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## Copyright, Interrupted: Building Trust in Blockchain-Based Content Platforms

Corinne Tan\*

[Abstract: *Are blockchains the solution to the disruption of copyright on digital content platforms? While the fundamental features of blockchains, being permanence, transparency and their quality of being decentralized records, may appear suited to fill the gaps left by copyright laws and alleviate some problems for content owners, there are challenges to their use. I argue in this article that trust is a necessary element for blockchain-based content platforms to fulfil their revolutionary potential in the copyright realm.*]

### Introduction

Blockchain systems, being the core technologies behind Ethereum, Bitcoin, Initial Coin Offerings (ICOs) and countless cryptocurrencies, et cetera, use technical protocols to create secure ledgers that report transactions to everyone within the networks.<sup>1</sup> The inherent nature of blockchain technologies – namely, being transparent, decentralized and open source – have been observed to appear compatible with the fundamentals of copyright laws.<sup>2</sup> Because of the success of Bitcoin, the predecessor of blockchain technologies, it is believed that these technologies could empower disintermediated, smart and cryptographic models of social organizations.<sup>3</sup> The high visibility of blockchains in cryptocurrencies has resulted in the widespread exploration of their application to other domains such as copyright.<sup>4</sup> There is a significant deployment of blockchain technologies in the online music sector,<sup>5</sup> although we are still in the early stages of their application to copyright protected content.

The common characteristics of a blockchain system which make it relevant to copyright have been identified as follows:<sup>6</sup> (1) A blockchain is an append-only database of which all users have access to the same full transaction history and have the ability to verify any record;<sup>7</sup> (2) As a distributed ledger, a blockchain records ownership and other transactions of digital tokens. As such, any type of information can be expressed as a token, using a cryptographic signature – this information could include a copy of the protected work itself, or a record of the rights management information (RMI) for protected content, et cetera;<sup>8</sup> (3) Smart contracts which are

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<sup>1</sup> See, eg, Satoshi Nakamoto, ‘Bitcoin: A Peer-to-Peer Electronic Cash System’, *Bitcoin* (1 November 2008) <<http://www.bitcoin.org/bitcoin.pdf>>; Annabel Tresise, Jake Goldenfein and Dan Hunter, ‘What Blockchain Can and Can’t Do for Copyright’ (2018) 28(4) *Australian Intellectual Property Journal* 144.

<sup>2</sup> See, eg, B. Bodo, D. Gervais and J.P. Quintas, ‘Blockchain and smart contracts: the missing link in copyright licensing?’ (2018) 26 *International Journal of Law and Information Technology* 311.

<sup>3</sup> D Tapscott and A Tapscott, *Blockchain Revolution: How the Technology Behind Bitcoin is Changing Money, Business and the World* (Portfolio, 2016).

<sup>4</sup> See, eg, Bodo, Gervais and Quintas, above n 2, 312.

<sup>5</sup> Ibid.

<sup>6</sup> Ibid 314.

<sup>7</sup> See, eg, A Narayanan and others, *Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction* (Princeton University Press, 2016).

<sup>8</sup> See, eg, Bodo, Gervais and Quintas, above n 2, 315.

self-enforcing and immutable are the algorithmic account holders on a blockchain;<sup>9</sup> (4) In the blockchain environment of decentralization and (non-absolute) disintermediation,<sup>10</sup> the transactions need not be routed through central third parties for entities to engage with one another; and (5) A blockchain may be open (ie, relying on open source code which anyone can alter) or closed (ie, where who can participate in the transaction validation process is limited).

### **Blockchains as a solution**

It has been argued that copyright registration systems on blockchain-based platforms can overcome issues relating to proof of copyright ownership and user accessibility for the volume of digital works generated daily.<sup>11</sup> In this respect, although mandatory formalities are prohibited under the *Berne Convention for the Protection of Literary and Artistic Work (Berne Convention)*,<sup>12</sup> voluntary registration systems on blockchains can prove useful when it comes to determining the duration of any copyright term for a work and in searching for licensing terms.<sup>13</sup>

More specifically, blockchains are seen to hold promise in resolving the dilemmas posed by orphan works of which copyrights are still valid, but for which no author can be found.<sup>14</sup> Goldenfein and Hunter have proposed that blockchain technologies can be deployed to create a register of attempts to look for copyright holders of particular works, failing which certain works can be delivered into ‘orphan-hood’, hence affording the rights for others to use such works after the searches for the copyright holders are deemed ‘diligent’.<sup>15</sup>

Additionally, given that blockchains record information and transactions undertaken, they have the capacity to allow for a more comprehensive RMI registry. On the one hand, smart contracts can lower transaction costs through automating direct licensing, which removes the conventional middlemen in licensing transactions and potentially generates immediate remuneration for artists.<sup>16</sup> Artists who are also copyright holders can hence offer the licensing of their content at lower and more reasonable prices. On the other hand, because smart contract-based licensing can establish global licensing standards, similar to the Creative Commons (CC) licenses, licensing may become comparatively costlier in the long term.<sup>17</sup> Regardless of costs, in any case, content owners would appear to be working with, rather than against, technology, in adopting blockchains. Such use could inspire a culture that embraces the legal use of copyright protected content, resulting in a regime which is potentially self-regulating.<sup>18</sup>

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<sup>9</sup> Ibid 316.

<sup>10</sup> Complete dis-intermediation is not practical in some cases such as when it comes to online music, since the platforms assume the role of intermediaries in controlling the rights management information datasets for musical works and recordings held by collective management organisations. See, eg, Bodo, Gervais and Quintas, above n 2, 319.

<sup>11</sup> Tresise, Goldenfein and Hunter, above n 1, 146.

<sup>12</sup> *The Berne Convention for the Protection of Literary and Artistic Works*, opened for signature 9 September 1886, 1161 UNTS 30 (entered into force 5 December 1887) (*Berne Convention*) Art 5(2).

<sup>13</sup> See, eg, Graham Greenleaf and David Lindsay, *Public Rights: Copyrights' Public Domain* (Cambridge University Press, 2018) 271.

<sup>14</sup> Tresise, Goldenfein and Hunter, above n 1, 156.

<sup>15</sup> Jake Goldenfein and Dan Hunter, ‘Blockchains, Orphan Works, Public Domain’ (2017) 41 *Columbia Journal of Law and Arts* 1.

<sup>16</sup> See, eg, Bodo, Gervais and Quintas, above n 2, 315; Tresise, Goldenfein and Hunter, above n 1, 151.

<sup>17</sup> Bodo, Gervais and Quintas, above n 2, 331.

<sup>18</sup> Nick Vogel, ‘The Great Decentralization: How Web 3.0 Will Weaken Copyrights’ (2015) 15 *The John Marshall Review of Intellectual Property Law* 136, 149.

## Challenges in using blockchains

One question that arises particularly when blockchain systems are utilized for copyright registration is whether such copyright registries should be managed at the international, domestic or private level.<sup>19</sup> It has been highlighted that there is little utility for the World Intellectual Property Organisation (WIPO) or any government to fund and operate such a copyright registry, given that copyright registration is not a mandatory requirement to the function of copyright laws under the *Berne Convention*.<sup>20</sup> On this note, it has been observed that private players have started exploring using blockchains for *both* copyright registration and rights management – indeed, for a private player to remain viable, it would need to provide licensing and access to content, in addition to managing a copyright registry.<sup>21</sup>

Secondly, there is a lack of congruence between copyright and contract law that we need to consider. As the consequence attached to a blockchain-based transaction is technologically enabled, it will arguably be implemented on the blockchain, even if the desired legal effects are not achieved. This could occur, for instance, when a person gives another a token representing his or her copyright claim with the intention of transferring ownership of the work – while such person is not meeting the requirement for the assignment of copyright to be in writing so as to be valid,<sup>22</sup> it can nonetheless be effected by virtue of the blockchain system.<sup>23</sup> In this respect, the utilization of smart contracts for licensing may potentially bypass some tenets of intellectual property law, effectively subsuming intellectual property law under contract law.<sup>24</sup> In further elaboration of this, while copyright laws operate on territorial bases, the use of smart contracts establishes privately negotiated contractual frameworks that comprise of their own rules to define the use of copyright protected content, similar to specific contractual tools such as the Free/Libre Open Source Software (FLOSS) and the CC licences.<sup>25</sup> Such rules constitute a system that apply equally to all persons, regardless of where they are from or where they act.

Thirdly, notwithstanding that blockchain technologies allow for the licensing of copyright protected content via smart contracts, conflicts could emerge between smart contracts and traditional licenses – this could happen if off-(block)chain transactions are not recorded on a digital ledger, henceforth resulting in the desynchronization of the relevant blockchain.<sup>26</sup> It has therefore been suggested that the introduction of a blockchain system may have, contrary to what is expected, the *opposite* effect to reducing information uncertainty and increasing trust.<sup>27</sup> Such conflicts between smart contracts and traditional licences can be resolved, however, if one coordinating entity takes responsibility for both off and on-(block)chain records – this can

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<sup>19</sup> Tresise, Goldenfein and Hunter, above n 1, 148.

<sup>20</sup> *Berne Convention*, art 5(2).

<sup>21</sup> Tresise, Goldenfein and Hunter, above n 1, 149.

<sup>22</sup> See, eg, *Copyright Act 1968* (Cth) (*Australian Copyright Act*) in Australia (*Australian Copyright Act*) s 196(3); *Copyright Act* (Singapore, cap 63, 2006 rev ed) (*Singapore Copyright Act*) s 194(3).

<sup>23</sup> Bodo, Gervais and Quintas, above n 2, 322.

<sup>24</sup> Aaron Wright and Primavera De Filippi, *Decentralised Blockchain Technology and the Rise of Lex Cryptographia* (10 March 2015) <[https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2580664](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2580664)>.

<sup>25</sup> *Ibid.*

<sup>26</sup> Bodo, Gervais and Quintas, above n 2, 323.

<sup>27</sup> *Ibid.*

arguably be achieved through human coordination<sup>28</sup> before automated means become available.

Fourthly, where cryptocurrencies are used to remunerate the copyright holders, their fluctuations in value and their inherent lack of stability could mean that they remain unappealing for use as modes of payment.<sup>29</sup> In addition, where smart contracts are tied to cryptocurrencies to clear the relevant transactions, there is a lack of clarity around what the adjudicative or administrative processes for the tracing and release of funds will be, as and when contractual breaches occur.<sup>30</sup>

Finally, there is no specific legal protection of ‘copyright-replacing blockchain-related technological innovations’ at this point in time.<sup>31</sup> There may, however, be a need for special online intermediary exemptions from liability for blockchain platform operators (as well as people storing digital content to which the blockchain records links) due to the fact that blockchain records are immutable. Therefore, current laws which provide for the deletion or blocking of access to relevant content as a condition for intermediary exemptions to apply need to be adapted to accommodate the realities of how blockchain technologies function.<sup>32</sup> One reason is that removing content from a public blockchain within one jurisdiction will not affect the chain in another jurisdiction.<sup>33</sup> Henceforth, blockchains could affect the way copyright holders respond to copyright infringement. Instead of asking for content to be removed under the United States’ (US’) *Digital Millennium Copyright Act (DMCA)* or other statutes,<sup>34</sup> copyright holders may have to file more injunctions than is typical to block access to links – as such, attempts for enforcement of copyright could prove prohibitively expensive.<sup>35</sup>

Additionally, as a result of the permanence of blockchain records, a public blockchain in this respect could theoretically expose all node owners within the blockchain to both criminal and civil liabilities.<sup>36</sup> To complicate matters further, any transaction that occurs on the blockchain could potentially fall under the jurisdiction(s) of the location of each node within the network.<sup>37</sup> Henceforth, *how* such liabilities arise and *the extent* to which they do, will be subject to a number of legal regimes. It has been argued that node owners could avoid liability if they fall within the definition of an Internet Service Provider (ISP) under the copyright laws of the relevant jurisdiction, thereby entitling them to the protection of the legislative safe harbour

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<sup>28</sup> Ibid.

<sup>29</sup> Michele Finck and Valentina Moscon, ‘Copyright Law on Blockchain: Between New Forms of Rights Administration and Digital Rights Management 2.0’ (2019) 50 *International Review of Intellectual Property and Competition Law* 77, 97.

<sup>30</sup> Tresise, Goldenfein and Hunter, above n 1, 153.

<sup>31</sup> Bodo, Gervais and Quintas, above n 2, 332.

<sup>32</sup> See, eg, Alexander Savelyev, ‘Copyright in the Blockchain Era: Promises and Challenges’ on *National Research University Higher School of Economics Working Papers* (2017) <[https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3075246###](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3075246###)>.

<sup>33</sup> For instance, Bitcoin has several thousand reachable nodes hosting and validating exact replicas of its blockchain, see Garry Gabison, ‘Policy Considerations for the Blockchain Technology Public and Private Applications’ (2016) 19(3) *Science and Technology Law Review* 327, 337.

<sup>34</sup> See, eg, *Digital Millennium Copyright Act*, 17 USC § 512 (1998) (*DMCA*) and other legislation implemented pursuant to the *Directive 2000/31/EC* of the European Parliament and of the Council of 8 June 2000 on certain legal aspects of information society services, in particular electronic commerce, in the Internal Market [2000] OJ L 178/1 (*E-Commerce Directive*).

<sup>35</sup> See, eg, Gabison, above n 33, 337.

<sup>36</sup> Ibid 339. See also Audrey Rogers, ‘From Peer-to-Peer Networks to Cloud Computing: How Technology is Redefining Child Pornography Laws’ (2013) 87 *St John’s Law Review* 1013, 1045.

<sup>37</sup> World Economic Forum, *Redesigning Trust: Blockchain Deployment Toolkit* (April 2020) <<https://widgets.weforum.org/blockchain-toolkit/legal-and-regulatory-compliance>>.

provisions<sup>38</sup> insofar as they respond promptly to remove or disable access to content claimed to be infringing.<sup>39</sup> It could, however, be impractical for courts to require many users with computing power (also called super-nodes) to police and control the transactions occurring on the relevant blockchain, particularly where the power to alter such blockchain is shared equally among its users.<sup>40</sup> Furthermore, given that running a node can be carried out by anyone who is keen to do so,<sup>41</sup> exempting all node owners under safe harbour provisions could prejudice copyright holders.

## Examples of blockchain systems

In general, revenue from music has typically been unfairly distributed in favour of major labels and record companies, to the detriment of artists who create the music. These artists get a small percentage of the revenue which sometimes takes a few years to reach them.<sup>42</sup> As mentioned earlier, smart contracts on blockchains can alleviate this state of affairs, through the elimination of the traditional middlemen in the music industry, thus allowing for artists to be compensated almost instantaneously.<sup>43</sup> In this respect, blockchains arguably allow for music to be produced, purchased and listened in a more transparent manner. This results in a fairer outcome for the artists involved. An example of a blockchain-based platform is Ujo music: artists can upload, license and manage the distribution of their works.<sup>44</sup> Another example of such a platform is Mediachain,<sup>45</sup> which has been acquired by digital music service Spotify in 2017 for the purpose of having a ledger that serves as a database with information on the rights over music files, thus resolving issues around royalty payments and attribution.<sup>46</sup>

Blockchain-based platforms can also be adopted for other types of copyright protected content. For instance, while Monegraph<sup>47</sup> and Known Origin<sup>48</sup> are examples of platforms that allow artists to utilise smart contracts and licences to claim value for digital artworks, KodakOne provides for the licensing of digital images.<sup>49</sup> There is also Artbit,<sup>50</sup> which is a live concert hosting blockchain-based platform that makes payments to the artists (or performers) of live concerts possible.

## Important considerations and their implications

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<sup>38</sup> See, eg, *DMCA*, § 512(c); the *Copyright, Patents and Designs Act 1988* in the United Kingdom (*UK Copyright Act*), s 97A, read together with the *E-Commerce Directive Regulations 2002*; and *Singapore Copyright Act*, s 193D.

<sup>39</sup> Gabison, above n 33, 339.

<sup>40</sup> See, eg, Thibault Schrepel, *Anarchy, State and Blockchain Utopia: Rule of Law vs. Lex Cryptographia* (2020) <[https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3485436](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3485436)> .

<sup>41</sup> See, eg, Jimi S, *Blockchain: What are nodes and masternodes?* (2018) <<https://medium.com/coinmonks/blockchain-what-is-a-node-or-masternode-and-what-does-it-do-4d9a4200938f>>.

<sup>42</sup> See, eg, Good Audience, *Get ready to ditch your favourite Spotify: blockchain enters the music industry* (9 October 2018) <<https://blog.goodaudience.com/get-ready-to-ditch-your-favorite-spotify-blockchain-enters-the-music-industry-573e4899921>>; Sam Daley, *17 blockchain music companies re-shaping a troubled industry* (16 March 2019) <<https://builtin.com/blockchain/blockchain-music-innovation-examples>>.

<sup>43</sup> See, eg, Bodo, Gervais and Quintas, above n 2, 315; Tresise, Goldenfein and Hunter, above n 1, 151.

<sup>44</sup> Ujo Music, *Ujo Music* <<https://ujomusic.com/>>.

<sup>45</sup> Mediachain, *Mediachain* <<http://www.mediachain.io/>>.

<sup>46</sup> See, eg, Sarah Perez, *Spotify acquires blockchain startup Mediachain to solve music's attribution problem* (26 April 2017) <<https://techcrunch.com/2017/04/26/spotify-acquires-blockchain-startup-mediachain-to-solve-musics-attribution-problem/>>.

<sup>47</sup> Monegraph, *Monegraph*, <<https://monegraph.com/>>.

<sup>48</sup> Known Origin, *KnownOrigin* <<https://knownorigin.io/>>.

<sup>49</sup> Kodakone, *Kodakone* <<https://www.kodakone.com/>>.

<sup>50</sup> Artbit, *Artbit* <<https://artbit.com/>>.

Bodo, Gervais and Quintas have highlighted that for blockchain technologies to reach their promise, the blockchain ecosystems must achieve a degree of development, scalability and adoption beyond what there is at this stage.<sup>51</sup> When this occurs, such technologies could then have a significant and transformative impact on the operation of copyright laws online.<sup>52</sup> To elaborate further, an increase in scalability would mean that a blockchain-based platform dependent on network effects<sup>53</sup> (ie, the effects that the number of users of a service has on the value of the service to others) needs to be used by a substantial amount of copyright holders and users so as to include an adequate volume of copyright protected content of interest to its user base.<sup>54</sup> As of 2017, it was assessed that the number of copyright holders prepared to adopt blockchain systems has not reached a critical mass.<sup>55</sup> For now, widespread adoption of blockchains in the field of copyright remains a major challenge that has to be overcome for blockchain-based copyright management systems to be valuable.<sup>56</sup>

Even if there were scalable use of blockchain-based content platforms, we must be mindful that blockchain technologies are a form of code. Thus blockchain systems for copyright registration, licensing and enforcement arguably reinforce the tendency to rely on code (rather than on law) to regulate private actions and transactions.<sup>57</sup> Because code relies on formal algorithms, it has been argued that regulation by code is more specific and less flexible than the legal provisions code purports to implement.<sup>58</sup> Should blockchain technology serve as a regulatory technology, it is important for such technology or code to be properly designed since unstoppable code per se can be extremely strict and intrusive in its enforcement mechanisms – this is unlike the intentional ambiguity of law which integrates exceptions to accommodate edge-cases (as opposed to routine situations) and hence the unpredictability of human life.<sup>59</sup> More ominously, De Filippi and Hassan have argued that while using blockchain technologies to regulate can reflect strong democratic potential, there is a risk that a regime of inflexible and/or totalitarian networked governmentality could be forged within the current economic order.<sup>60</sup>

### *Digital Rights Management (DRM)*

Blockchain systems comprise of general-purpose technologies, allowing them to be deployed - for a wide variety of purposes - both as databases as well as platforms on which other applications run.<sup>61</sup> Finck and Moscon have argued that the following main characteristics of blockchain technologies are leveraged around three main aspects in the copyright domain: firstly, the potential capacity of blockchains to identify a digital asset precisely; secondly, the

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<sup>51</sup> Bodo, Gervais and Quintas, above n 2, 336.

<sup>52</sup> Ibid.

<sup>53</sup> Carl Shapiro and Hal R. Varian, *Information Rules: A Strategic Guide to the Network Economy* (Harvard Business Press, 1999). See also Corinne Tan, *Regulating Content on Social Media: Copyright, Terms of Service and Technological Features* (UCL Press, 2018) 5.

<sup>54</sup> See, eg, Shapiro and Varian, above n 53; Savelyev, above n 32; Finck and Moscon, above n 29, 97.

<sup>55</sup> See, eg, Savelyev, above n 32.

<sup>56</sup> See, eg, Finck and Moscon, above n 29, 98.

<sup>57</sup> See Primavera De Filippi and Samer Hassan, 'Blockchain Technology as a Regulatory Technology: From Code is Law to Law is Code' (November 2016) 21(12) *First Monday* 1, 10.

<sup>58</sup> Ibid.

<sup>59</sup> Ibid 18.

<sup>60</sup> Ibid 19.

<sup>61</sup> Finck and Moscon, above n 29, 84.

ability of blockchains to foster transparent transactions (ie, by way of smart contracts); and thirdly, the potential for blockchains to be developed as DRM.<sup>62</sup>

In relation to the *first* aspect, blockchains allow for the precise tracking of digital assets in the form of time-stamped records which could be used as evidence of authorship and chronology of authorship. This tracking is conducted through the use of tokens which can encode information including the origins and terms of use of content available online – this is valuable particularly for unregistered intellectual property rights such as copyrights.<sup>63</sup> This characteristic of blockchains lends the opportunity to conceive of a registry for copyright as well as its neighbouring rights.<sup>64</sup>

With reference to the *second* aspect, the use of smart contracts to facilitate transactions, as well as to divide and make payments to content contributors immediately enables the instant and transparent remuneration of copyright holders.<sup>65</sup> Such smart contracts can also play a part in standardizing licensing terms for copyright protected works across *varied uses* and in *different jurisdictions*, through the use of comprehensible language that potential licensees can understand.<sup>66</sup> Notwithstanding the absence of traditional intermediaries such as publishers, performance organisations, music labels and the like, the blockchain-based platforms arguably act as a new form of for-profit intermediaries that allow authors, artists and musicians to determine the prices and license their works to interested audiences directly.<sup>67</sup> The existence of these platforms can ameliorate to some extent the problem of unauthorised access to online content and the infringement that sometimes flows from the ease of access and distribution of such content.<sup>68</sup>

In relation to the *third* aspect, DRM as they currently exist could be disrupted by blockchains. It is deployed as a form of private ordering to implement its own objectives - at times conferring factual exclusivity over digital content not eligible for copyright protection and at other times, disregarding copyright exceptions that protect users' rights vis-à-vis copyright holders.<sup>69</sup> In mass contract situations, by way of DRM, content owners as licensors can model terms and conditions which limit the rights of licensees to use copyright protected content.<sup>70</sup> This negates the limits to copyright enshrined in law.<sup>71</sup> Such use of DRM demonstrates that private ordering by code can allow for abuse of a factual exclusivity which has been artificially created<sup>72</sup> and is therefore not legitimized under the relevant copyright laws.

On the other hand, as mentioned above, blockchains can record initial ownership while smart contracts on the blockchains can automate and standardize the licensing of copyright protected content, as well as the remuneration for its use.<sup>73</sup> Here smart contracts can contain and execute contractual code. This will be demonstrated through the independent establishment and self-

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<sup>62</sup> Ibid 93.

<sup>63</sup> Ibid 94.

<sup>64</sup> Ibid.

<sup>65</sup> Ibid 95.

<sup>66</sup> Ibid 96.

<sup>67</sup> Ibid 95.

<sup>68</sup> Ibid.

<sup>69</sup> Ibid 83. See also Hilty RM, 'IP and Private Ordering' in Pila J, Dreyfuss R (eds), *The Oxford Handbook of Intellectual Property Law* (Oxford University Press, 2018) 10.

<sup>70</sup> Finck and Moscon, above n 29, 83.

<sup>71</sup> Ibid 83.

<sup>72</sup> Ibid 84.

<sup>73</sup> Ibid 96.



enforcement of copyright licences, as well as the provision of information about rights in copyright protected content. It has been suggested that having user rights encoded on blockchains could offer copyright holders greater security and stronger protection – in comparison to DRM - against infringers seeking to access the digital content without permissions.<sup>74</sup> This is as the encoded user rights can be verified before the related copyright protected content is decrypted, following which smart contracts come into play to facilitate licensing and remuneration through granting access to such content.<sup>75</sup> The difference between blockchains and the DRM is that blockchains mainly utilise smart contracts that contain information on permissions rather than merely control the copyright protected content.<sup>76</sup> Because smart contracts can do more, they may in fact replicate the undesirable aspects of DRM, going above and beyond copyright laws to protect the content of copyright holders.<sup>77</sup> Thus there is no certainty that blockchain-based copyright platforms using smart contracts can enforce copyright laws in a more balanced manner than DRM systems have done.

### *‘Lex cryptographia’*

Wright and Filippi have used the term *‘lex cryptographia’* to refer to the rules administered through self-executing smart contracts on blockchains and other decentralized mechanisms.<sup>78</sup> That the use of smart contracts on blockchains can subsume copyright under contract law is just one example where blockchains can allow private actors to construct their own systems of rules – such private regulatory frameworks are systems of order (at times with no alignment with law) or *lex cryptographia*.<sup>79</sup> They have argued that the frameworks reliant primarily on *lex cryptographia* will be tougher to regulate since they are enforced automatically by the underlying blockchain-based networks.<sup>80</sup> Additionally, online applications relying on blockchain technologies can be designed to be more independent of the intentions of their centralized intermediaries and are executed in a distributed manner, regardless of their compliance with the law.<sup>81</sup> These applications - implementing their own systems of rules or *lex cryptographia* - hold the potential to create further tensions with existing legal regimes which are focused around regulating the identifiable intermediaries.<sup>82</sup> The focal point of power would then be the informal and invisible rules dictated by programmers deploying the code behind the applications, as a result of which participants in such an environment could be subject to the *‘rule of code’* instead of the *‘rule of law’*.<sup>83</sup>

An advantage identified is that in the absence of enforceability by the rule of law, fundamental rights of copyright holders can still be protected on blockchains.<sup>84</sup> In this sense, the emergence and availability of blockchains may be welcome if the rule of law ecosystem is perceived by copyright holders to have failed to protect their rights adequately. This is in spite of the fact that law, as we conventionally understand it to be, cannot be applied in the blockchain space in the same manner as outside of it – whether this ‘outside’ space refers to the ‘real (physical)

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<sup>74</sup> Ibid 97.

<sup>75</sup> Ibid.

<sup>76</sup> Ibid.

<sup>77</sup> See, eg, Marcus O’Dair, *Distributed Creativity: How Blockchain Technology will Transform the Creative Economy* (Palgrave Macmillan, 2019) 89.

<sup>78</sup> Wright and Filippi, above n 24. See also Schrepel, above n 40.

<sup>79</sup> See De Filippi and Wright, *Blockchain and the Law: The Rule of Code* (Harvard University Press, 2019) 5.

<sup>80</sup> Ibid 6.

<sup>81</sup> Ibid.

<sup>82</sup> Ibid 6 and 50.

<sup>83</sup> Ibid 55.

<sup>84</sup> See, eg, Schrepel, above n 40.

space' or on the Internet.<sup>85</sup> In this respect, Nozick imagined two systems that can co-exist on a blockchain: the rule of law beyond and outside the relevant blockchain and *lex cryptographia*, on the blockchain system itself.<sup>86</sup> Where the rule of law fails to protect certain rights, blockchain technologies (or the *rule of code*) can fill this gap.<sup>87</sup> An example of this has been given. While courts cannot initiate or prohibit transactions occurring on blockchains which are unreachable by the rule of law, technical mechanisms existing on blockchains can ensure the enforceability of specified transactions via smart contracts.<sup>88</sup> Here, Schrepel has argued that blockchains imply new social contracts in which users who decide to use blockchain technologies agree to an alternative ecosystem of rights<sup>89</sup> distinct from the legal regime.

He has argued further that blockchains can in fact make the *rights* that are allowed almost *absolute*, illustrating this through making examples of fundamental rights such as the freedom of expression and the right of privacy.<sup>90</sup> While both rights are said to be limited under the rule of law ecosystem, the right to freedom of expression is argued to be absolute under the *lex cryptographia* ecosystem. On the other hand, the right of privacy is argued to be non-existent under the *lex cryptographia* ecosystem.<sup>91</sup> Analogizing this to rights such as the right to hold copyrights and the right to freedom of expression on the blockchain-based content platforms currently available, I argue that copyrights may be over-extended (albeit *not* absolute) and there is *none or little* freedom of expression (for copyright exceptions such as fair uses and fair dealings to apply) *on* the blockchain. *Off* the blockchain, some freedom to use the content remains, in view of the exceptions under copyright laws.

The message is that inhabitants of the *lex cryptographia* ecosystem must choose to use blockchains on the basis of the fundamental rights they value the most and subject to the violations that they are willing to accept due to the absence of limits for either the rights or the violations.<sup>92</sup> Within the context of this article, blockchains can maximise copyrights at the expense of users' rights. In spite of the risks of blockchains, I posit that both the ecosystems of copyright laws and *lex cryptographia* should be allowed to co-exist, so that the choice between the two systems remains and innovations are permitted.<sup>93</sup>

### **Trusting blockchains and regulation by law**

Great challenges are posed, however, in reconciling copyright laws with the borderless, standardized and automated regulatory solutions offered by blockchain technologies.<sup>94</sup>

Blockchains allow their participants to trust their outcomes without trusting any individual participant on the blockchains.<sup>95</sup> Although blockchains are 'distributed' in the sense that there is no master copy, a participant on a blockchain network can maintain an instantiation of the

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<sup>85</sup> Ibid.

<sup>86</sup> Schrepel, above n 40, referring to Robert Nozick, *Anarchy, State and Utopia* (Blackwell, 1974).

<sup>87</sup> Ibid.

<sup>88</sup> Ibid.

<sup>89</sup> Ibid.

<sup>90</sup> Ibid.

<sup>91</sup> Ibid.

<sup>92</sup> Ibid.

<sup>93</sup> See *ibid.*

<sup>94</sup> See Bodo, Gervais and Quintas, above n 2, 336.

<sup>95</sup> See, eg, Kevin Werbach, 'Trust, but Verify: Why the Blockchain Needs the Law' (2018) 33(2) *Berkeley Technology Law Journal* 487, 494; Joshua A.T. Fairfield, 'BitProperty' (2015) 88 *Southern California Law Review* 805, 814.

ledger, yet be confident it matches all the others. Notwithstanding this and although blockchains are an ingenious solution for verification, Werbach has argued that they do not as a matter of course engender trust – something more is needed and that is where the rule of law comes into play.<sup>96</sup> It is important to note that blockchains are systems designed and implemented by people, therefore, *subjective* intent – although expressed through *objective* code – is relevant.<sup>97</sup> What *intents* and *purposes* would be *legitimate* on blockchain systems? This is a broad governance question which needs to be addressed.

The two primary value propositions behind blockchains are identified as the avoidance of dependence on central actors and the creation of universal truth among untrusting parties.<sup>98</sup> In general, in spite of existing safeguards on blockchains, it has been noted that where there is trust, there is also the risk that the parties trusted can turn out to be untrustworthy.<sup>99</sup> On this note, although blockchain-based content platforms such as the examples discussed above can give their participants the confidence that valuable copyright-protected content can be stored and shared, this confidence on its own will not directly translate to trust participants on such platforms (whether copyright holders or potential licensees) have in other participants or in the blockchain-based platforms themselves.

I argue that this is where the rule of law (ie, copyright laws in this article) can operate as a complementary mechanism alongside *lex cryptographia* on the blockchain-based platforms, for reliance on *lex cryptographia* alone would likely produce distrust. The latter is not likely to happen organically in any case. Governments are not readily disintermediated - where they have the desire to regulate online activities, including those on blockchains, they will find ways to do so.<sup>100</sup> An instance which demonstrates that blockchains are not impermeable from legal enforcement is the takedown of the online black market Silk Road.<sup>101</sup> While practical difficulties could exist in identifying anonymous or pseudonymous participants on blockchains for contractual enforcement, there will usually be some known entities to sue; furthermore, legal actions can be brought against parties residing in other countries – even if issues of jurisdiction and choice of law could prove challenging, some resolution can nonetheless be worked out.<sup>102</sup>

It has been highlighted that different levels of security and robustness would be needed depending on the content – for instance, medical records on blockchains could have different risk profiles than supply chain records for diamonds.<sup>103</sup> I argue that given that the consumer transactions are typically smaller-value on blockchain-based content platforms, the level of security required to foster trust would reasonably be lesser than in another context. This could explain why legislation targeting blockchain activities are thus far directed at more urgent concerns such as cryptocurrencies and related activities, as well as taxation.<sup>104</sup> Be that as it

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<sup>96</sup> Werbach, above n 95, 494.

<sup>97</sup> Ibid.

<sup>98</sup> Ibid 507.

<sup>99</sup> Ibid 508.

<sup>100</sup> Ibid 522.

<sup>101</sup> See, eg, Kim Zetter, ‘How the Feds took down the Silk Road drug wonderland’ (18 November 2013) <<https://www.wired.com/2013/11/silk-road/>>; Ibid 534.

<sup>102</sup> Werbach, above n 95, 528.

<sup>103</sup> Ibid 515.

<sup>104</sup> For instance, digital tokens that are ‘capital markets products’ as defined under the *Securities and Futures Act* (Singapore, cap 289, 2006 rev ed) are regulated by the Monetary Authority of Singapore, although Singapore appears to be generally permissive to blockchain activities, see Monetary Authority of Singapore, *A Guide to Digital Token Offerings* (26 May 2020) <<https://www.mas.gov.sg/-/media/MAS/Sectors/Guidance/Guide-to->

may, stable and reliable regulation remains important for building trust in blockchain-based platforms that require a large user base to be viable.<sup>105</sup> This includes the blockchain-based content platforms the article is concerned with. Both the legal system and the software code (or *lex cryptographia*), being modalities of regulation,<sup>106</sup> play a role in establishing such trust, or undermining it.<sup>107</sup>

In the same vein, Werbach has argued that both legal actors and technologists must take affirmative steps to promote trust, such that blockchain-based solutions can overcome the limitations of legal enforcement and vice versa. This can be done in three primary ways: having the relevant blockchain as a *supplement*, *complement* or *substitute* to the legal regime.<sup>108</sup> In this respect, the blockchain-based content platforms discussed earlier fall within the second category, as they arguably *extend* and *improve* the existing trust architecture where copyright laws alone are insufficient. The integration of blockchains on these platforms could return some power to creators and/or content owners who often experience difficulties receiving sufficient compensation for their creations. This is done primarily through providing an aggregated view of ownership (ie, who owns what) and scalable licensing solutions (ie, improving the accessibility to content).<sup>109</sup> Distributed rights platforms in such instances would henceforth *complement*, but never substitute copyright laws.<sup>110</sup> Indeed, these platforms constitute private solutions that are *voluntarily* arrived at by the content platforms and copyright holders to create a copyright enforcement system that works for them.<sup>111</sup> Arguably, copyright laws still play a role in balancing the rights of the content platforms, the copyright holders and users, as well as in ensuring that the public interest does not get lost in the process of using blockchains on these platforms.

Just as is the case with blockchain technologies generally, the further proliferation of blockchain-based content platforms specifically will depend in part on adoption patterns, innovations built on top of the platforms, as well as the resolution of the governance challenges to their trust architecture.<sup>112</sup> In respect of the latter, it is clear law and blockchain technologies will need each other to move forward.<sup>113</sup> A clear regulatory framework to govern blockchain-based copyright management platforms would arguably give users more certainty in the blockchain space, henceforth giving room for trust to develop.

## Concluding thoughts

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Digital-Token-Offerings-26-May-2020.pdf>. Countries in the European Union have also started regulating crypto exchanges and/or crypto service providers, see, eg, Kevin Helms, *Regulatory Roundup: EU Wide CryptoRegulations, New Rules in Europe, US, Asia* (14 January 2020) <<https://news.bitcoin.com/regulatory-roundup-eu-wide-crypto-regulations-new-rules-in-europe-us-asia/>>.

<sup>105</sup> Werbach, above n 95, 533.

<sup>106</sup> See Lessig, *Code and Other Laws of Cyberspace* (Basic Books, 1999); Lawrence Lessig, *Code Version 2.0* (Basic Books, 2<sup>nd</sup> ed, 2006), where the modalities of regulation under Lessig's regulatory theory of cyberspace include not just law, but also architecture (code), markets and social norms.

<sup>107</sup> See Werbach, above n 95, 534.

<sup>108</sup> Ibid 535.

<sup>109</sup> These are the two main problems blockchain technologies can solve for the creative economy, see O'Dair, above n 77, 38, quoting Dan Fowler, an interviewee.

<sup>110</sup> Werbach, above n 95, 538.

<sup>111</sup> See Diane Leenheer Zimmerman, 'Copyright and Social Media: A Tale of Legislative Abdication' (2014) 35(1) *Pace Law Review* 260, 270.

<sup>112</sup> See Werbach, above n 95, 550.

<sup>113</sup> Ibid.

For blockchain-based content platforms to reach their promise in filling the gaps left by copyright laws, platforms need to achieve sufficient scale - this means that a good number of content owners and users will have to be comfortable with participating and transacting on these platforms. For this to be possible, I argue that trust will be the common thread and necessary element underpinning the platforms and holding the three main groups of participants together: the content platforms; the content owners or copyright holders; and the users or potential licensees. At this point in time, with the exception of Spotify, most of the other blockchain-based content platforms listed earlier and which are dependent on network effects may not have reached their critical masses.<sup>114</sup>

To elaborate further, the content platforms will need trust in the regulatory climate within which they operate. If secondary liability for copyright infringement is a concern, these content platforms as providers of online services can likely be exempt from liability for copyright infringement so long as they can meet the notice and takedown requirements under safe harbour provisions in many jurisdictions including the US, the United Kingdom, Australia and Singapore.<sup>115</sup> Nonetheless, given that blockchain records are permanent, *no* single party holds the *actual* capacity to respond to a takedown notice by removing the allegedly infringing content.<sup>116</sup> This means that the notice and takedown mechanisms under the copyright laws mentioned are arguably incompatible with how blockchain-based content platforms operate. Special exemptions for this group of online intermediaries utilising blockchains could therefore encourage innovation and nurture their growth at this crucial stage of their development. More specifically, for future copyright reform, the nature of blockchains and how they function on these content platforms should be taken into account in order to address enforcement and liability dilemmas more effectively. On a separate note, the immutability of blockchain records would certainly give rise to other concerns around the protection of personal information and privacy. This discussion is, however, outside the scope of this article.

What, then, can be done to increase the trust content owners and users have in blockchain-based content platforms? Certainly, these content platforms would wish to avoid losing the trust of users over time as is happening to social platform Facebook.<sup>117</sup> Further, the extent of trust required in participants for such content platforms to be viable would arguably be lesser and more readily achievable as compared to the trust required in adopting artificial intelligence (AI) for autonomous or driverless cars - in the latter, the stakes are higher and there are immediate threats to physical safety if this trust is unjustified or misplaced. In addition, I argue

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<sup>114</sup> Spotify has 248 million monthly active users at the end of 2019, see, eg, Matthew De Silva, *Spotify is the king of music streaming – for now* (29 October 2019) <<https://qz.com/1736762/spotify-grows-monthly-active-users-and-turns-profit-shares-jump-15-percent/>>.

<sup>115</sup> See, eg, the *DMCA*, § 512(c); the *UK Copyright Act*, s 97A, read together with the E-Commerce Directive Regulations 2002; and the *Singapore Copyright Act*, s 193D. But see *Australian Copyright Act*, ss 116AE, 116AF and 116AH. It is not clear if a blockchain-based content platform would fall under the definition of a ‘carriage service provider’ in the *Telecommunications Act 1997* (Cth) s 87. See also Australian Digital Alliance, *Submission in response to the preliminary report of the Australian Competition and Consumer Commission Digital Platforms Inquiry* (Feb 2019) <<https://www.accc.gov.au/system/files/Australian%20Digital%20Alliance%20%28February%202019%29.PDF>>, which indicates that Australia is an anomaly internationally, having restricted to safe harbour provisions to certain service providers (including commercial internet service providers).

<sup>116</sup> De Filippi and Wright, above n 79, 124.

<sup>117</sup> See, eg, Herb Weisbaum, *Trust in Facebook has dropped by 66 percent since the Cambridge Analytica scandal* (19 April 2018) <<https://www.nbcnews.com/business/consumer/trust-facebook-has-dropped-51-percent-cambridge-analytica-scandal-n867011>>; Greg Sterling, *More people trust (and distrust) Facebook than any other social site – [survey]* (16 October 2019) <<https://marketingland.com/more-people-trust-and-distrust-facebook-than-any-other-social-site-survey-269130>>.

that the ethical considerations around AI are a useful reference, albeit applying to a lesser extent in this context. This means that all participants (ie, content platforms, owners and users) should conduct transactions based on principles such as honesty (for instance, through being transparent about the remuneration paid to content owners), fairness (ie, fair value for the content) and integrity (for example, content owners should own what they claim to own).<sup>118</sup>

The code running on these platforms will also need to be designed well such that the smart contracts used do not intrusively enforce copyright laws, going beyond their reach to protect the rights of copyright holders.<sup>119</sup> It would be crucial to establish international norms and standards, on top of introducing legislation and guidelines to direct and provide guidance on how the code in blockchains should be designed, and what are the *legitimate intents* and *purposes* of such code. Where technological advancements permit, it may be possible in future to avoid the result of copyright over-reaching through consciously designing the platforms to accommodate uses which are legitimate fair uses and/or fall under fair dealing exceptions under the relevant copyright legislation.<sup>120</sup> In doing so, *lex cryptographia* on the blockchain-based content platforms would complement and can benefit from the protection of the rule of law. *Lex cryptographia* co-exists with copyright laws, rather than works against them. This, together with a focus around the extension of creative commons,<sup>121</sup> as well as a clear articulation of terms of service for both content owners and users, could help foster the trust in both groups of participants alike. Such trust is necessary for the continued growth of blockchain-based content platforms.

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<sup>118</sup> See, eg, the principles referred to in the White House, *American Artificial Intelligence Initiative: Year One Annual Report* (Feb 2020) <<https://www.whitehouse.gov/wp-content/uploads/2020/02/American-AI-Initiative-One-Year-Annual-Report.pdf>>; Committee on Standards in Public Life, *Artificial Intelligence and Public Standards* (Feb 2020) <[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/868284/Web\\_Version\\_AI\\_and\\_Public\\_Standards.PDF](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/868284/Web_Version_AI_and_Public_Standards.PDF)>; Australian Government, *AI Ethics Principles* <<https://www.industry.gov.au/data-and-publications/building-australias-artificial-intelligence-capability/ai-ethics-framework/ai-ethics-principles>>; Personal Data Protection Commission, *Model Artificial Intelligence Governance Framework* (Jan 2020) <<https://www.pdpc.gov.sg/-/media/files/pdpc/pdf-files/resource-for-organisation/ai/sgmodelaigovframework2.pdf>>.

<sup>119</sup> See, eg, O’Dair, above n 72, 89.

<sup>120</sup> See, eg, *DMCA*, § 107; *UK Copyright Act*, ss 29-30A; *Australian Copyright Act*, ss 40-42 and 103A-103C; and *Singapore Copyright Act*, ss 35-37.

<sup>121</sup> See, eg, Martin Zeilinger, “Digital Art as ‘Monetised Graphics’: Enforcing Intellectual Property on the Blockchain” (2018) 31 *Philosophy and Technology* 15, 35.