling options to provide better information and confidence to consumers. IP Australia has been looking at measures such as smart trademarks to combat the market for fakes, including one trial involving blockchain (led by the South Australia Museum). The heterogeneous elements of administration in this case are being transformed through tools for establishing provenance (blockchain as well as internet of things technologies including smart trademarks and canvases) and tracing goods as they move through a supply chain. The possibilities for shared infrastructures are significant, yet these will also require changes to how things are done, and may require altering regulatory requirements in some instances.

A further point raised by Grady in her presentation was that the Copyright Agency was left wondering how they would deal with multiple blockchain galleries or other art market platforms if these become significant players. The online galleries she was referring to create tokens, or 'digital twins', of artworks that contain metadata of an object's history as well as enabling fractional ownership. Agencies may need to develop ways of working with blockchain companies—including being party to smart contracts—in order to carry out their functions effectively.

Or it may be the case that agencies themselves will become redundant. Under Australian law, the rights holder may notify the Copyright Agency that they do not want it to collect the resale royalty owing on a particular commercial resale, or the rights holder can choose not have the right enforced at all. Blockchain-based galleries could assume this role at the behest of artists (dada.nyc, for instance, intends to automate a resale royalty for the resale of digital works developed on its platform). If the time comes when people begin to prefer blockchain platforms over established systems, it will be necessary to examine what other functions agencies perform (if any) that cannot be automated and any resulting problems arising from blockchain-facilitated regulation.

Conclusion

The blockchain experiments being conducted within statutory agencies and other governmental organisations are part of the here and now of blockchain. They are motivated by the possibilities of distributed systems, yet produce immediate problems regarding the automation of institutions. Mechanisms for cooperation extend beyond protocols that reduce the need for trust: the capacities of organisations, their data practices and their willingness to look beyond their

immediate needs towards the construction of shared infrastructures will also influence the prospects for blockchain-based institutions.

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Works Cited

- Benkler, Yochai. *The Wealth of Networks: How Social Production Transforms Markets and Freedom*. New Haven: Yale UP, 2006.
- Berg, Chris, Sinclair Davidson, and Jason Potts. *Understanding the Blockchain Economy: An Introduction to Institutional Cryptoeconomics*. Cheltenham: Edward Elgar, 2019.
- Busch, Lawrence. *Standards: Recipes for Reality*. Cambridge: MIT Press, 2011.
- Buterin, Vitalik. 'Bootstrapping A Decentralized Autonomous Corporation: Part I.' 20 September 2013 <<https://bitcoinmagazine.com/articles/bootstrapping-a-decentralized-autonomous-corporation-part-i-1379644274>>. 20 Feb. 2020.
- Cook, Karen S., Russell Hardin and Margaret Levi. *Cooperation Without Trust?* New York: Russell Sage Foundation, 2005.
- Department of Communications and the Arts. 'Post-Implementation Review—Resale Royalty Right for Visual Artists Act 2009 and the Resale Royalty Scheme.' 23 December 2019. <<https://www.arts.gov.au/documents/post-implementation-review-resale-royalty-right-visual-artists-act-2009-and-resale-royalty-scheme>>. 28 Feb. 2020.
- Foucault, Michel. 'The Subject and Power.' *Critical Inquiry* 8.4 (1982): 777-95.
- Grady, Judy. Presentation on behalf of the Copyright Agency at 'Short, Sharp and Immediately Useful,' AFTRS (The Australian Film, Television and Radio School), Sydney, 27 February 2020.
- Hayes, Adam. 'The Socio-technological Lives of Bitcoin.' *Theory, Culture and Society* 36.4 (2019): 49-72.
- Kelty, Chris. *Two Bits: The Cultural Significance of Free Software*. Durham: Duke UP, 2008.
- Larkin, Brian. 'The Politics and Poetics of Infrastructure.' *Annual Review of Anthropology* 42 (2013): 327-43.
- Latour, Bruno. *An Enquiry into Modes of Existence: An Anthropology of the Moderns*. Cambridge: Harvard UP, 2013.

- Productivity Commission. *Data Availability and Use*. Report No. 82, 2017. <<https://www.pc.gov.au/inquiries/completed/data-access/report>>. 1 Nov. 2018.
- Rauchs, Michel, et al. 'Distributed Ledger Technology Systems: A Conceptual Framework.' Cambridge: Cambridge University Judge Business School, 2018.
- Star, Susan Leigh. 'The Ethnography of Infrastructure.' *American Behavioral Scientist* 43.3 (1999): 377-91.
- Star, Susan Leigh, and Karen Ruhleder. 'Steps Toward an Ecology of Infrastructure: Design and Access for Large Information Spaces.' *Information Systems Research* 7.1 (1996): 111-35.
- Szabo, Nick. 'Money, Blockchains, and Social Scalability.' *Unenumerated* (blog). 9 February 2017. <<https://unenumerated.blogspot.com/2017/02/money-blockchains-and-social-scalability.html>>. 1 Oct. 2018.
- Tilly, Charles. *Identities, boundaries, and social ties*. Boulder: Paradigm Publishers, 2005.
- Torpey, John C. *The Invention of the Passport: Surveillance, Citizenship and the State* (2nd ed.). Cambridge: Cambridge University Press, 2000.
- Weber, Eugen. *Peasants into Frenchmen: The modernization of rural France, 1870-1914*. Stanford: Stanford University Press, 1976.