

Collective Management Organizations as Fiduciaries and Blockchain's Potential for Copyright Management

George Bouchagiar (University of Antwerp)

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Abstract

As widely acknowledged by academics and European copyright laws, Collective Management Organizations (CMOs) play an important role as promoters of creativity and key contributors to the quality of culture. Collective management of copyright is not just a technical problem, dealing with licensing of works or collection and distribution of royalties. Several uncertainties may occur due to the monopoly position, on the basis of which these organizations operate. In this context, authors have argued that CMOs should meet higher levels of transparency to better reach their goals. While some minimum standards are set by laws, perhaps, new ideas could be brought to the discussion table to better manage copyright in the interest of rightsholders and the culture itself. In this paper, the introduction of fiduciary laws is proposed to treat CMOs as trustees, who would act to promote the beneficiaries' (i.e. the rightsholders') interests. In such relationships, CMOs could manage copyright with duties of loyalty, trust, and care, which could most probably ensure the optimal level of transparency. Organizations' superiority over their members could justify fiduciary laws, which deal with relationships based on trust. The latter could also be strengthened by promising technologies. So, blockchain is tested to examine its potential in the field of copyright management. Its intrinsic and emergent properties are distinguished from one another to highlight the need for experimenting to better understand blockchain's possibilities and its limitations. Finally, by further analyzing its characteristics, this paper argues that blockchain could offer new opportunities, but also pose great challenges for copyright management.

Keywords: copyright, Collective Management Organizations, blockchain, fiduciary laws

1. Introduction

In 1979 the musical band “The Undertones” published the song “Teenage Kicks”. The singer, Feargal Sharkey, later became the Chief Executive of “UK Music”¹.

As he stated in 2010, “[s]omewhere right now [...] a young person is scribbling on a scrap of paper [...] composing a song that will resonate far beyond the page [...] [t]his industry may change, but that simple act of creativity, remains and will always remain, immortal and timeless [...]”². In UK Music’s “Liberating Creativity”³, one may find the romantic statement, supporting the mysterious and magical process of creativity, but also a lobbyist-like-argument for government intervention and investment in the name of creativity⁴.

In another example that history provides, in 1847, Ernest Bourget, a French composer, visited the Paris café “Ambassadeurs”, where his music was being played without his permission⁵. Bourget refused to pay his drink arguing that “*you consume my music, I consume your wares*”⁶. This argument was won before the Tribunal de Commerce de la Seine that upheld a law of 1793 recognizing a right to public performance for the first time⁷. He, then, co-founded an agency, which was the direct predecessor of SACEM⁸.

¹ Josh Halliday, Feargal Sharkey stands down as chief of UK Music, 11 November 2011, The Guardian, available at <https://www.theguardian.com/music/2011/nov/11/feargal-sharkey-resigns-uk-music>. See also at Music Tank: <http://www.musictank.co.uk/resources/speaker-biographies/feargal-sharkey-ceo-uk-music/>.

² UK Music, *Liberating Creativity*, 2010, available at https://www.mpaonline.org.uk/wp-content/uploads/2017/09/LC_BrochureDigital4.pdf, at p. 5.

³ UK Music, *Liberating Creativity*, id.

⁴ UK Music, *Liberating Creativity*, id, at p. 10, mentioning that “[...] [w]hile Government has always had a profound impact on the music industry, public policy will matter even more in the future because more is at stake [...] [t]he creative industries are the future [...]”.

⁵ Polk Wagner, *Information wants to be free: Intellectual Property and the mythologies of control*, in David Vaver (ed.), *Intellectual Property Rights: Critical Concepts in Law*, Taylor & Francis, 2006, pp. 329-368, at p. 347.

⁶ Dinusha Mendis, *Directive 2014/26/EU on Collective Management Of Copyright And Related Rights And Multi-Territorial Licensing of Rights in Musical Works for Online Use in the Internal Market*, in Arno R. Lodder & Andrew D. Murray (eds), *EU Regulation of E-Commerce: A Commentary*, Edward Elgar Publishing, 2017, pp. 290-312, at pp. 307-308; Mihály Ficsor, *Collective Management of Copyright and Related Rights*, 2002, World Intellectual Property Organization, at p. 19, paragraph 28 (“[...] *they had to pay for their seats and meals [...] whereas nobody had the intension of paying for their works [...]*”).

⁷ Martin Kretschmer, *Access and Reward in the Information Society: Regulating the Collective Management of Copyright*, February 1, 2007, CIPPM Working paper, 2007, available at <https://ssrn.com/abstract=2739837> or <http://dx.doi.org/10.2139/ssrn.2739837>, pp. 1-29, at pp. 5-6.

⁸ Martin Kretschmer, *Access and Reward in the Information Society: Regulating the Collective Management of Copyright*, id, mentioning that the origins of collective administration may appear as a straightforward response to a problem of transaction costs, like information, contract, and governance costs (e.g. identifying the owner, negotiating a price, or monitoring and enforcement costs).

To many authors, Collective Management⁹ Organizations¹⁰ (CMOs) are important in the digital economy¹¹. This is something the European Parliament and the Council have also accepted¹². CMOs are the intermediaries that act on behalf of their members¹³, the rightsholders¹⁴. Their main duties include, not just the

⁹ As Ficsor argues, the term “collective management” only refers to those forms of joint exercise of rights where there are truly “collectivized” aspects (such as tariffs, licensing conditions, and distribution rules); where there is an organized community behind it; where the management is carried out on behalf of such a community; and where the organization serves collective objectives beyond merely carrying out the tasks of rights management. Mihály Ficsor, *Collective Management of Copyright and Related Rights*, id, at p. 12.

¹⁰ For some historical information on collective management, see Daniel Gervais, *Collective Management of Copyright: Theory and Practice in the Digital Age*, in Daniel Gervais (ed.), *Collective Management of Copyright and Related Rights*, 3rd Edition, Wolters Kluwer, 2015, The Netherlands, pp. 3-30, at pp. 5-7, mentioning that the story of the rise of collective management begins in France with the French playwright Pierre-Augustin Caron de Beaumarchais in the “*dark and dingy Parisian theatres*” in the 1700s. See also Mihály Ficsor, *Collective Management of Copyright and Related Rights*, id, at p. 18, paragraphs 25-26 (mentioning that Beaumarchais’s legal battles against theatres led to the foundation of the Bureau de législation dramatique in 1777). CMOs are also known as “collecting societies”. See Judgment of the General Court (6th Chamber), 12 April 2013, in Case T-442/08, *International Confederation of Societies of Authors and Composers (CISAC) v European Commission*, at paragraph 2. As Gervais has aptly put it, the term “collecting societies” is used by one who “*does not like*” CMOs. Daniel Gervais, *Collective Administration of Rights*, Lecture (July 3, 2018), International Copyright Law Summer Course, IViR, University of Amsterdam, 2-6 July, 2018.

¹¹ Ruth Towse, *The Economic Effects of Digitization on the Administration of Musical Copyrights*, *Review of Economic Research on Copyright Issues*, 2013, Vol. 10, No. 2, pp. 55-67, available at <https://ssrn.com/abstract=2381882>, at p. 56, arguing that the non-profit status of collecting societies is leading to new forms of cooperation to deal with the impact of online licensing; Christian Handke & Ruth Towse, *Economics of Copyright Collecting Societies*, *International Review of Intellectual Property and Competition Law*, Vol. 38, No. 8, 2007, pp. 937-957 (also available at <https://ssrn.com/abstract=1159085> or <http://dx.doi.org/10.2139/ssrn.1159085>, pp. 1-19, at p. 1, mentioning that, to economists, CMOs play a fundamental role in the copyright system).

¹² See Directive 2014/26/EU of the European Parliament and of the Council of 26 February 2014 on collective management of copyright and related rights and multi-territorial licensing of rights in musical works for online use in the internal market (hereinafter referred to as “Directive 2014/26/EU”). Some argue that this Directive, the longest of the EU directives dealing with copyright law, reveals that the topic is extremely complicated. Sylvie Nérison, *Has Collective Management of Copyright Run Its Course? Not so Fast*, *IIC - International Review of Intellectual Property and Competition Law*, 2015, Vol. 46, No. 5, pp. 505-507, at p. 506.

¹³ Laurence R. Helfer, *Collective Management of Copyrights and Human Rights: An Uneasy Alliance Revisited*, in Daniel Gervais (ed.), *Collective Management of Copyright and Related Rights*, 2010 Kluwer Law International BV, The Netherlands, pp. 75-103, at p. 75.

¹⁴ As regards the relationship between these societies and their members, the Court of Justice of the European Union has ruled that a compulsory assignment of all copyrights, both present and future, no distinction being drawn between the different generally accepted types of exploitation, may appear as an unfair condition, especially if such assignment is required for an extended period after the member’s withdrawal (Judgment of the Court of 27 March 1974, *Belgische Radio*

collection/distribution of royalties¹⁵ and the licensing of their members' works¹⁶, but also the promotion of creativity¹⁷ and of social-cultural value¹⁸ and the

en Televisie and société belge des auteurs, compositeurs et éditeurs v SV SABAM and NV Fonior, Reference for a preliminary ruling: Rechtbank van eerste aanleg te Brussel – Belgium, BRT-II, Case 127-73, at paragraph 12). Besides, a collective management society must not discriminate among its members as regards distribution of income and it should not refuse to accept nationals of European Union member states as members (Frank L. Fine, *The Impact of EEC Competition Law on the Music Industry*, *Northwestern Journal of International Law & Business*, Vol. 12, Issue 3, Winter 1992, pp. 508-535, at pp. 521, 524). With regard to the relationship between a CMO and users, the former may only refuse to grant direct access to its own national repertoire to users established in other European Union member states for efficiency reasons (Judgment of the Court of 13 July 1989, *Ministère public v Jean-Louis Tournier*, Reference for a preliminary ruling: Cour d'appel d'Aix-en-Provence – France, Competition - Copyright - Amount of royalties - Reciprocal representation contracts, Case 395/87). Competition law is of major significance, as a society imposes unfair trading conditions if the royalties charged are appreciably higher than those charged in other member states, unless the differences are justified by objective and relevant factors (Judgment of the Court of 13 July 1989, *Ministère public v Jean-Louis Tournier*, id, at paragraphs 34-36; Judgment of the Court of 13 July 1989, *François Lucazeau and others v Société des Auteurs, Compositeurs et Editeurs de Musique (SACEM) and others*, References for a preliminary ruling: Cour d'appel de Poitiers and Tribunal de grande instance de Poitiers – France, Competition - Copyright - Amount of royalties - Reciprocal representation contracts, Joined cases 110/88, 241/88 and 242/88, at paragraphs 21-33). Regarding relationship between these societies, there has been a call for efficient exchange of information and the discontinuation of B contracts, under which no money is transferred and each society collects and distributes royalties used in its territory only to its own rightsholders (European Parliament resolution on a Community framework for collective management societies in the field of copyright and neighbouring rights (2002/2274(INI)), at paragraphs 45, 56; Communication from the Commission to the Council, the European Parliament and the European Economic and Social – Committee, *The Management of Copyright and Related Rights in the Internal Market*, COM/2004/0261, final).

¹⁵ Daniel Gervais, *Collective Management of Copyright: Theory and Practice in the Digital Age*, id, at p. 7, mentioning that CMOs facilitate the establishment of unified methods for collecting and dispersing royalties and negotiate licensing arrangements for works.

¹⁶ Simone Schroff & John Street, *The politics of the Digital Single Market: culture vs. competition vs. copyright*, *Information, Communication & Society*, 2018, Vol. 21, No. 10, DOI: 10.1080/1369118X.2017.1309445, pp. 1305-1321, at p. 1307 mentioning that a CMO's function is to provide users with licenses, collect royalties and distribute them to their members, as well as to monitor the use of works to ensure that those who owe royalties actually pay them. See also at p. 1315, arguing that they also act as lobbying organizations that represent their members in public debate “*pushing for effective protection*”.

¹⁷ As creativity is the *raison d'être* of copyright, CMOs need to go beyond the operation of a mere technical machinery. Mihály Ficsor, *Collective Management of Copyright and Related Rights*, id, at p. 21, paragraphs 33-34. See also Ruth Towse, *Creativity, Incentive, and Reward: An Economic Analysis of Copyright and Culture in the Information Age*, Edward Elgar, 2001; Recital (1) of the Directive 2014/26/EU (mentioning that previous Directives contribute to the development and maintenance of creativity).

¹⁸ Daniel Gervais, *Collective Management of Copyright: Theory and Practice in the Digital Age*, id, at p. 7 (“*the role of CMOs has evolved to oversee copyright compliance, fight piracy and perform various social and cultural functions*”); Laurence R. Helfer, *Collective Management of Copyrights and Human Rights: An Uneasy Alliance Revisited*, id, at p. 98 (“[...] *many CMOs*

contribution to the quality of culture¹⁹ and cultural diversity²⁰. Namely, GESAC, the European Grouping of Societies of Authors and Composers, states that it aims not only to advocate for adequate remuneration for creators but also to ensure a sustainable creative and cultural ecosystem²¹. Besides, many CMOs mention that they aim to promote creative work, support live performances, or contribute to culture²². Hence, it seems that these cultural and solidarity aspects recognize the sociological function of CMOs; they represent creative people whose activity is, not neutral but, directly linked to the cultural sphere. Thus, collective management is not just a technical problem.

These organizations mainly operate on the basis of (national) monopoly position²³, and it is well known that such positions can be abused²⁴. So, to better

engage in a broad range of social, educational, and cultural activities [...] Commentators continue to debate the legality and wisdom of entrusting CMOs with the promotion of culture [...]”

¹⁹ Martin Kretschmer, *Access and Reward in the Information Society: Regulating the Collective Management of Copyright*, id, at p. 9, mentioning that the features of the European CMOs include some characteristics under “*solidarity rationale*”: publishers’ control below market expectations; socio-cultural deductions for the benefit of domestic creators; cross-subsidy between big and small holders; and discrimination between genres.

²⁰ See recital (3) of the Directive 2014/26/EU, mentioning that CMOs play and should continue to play an important role as promoters of the diversity of cultural expression by enabling the smallest and less popular repertoires to access the market and by providing social, cultural, and educational services for the benefit of their rightsholders and the public.

²¹ See GESAC’s website: <http://authorsocieties.eu/about/about-gesac> (mentioning also that its mission is to promote collective management as “*the best solution to respect and protect authors’ rights*”).

²² Take, for example, PRS for Music (UK: <https://www.prsformusic.com/what-we-do>), SACEM (France: <https://societe.sacem.fr/en/presentation>), or GEMA (Germany: <https://www.gema.de/>).

²³ Ruth Towse, *The Economic Effects Of Digitization On The Administration Of Musical Copyrights*, id, at p. 65 (see also at p. 58, mentioning that a CMO has a “front” and a “back” office; while the former deals with licensing, including negotiating of contracts, royalty rates etc, the latter is related to procedures of collection and distribution of revenues or matching of usage reports to repertoire metadata); Ian Hargreaves, *Digital opportunity: A review of intellectual property and growth*, May 2011, Independent Report, at p. 36, paragraph 4.44 (mentioning that CMOs fulfill a valuable role in markets, reducing transactions costs by enabling “many to many” licensing, but they can also harm competition as they are in effect natural monopolies); Martin Kretschmer, *Access and Reward in the Information Society: Regulating the Collective Management of Copyright*, id, at p. 7 arguing that the monopolistic structure leaves CMOs in control of the terms of access and royalty distribution in their particular rights domain. For a definition of “natural monopolies”, see Christian Handke & Ruth Towse, *Economics of Copyright Collecting Societies*, id, at pp. 3-4 (CMOs are “[...] ‘*natural monopolies*’ meaning that as monopoly suppliers they are more efficient in the sense of having lower costs than if there were competition [...]”); Thomas Riis, *Collecting societies, competition, and the Services Directive*, *Journal of Intellectual Property Law & Practice*, 2011, Vol. 6, No. 7, pp. 482-493, at pp. 483-484 (arguing that the *raison d’être* of CMOs is economies of scale and scope in negotiating, monitoring, and enforcing copyright, which implicitly presupposes that collective copyright

reach their goals, they should meet some standards of both governance²⁵ and transparency²⁶. For instance, under Article 18(1)(f) of the Directive 2014/26/EU, a CMO should provide information concerning deductions made for any purpose other than in respect of management fees, including those that may be required for the provision of any social, cultural or educational services. The annual transparency report, provided in Article 22 of the above Directive, is also a novelty to ensure some higher levels of transparency.

European national laws concerning collective management may vary²⁷. Although collective management “*comes in many shapes and sizes*”²⁸, it is

management is a natural monopoly, and a natural monopoly should not be regulated in order to foster competition).

²⁴ Adolf Dietz, *Legal Regulation of Collective Management of Copyright (Collecting Societies Law) in Western and Eastern Europe*, J. Copyright Society of the U.S.A., 2002, Vol. 49, pp. 897-916, at p. 903 (mentioning that the antitrust approach against CMOs has been dominant for a long time). See also at p. 907, where Dietz mentions CMOs’ duty to contract with users on equitable terms, as a consequence of their predominant monopoly.

²⁵ See recital (9) of the Directive 2014/26/EU (“[...] *The aim of this Directive is to lay down requirements applicable to collective management organisations, in order to ensure a high standard of governance, financial management, transparency and reporting [...]*”).

²⁶ Ian Hargreaves, *Digital opportunity: A review of intellectual property and growth*, id, at p. 36, paragraph 4.45, mentioning that members of collecting societies need to have confidence that their interests are managed effectively, responsibly, and transparently. As others have argued, collective management societies could compete on the grounds of efficiency, transparency, and accountability to benefit both users and authors. Lucie Guibault and Stef van Gompel, *Collective Management in the European Union*, in Daniel Gervais (ed.), *Collective Management of Copyright and Related Rights*, second edition (Kluwer Law International, 2010), pp. 135-167. Available at https://pure.uva.nl/ws/files/1511071/106092_SSRN_id1984015_1_.pdf (pp. 1-38, at p. 2). See also later edition: Lucie Guibault & Stef van Gompel, *Collective Management in the European Union*, in Daniel Gervais (ed.), *Collective Management of Copyright and Related Rights (Third Edition, 2015)*, Kluwer Law International, pp. 139-174, available at https://www.ivir.nl/publicaties/download/CMCR_5.pdf.

²⁷ In general, European CMOs need special authorization from competent bodies, like a Ministry. For instance, under Article L.321-3 of the French Intellectual Property Code the statutes and general regulations of the royalty collection and distribution should be addressed to the Minister responsible for culture. In most jurisdictions, only certain legal types of organizations are allowed. Namely, under Article L.321-1 of the French Intellectual Property Code, the societies need to be established in the form of civil law companies. See also Daniel Gervais, *Collective Management of Copyright: Theory and Practice in the Digital Age*, id, at p. 8 (mentioning that most CMOs are private entities). In some national laws, it is provided that only a single monopolistic CMO is allowed. See Article 86(2) of the Hungarian Act LXXVI of 1999 on Copyright (“[...] *The register shall list the rights management activities a collecting society is entitled to exercise [...]*”); Article 151(1) of the Slovenian Copyright and Neighboring Rights Act of 30 March 1995 (“[...] *The Office grants permission to a collecting society that best meets the requirements of a public tender offer, which must be published in the Official Gazette of the Republic of Slovenia [...]*”). The provision for the competence of a single CMO used to be the case in Greece too. Under Article 49(6) of Law No. 2121/1993 the single CMO used to be the only competent and responsible for managing related rights. But the above provision was repealed

generally acknowledged that CMOs should act in the best interests of their members and provide for systems that enable rightsholders to exercise their membership rights by participating in the organization's decision-making process²⁹. Besides, rightsholders should exercise control over the activities of the CMOs³⁰.

In this context, these complex³¹ and, to some, extremely problematic³² societies could be regarded as trustees, i.e. fiduciaries in a relationship where the rightsholders would be the beneficiaries. This paper proposes the introduction of fiduciary laws to achieve higher levels of transparency through the duties of loyalty and care. Such laws regulate relationships based on trust; and trust could be further promoted by the very promising blockchains. Thus, these technologies are examined to test their potential for copyright management. While blockchain is still immature and evolving, properties by construction need to be distinguished from its emergent features or desired goals. Experimenting is most probably needed to better understand possibilities and limitations. But some further discussion on blockchains' characteristics may allow to draw some safe conclusions as regards opportunities and challenges for copyright management.

2. CMOs as fiduciaries

Fiduciary laws reflect society's values and norms with great clarity³³. Fiduciary duty is a legal term referring to the type of duty that a person or an organization, who/which manages someone else's power, wealth or property, has in

by Article 54(6)(c) of Law No. 4481/2017. This raised crucial questions with regard to the legitimacy and competence of other CMOs, which also collected royalties (and managed related rights) before Law No. 4481/2017 came into force.

²⁸ Daniel Gervais, Keynote: The Landscape of Collective Management Schemes, *Columbia Journal of Law & the Arts*, 2011, Vol 34, No. 4, pp. 591-617, at p. 591. See also at pp. 595-596, mentioning that some basic economic functions unite all CMOs: a CMO must acquire the ability to license from a plurality of rightsholders or some other authority to get paid; find a way to offer a license or other rights to users and this includes negotiating or setting; obtain usage data or other data from users for purposes of distribution. To Gervais, "*rights management is what CMOs do*".

²⁹ See recital (22) of the Directive 2014/26/EU.

³⁰ See recital (55) of the Directive 2014/26/EU.

³¹ The complexity may be due to the fact that CMOs operate as businesses, but they also have a cultural function. For an analysis as regards CMOs as cultural agents, see Daniel Gervais, *Collective Management of Copyright: Theory and Practice in the Digital Age*, id, at pp. 17-20.

³² Martin Kretschmer, *Access and Reward in the Information Society: Regulating the Collective Management of Copyright*, id, at pp. 2, 3 ("*From the perspective of European competition law, collecting societies prima facie appear extremely problematic*").

³³ Tamar Frankel, *Fiduciary law in the twenty-first century*, *Boston University Law Review*, 2011, Vol. 91, pp. 1289-1299, at p. 1292, available at <https://www.bu.edu/law/journals-archive/bulr/documents/frankel.pdf>.

certain circumstances in relation to the owner or the beneficiary of that power, wealth or property³⁴.

These laws deal with relationships based on trust³⁵. And trust enables an individual to be willing to make herself vulnerable to another party, despite potential risks that the latter will act in a way that can harm the former³⁶. In case of copyright management, trust could mean the willingness to become vulnerable to a CMO, which would manage its members' rights. An author would be the entrustor; the act of becoming a CMO's member would be the entrusting; and the CMO would be the trustee, the fiduciary. And, perhaps, it would be fair to argue that all rightsholders are entrustors, entrusting CMOs when becoming their members³⁷. They become vulnerable when they face the risk of e.g. lack of transparency³⁸ that might lead to mismanagement of their rights.

If the concept of trust were introduced in copyright law, it could guarantee higher levels of honesty and loyalty. In fact, one of the most important fiduciary duties is the duty of loyalty; fiduciaries should act in good faith in the interests of their beneficiaries and impartially balance the conflicting interests of different beneficiaries³⁹. They should avoid conflicts of interest and should not act for the benefit of themselves or a third party⁴⁰. Another important duty is the duty to act prudently, which means that fiduciaries should act with due care, skill, and diligence⁴¹. In either case, the objective is to encourage the fiduciary to take the

³⁴ The European Commission, Resource Efficiency and Fiduciary Duties of Investors, Final Report, ENV.F.1/ETU/2014/0002, DG Environment, at p. 22. Available at http://ec.europa.eu/environment/enveco/resource_efficiency/pdf/FiduciaryDuties.pdf.

³⁵ See, in general, Tamar Frankel, Fiduciary Law, California Law Review, 1983, Vol. 71, No. 3, pp. 795-836, available at <https://scholarship.law.berkeley.edu/californialawreview/vol71/iss3/1/>.

³⁶ Eli Bukspan, Trust and the Triangle Expectation Model in Twenty-First Century Contract Law, 11 DePaul Bus. & Com. L.J., 2013, pp. 379-415, at pp. 382-383 (available at <http://via.library.depaul.edu/bclj/vol11/iss3/4>); Irwin Altman, Reciprocity of Interpersonal Exchange, Journal of the theory of social behavior, Vol. 3, Issue 2, October 1973, pp. 249-261 (available at <https://onlinelibrary.wiley.com/doi/pdf/10.1111/j.1468-5914.1973.tb00325.x>).

³⁷ As regards authors' rights, a CMO has been regarded as an organization that aims at advancing the moral rights and/or that has at its disposal effective machinery for the collection and distribution of copyright royalties and assumes full responsibility for the operations attaching to the administration of the rights "*entrusted*" to it. Mihály Ficsor, Collective Management of Copyright and Related Rights, id, at p. 20, paragraph 31.

³⁸ As regards lack of transparency, see, amongst others, US Copyright Office, Copyright and the Music Marketplace: A report of the register of copyrights, February 2015, at p. 77 (available at <https://copyright.gov/docs/musiclicensingstudy/copyright-and-the-music-marketplace.pdf>).

³⁹ The European Commission, Resource Efficiency and Fiduciary Duties of Investors, id, at p. 7.

⁴⁰ To some, the duty of loyalty is a response to the impossibility of writing contracts completely specifying the parties' obligations. Frank H. Easterbrook, Daniel R. Fischel, Contract and fiduciary duty, The Journal of Law and Economics, The University of Chicago Law School, Vol. XXXVI, April 1993, pp. 425-446, at p. 426.

⁴¹ The European Commission, Resource Efficiency and Fiduciary Duties of Investors, id, at p. 7.

beneficiary's interests properly into account in making decisions and to facilitate detection of her failure to do so⁴².

In general, fiduciaries provide services that are socially important and it is in the interest of society that people use them⁴³. In case of copyright, its management is said to be socially important as it aims at promoting culture; it is in the interest of an author that she receives fair remuneration; and it is in the interest of society that people use such "services" to e.g. listen to music. If one accepts the importance, which the European legislator has attached to CMOs, it seems that rightsholders need⁴⁴ to rely on them; it would make no sense for each author to become an expert and e.g. negotiate the level of royalties. Besides, fiduciaries cannot perform, unless they are entrusted with power; similarly, a physician must have full control over the patient's body to operate on her.

And the single goal of this entrustment is to facilitate services to the entrustors⁴⁵. The risk that fiduciaries may use the entrusted power for purposes other than in the service of the entrustors involves competition among fiduciaries; they have to convince beneficiaries that they use the relevant power for the entrustors' benefit⁴⁶.

There are many topics to which the label "fiduciary" can be applied⁴⁷ and the duties may vary. But the most important duty of loyalty, the duty to act for the

⁴² Elizabeth S. Scott and Robert E. Scott, Parents as Fiduciaries, *Virginia Law Review*, Vol. 81, No. 8, Symposium: New Directions in Family Law (Nov. 1995), pp. 2401-2476, at pp. 2420-2421.

⁴³ Jack M. Balkin, Information Fiduciaries and the First Amendment, *UC Davis Law Review*, 2016, Vol. 49, No. 4, pp. 1183-1234. Available at <https://ssrn.com/abstract=2675270>.

⁴⁴ Christian Handke & Ruth Towse, Economics of Copyright Collecting Societies, *id.*, at p. 1, arguing that rightsholders need the CMOs. See also Daniel Gervais, Individual and Collective Management of Rights Online, in Johan Axhamn (ed.), *Copyright in a Borderless Online Environment*, The Institute for Legal Research (Institutet för Rättsvetenskaplig Forskning), 2012, pp. 89-99, at p. 89, mentioning that there is a substantial middle ground, an area comprising compulsory licenses and collective management, in which rightsholders have, *de jure* or *de facto*, lost the ability to *say no* to the use of their works, but not the right to be paid.

⁴⁵ L. S. Sealy, Fiduciary Relationships, *The Cambridge Law Journal*, Vol. 20, Issue 1 (April 1962), pp. 69-81; Robert Cooter & Bradley J. Freedman, The fiduciary relationship: Its economic character and legal consequences, *New York University Law Review*, 1991, Vol. 66, pp. 1045-1075.

⁴⁶ Tamar Frankel, Fiduciary law in the twenty-first century, *id.*, at p. 1294; Deborah A. DeMott, Causation in the fiduciary realm, *Boston University Law Review*, 2011, Vol. 91, pp. 851-871, at p. 871.

⁴⁷ Frank H. Easterbrook & Daniel R. Fischel, Contract and Fiduciary Duty, *id.*, at p. 432; Tamar Frankel, Fiduciary Law, *id.*, at p. 795; D. Gordon Smith, The Critical Resource Theory of Fiduciary Duty, *Vanderbilt Law Review*, Vol. 55, pp. 1399-1497, at p. 1412-1413.

exclusive benefit of the beneficiary⁴⁸, could be introduced for copyright management. Indeed, rightsholders entrust CMOs their rights over which these organizations have control. They are the experts, who are (capable of) providing socially useful services. And it could also be argued that CMOs should have duties going beyond mere fairness and honesty; they could be obliged to act to further authors' best interests⁴⁹. And, in fact, CMOs are required to do more than just serve the interests of their members⁵⁰.

The potential introduction of flexible⁵¹ fiduciary laws in copyright management might guarantee multiple advantages. Authors would, perhaps, choose among alternative fiduciaries⁵² and negotiate the terms of the relationship. Besides, a main pillar of the European Union's policy is the freedom for copyright owners to choose the CMO they prefer; to "*vote with their feet*"⁵³. Perhaps, the CMOs would rarely have monopoly over the rightsholders' needs and, unless the author agreed, the fiduciaries would not manipulate the terms of their performance⁵⁴. It seems that

⁴⁸ Lynn Stout, *On the Export of U.S.-Style Corporate Fiduciary Duties to Other Cultures: Can a Transplant Take?* (May 21, 2002), UCLA, School of Law, Working Paper No. 02-11 (available at <https://ssrn.com/abstract=313679> or <http://dx.doi.org/10.2139/ssrn.313679>), pp. 1-39, at p. 14.

⁴⁹ Deborah A. DeMott, *Beyond Metaphor: An analysis of fiduciary obligation*, *Duke Law Journal*, 1988, pp. 879-924, at p. 882, mentioning that "[...] *The fiduciary's duties go beyond mere fairness and honesty; they oblige him to act to further the beneficiary's best interests* [...]".

⁵⁰ Simone Schroff & John Street, *The politics of the Digital Single Market: culture vs. competition vs. copyright*, *id.*, at p. 1308, mentioning, amongst others, that CMOs are expected to provide social benefits in the form of trade union style collective bargaining with users or to contribute to state cultural policy by cross-subsidizing less popular music genres; CMOs have also a "solidarity function" as they provide for social insurance. Besides, case law has imposed CMOs further duties. See, in general, Martin Kretschmer, *The Aims of European Competition Policy towards Copyright Collecting Societies*, Paper for Society for Economic Research on Copyright Issues SERCIAC 2005, Montreal, 7-8 July 2005, available at <http://serci.org/wp-content/uploads/2017/07/kretschmer.pdf>, at pp. 14-15. As some argue, an exclusive right may be enjoyed to the fullest possible extent. Mihály Ficsor, *Collective Management of Copyright and Related Rights*, *id.*, at p. 16, paragraph 16.

⁵¹ Ethan J. Leib, *Friends as Fiduciaries*, *Washington University Law Review*, Vol. 86 (2008-2009), pp. 665-732, at pp. 707, 732 (arguing for flexibility of fiduciary laws).

⁵² Floyd Mechem, *Elements of the law of partnership*, 2nd edition, 1920, Chicago Callaghan and Company, at p. 7, paragraph 5, mentioning that the law does not choose partners for people. Fiduciary relations are not mandated by law. However, when fiduciary relations are established, their legal consequences are determined by the law; the parties cannot waive the courts' supervision over the fiduciary. Alison Grey Anderson, *Conflicts of Interest: Efficiency, Fairness and Corporate Structure*, *UCLA Law Review*, 1978, Vol. 25, pp. 738-795, at p. 756.

⁵³ Simone Schroff & John Street, *The politics of the Digital Single Market: culture vs. competition vs. copyright*, *id.*, at p. 1312.

⁵⁴ Tamar Frankel, *Fiduciary Law*, *id.*, at p. 801.

CMOs could be obliged to consult⁵⁵ with authors and give them the opportunity to express their best interests and opinions, in accordance with which rights would be managed. Maybe, CMOs would implement internal policies and other safeguards to enhance transparency and avoid mismanagement. And this would be needed, since current transparency policies do not always meet high standards. Namely, while Article 18 of the Directive 2014/26/EU provides that a CMO should make available to each member information on e.g. royalties distribution, albeit it allows making available this information in national language that not all members may understand⁵⁶.

In addition to the above, in contrast to contract relations, where both parties seek to satisfy their needs, fiduciary relations are designed to satisfy only the needs of the entrustor⁵⁷, who may also monitor fiduciaries. As some have aptly put it, these laws are in place to avoid having the beneficiary “*looking over the fiduciary’s shoulder*”⁵⁸. Affirmative duties to disclose⁵⁹ or “*volunteer*”⁶⁰ information could also be introduced to ensure that CMOs, as decisionmakers⁶¹, would become accountable. And this would very likely strengthen the member’s right to participate in decision making, a right that has already been established by Article 6(3) of the Directive 2014/26/EU. Rightsholders would be able to better monitor and exercise more scrutiny over CMOs’ activities.

A trust approach would also have a symbolic value; it would be a statement of societal expectations⁶². And it would be fair to argue that what we need today is the

⁵⁵ J. Sandberg, Socially Responsible Investment and Fiduciary Duty: Putting the Freshfields Report into Perspective, *Journal of Business Ethics*, 101, Springer 2010, pp. 143-162, at p. 145. Available at <https://link.springer.com/content/pdf/10.1007%2Fs10551-010-0714-8.pdf>.

⁵⁶ Take, for instance, the Spanish CMO, SGAE, whose website provides some information only in Spanish: www.sgae.es.

⁵⁷ Tamar Frankel, *Fiduciary Law*, id, at pp. 801, 818, 819.

⁵⁸ Kenneth B. Jr. Davis, *Judicial Review of Fiduciary Decisionmaking - Some Theoretical Perspectives*, *Northwestern University Law Review*, March 1985, Vol. 80, No. 1, pp. 1-99, at p. 6.

⁵⁹ Robert C. Clark, *Agency Costs versus Fiduciary Duties*, in John W. Pratt & Richard J. Zeckhauser (eds), *Principals and Agents: The Structure of Business*, Harvard Business School Press, 1985, at pp. 71-76; Frank H. Easterbrook, Daniel R. Fischel, *Contract and fiduciary duty*, id, at p. 445.

⁶⁰ Scott FitzGibbon, *Fiduciary Relationships Are Not Contracts*, *Marquette Law Review*, Vol. 82 (Winter 1999), No. 2, pp. 303-353, at p. 308.

⁶¹ Fiduciaries are typically decisionmakers, whose specialized function is that of recommending or making decisions of a discretionary nature about the management or investment of the (property or) power of others. Alison Grey Anderson, *Conflicts of Interest: Efficiency, Fairness and Corporate Structure*, id, at p. 757.

⁶² Annette C. Baier, *Trust and Antitrust, Moral Prejudices: Essays on Ethics*, 1994, Harvard University Press, at p. 130.

emergence of societies based on fiduciary relations⁶³, whose moral⁶⁴ theme⁶⁵ includes loyalty, fidelity, faith, and honor. So, maybe, the law could provide incentives to encourage potential fiduciaries and entrustors to enter into such relations, which by law demand fairness.

To sum up, CMOs do have special power over others and special relationship to others. What if the royalties collected were offered as “salaries” to the Executives of a CMO⁶⁶, instead of being distributed among members? The duty of loyalty and trustworthiness would probably ensure that the fiduciary would act in the interest of the beneficiary; the entrusted fiduciary would not betray the trust. Since, in almost every case, these potential fiduciaries manage important rights, it seems that they could have a duty of care, a duty to act competently and diligently. Besides, CMOs, as professionals having skills and knowledge, and rightsholders, being ill-prepared⁶⁷ to monitor CMOs’ behavior, are not equal. This leads to asymmetry or superiority, a prerequisite for fiduciary laws to apply. In the relationship between members and CMOs, there is vulnerability, dependence, and the experts’ awareness of managing valuable rights. So, it seems that the above could justify the application of fiduciary laws.

And it might be surprising and most probably unwelcome news to CMOs that another body of law is relevant to the collective administration⁶⁸ of copyright⁶⁹. Yet fiduciary laws could guarantee trust.

⁶³ The European Commission, Resource Efficiency and Fiduciary Duties of Investors, id, at p. 22; Kenneth M. Rosen, Fiduciaries, Meador Lecture Series 2005-2006: Fiduciaries, Alabama Law Review, Vol. 58, pp. 1041-1048, at p. 1042.

⁶⁴ Courts often “write” as if they are importing moral requirements into the law through their policing of fiduciary relationships; this way courts draw from the moral sphere, use informal social norms to influence fiduciary behavior, and create extra-legal norms. Elizabeth S. Scott and Robert E. Scott, Parents as Fiduciaries, id, at pp. 2422, 2425; Larry E. Ribstein, Are Partners Fiduciaries?, University of Illinois Law Review, Symposium Issue, Vol. 2005, No. 1, February 2005, Illinois Public Law Research Paper No. 04-20, University of Illinois Law & Economics Research Paper No. LE04-008, pp. 101-140, at p. 127; Robert Cooter & Bradley J. Freedman, The Fiduciary Relationship: Its Economic Character and Legal Consequences, id, at pp. 1073-1074.

⁶⁵ Tamar Frankel, Fiduciary Law, id, at pp. 829-832, discussing the moral theme in fiduciary regulation.

⁶⁶ In fact, this has recently been the case in Greece. See, amongst others, The National Herald, Greece’s Intellectual Property Agency Scandal Brings Corruption Charges, July 2, 2018, available at <https://www.thenationalherald.com/206338/greeces-intellectual-property-agency-scandal-brings-corruption-charges/>.

⁶⁷ Rightsholders are in a weak position, while CMOs have become the “*indispensable intermediaries*”. Sebastian Haunss, The changing role of collecting societies in the Internet, Internet Policy Review, Journal on internet regulation, 2013, Vol. 2, Issue 3, pp. 1-8, at p. 1.

⁶⁸ CMOs’ reactions may be the same as regards e.g. competition law. Laurence R. Helfer, Collective Management of Copyrights and Human Rights: An Uneasy Alliance Revisited, id, at p. 76.

And, maybe, technology could strengthen relationships of trust.

3. The promising chains

Transactions and the records of them are among the defining structures in economic and legal systems⁷⁰, protecting assets, creating ownership, or establishing a layer, where people interact in trust. Laws of trust are said to be partly inside technologies⁷¹ and it is believed that a “programmable economy”, enabled by meta-coins and smart technologies, may support new forms of exchange, new markets, and new kinds of economies⁷².

And, in fields of copyright, industries tend to adopt new technology solutions⁷³. Since in a movie or a song many rightsholders can be involved, complexity may occur in terms of right claims, ownership, or collection and distribution of royalties⁷⁴. So, some⁷⁵ have proposed blockchain⁷⁶ to address the

⁶⁹ Such laws might, for instance, question the competence of a CMO, as a fiduciary, to transfer the beneficiary’s (e.g. author’s) right to receive fair remuneration to another CMO.

⁷⁰ Marco Iansiti & Karim R. Lakhani, *The Truth About Blockchain*, Harvard Business Review, January-February 2017 Issue, available at <https://hbr.org/2017/01/the-truth-about-blockchain> (“*they establish and verify identities and chronicle events*”).

⁷¹ Johan Pouwelse, André de Kok, Joost Fleuren, Peter Hoogendoorn, Raynor Vliegendorhart and Martijn de Vos, *Laws for Creating Trust in the Blockchain Age*, EPLJ, 2017, Vol. 6, No. 3, pp. 321-360, at p. 322 (“*Laws of trust are now partly inside commercial software*”).

⁷² Viveca Woods, *Gartner Says the Programmable Economy Has the Potential to Disrupt Every Facet of the Global Economy*, October 8, 2015, Gartner, Inc., available at <https://www.gartner.com/newsroom/id/3146018>, mentioning as examples the attention economy, the reputation economy, the on-demand economy, and the resource optimization economy. See also Panos Constantinides, Ola Henfridsson, Geoffrey G. Parker, *Introduction-Platforms and Infrastructures in the Digital Age*, 2018, Information Systems Research, Vol. 29, No. 2, available at <https://doi.org/10.1287/isre.2018.0794>, pp. 381-400, at p. 390, mentioning that blockchain offers infrastructure leaders the opportunity to not only increase efficiency and reduce costs, but also evolve how physical commodities are distributed and consumed.

⁷³ Sergey Bludov, *Utilizing Blockchain Technology to Improve Music Copyright Management*, 24 April 2017, Data Art, available at <https://blog.dataart.com/utilizing-blockchain-technology-to-improve-music-copyright-management/>.

⁷⁴ Benji Rogers, *How the Blockchain and VR Can Change the Music Industry (Part 1)*, Nov. 2016, Medium, available at <https://medium.com/cuepoint/bc-a-fair-trade-music-format-virtual-reality-the-blockchain-76fc47699733>. For a discussion on how musicians are paid, see Aisling Quinn, *Are online music platforms undermining the principles of copyright law?*, *Journal of Intellectual Property Law & Practice*, 2018, Vol. 13, No. 1, pp. 49-60 (at p. 52, mentioning that contract terms limited Prince to a certain number of concert tours). See also Kevin Gray, *Kobalt changed the rules of the music industry using data – and saved it*, *Wired*, May 1, 2015, available at <https://www.wired.co.uk/article/kobalt-how-data-saved-music> (“*songwriters signed to big music publishers often wait up to two years to get their money after it’s been collected*”).

⁷⁵ Ignacio De Leon & Ravi Gupta, *The Impact of Digital Innovation and Blockchain on the Music Industry*, Nov. 2017, Inter-American Development Bank, at p. 19, available at

copyright “mess”; thanks to its potential for digital proof of identity and costless verification, blockchain could have a wide range of applications including the sphere of copyright management⁷⁷.

By deploying cryptographic mechanisms to reach consensus, these chains are said to eliminate the need for an intermediary; as many scholars argue, they create a distributed trust system of value transfer⁷⁸. After having shifted from Bitcoin to Ethereum⁷⁹, to some⁸⁰, the second generation or the “Blockchain 2.0”, experts state

<https://publications.iadb.org/bitstream/handle/11319/8627/The-Impact-of-Digital-Innovation-and-Blockchain-on-the-Music-Industry.PDF?sequence=1&isAllowed=y>; Revelator, Blockchain: The operating system for music, A solution to the music copyright mess, available at <https://www.weusecoins.com/assets/pdf/library/Blockchain%20Solution%20for%20the%20Music%20Industry.pdf>, at p. 3 (arguing that blockchain technologies could address the aspects of data openness/standardization and copyright ownership/transfer). See also Music Business Worldwide, Universal, Sony, Warner Vow to Create A Working Global Rights Database, June 14, 2016, available at <https://www.musicbusinessworldwide.com/universal-sony-warner-vow-create-working-global-rights-database/>.

⁷⁶ Buterin offers a definition of blockchain: “[...] A *blockchain* is a magic computer that anyone can upload programs to and leave the programs to self-execute, where the current and all previous states of every program are always publicly visible, and which carries a very strong cryptoeconomically secured guarantee that programs running on the chain will continue to execute in exactly the way that the blockchain protocol specifies [...] They’re Lego Mindstorms for building economic and social institutions [...]”. Vitalik Buterin, Visions, Part 1: The Value of Blockchain Technology, April 12, 2015, Ethereum Blog, available at <https://blog.ethereum.org/2015/04/13/visions-part-1-the-value-of-blockchain-technology/>. As others have argued, blockchains compete with organizations, but they are not organizations; they have market-like properties, but they are not markets; they facilitate transactions, not (just) exchange. Sinclair Davidson, Primavera De Filippi, Jason Potts, Economics of Blockchain, March 8, 2016, available at <https://ssrn.com/abstract=2744751> or <http://dx.doi.org/10.2139/ssrn.2744751>, pp. 1-23, at p. 11.

⁷⁷ Marina Niforos, Blockchain in Development - A New Mechanism of ‘Trust’?, in Ofeoritse Daibo & Matt Benjamin (eds), Blockchain: Opportunities for Private Enterprises in Emerging Markets, International Finance Corporation, October 2017, available at https://www.ifc.org/wps/wcm/connect/publications_ext_content/ifc_external_publication_site/publications_listing_page/blockchain+report, pp. 9-15, at p. 9.

⁷⁸ Michael Casey, The Blockchain: Decentralized trust to unlock a decentralized future, September 8, 2016, O’Reilly, available at <https://www.oreilly.com/ideas/the-blockchain-decentralized-trust-to-unlock-a-decentralized-future>.

⁷⁹ Andrew Marshall, Ethereum 101: from Idea to Release, June 22, 2016, The Coin Telegraph, available at <https://cointelegraph.com/news/ethereum-101-from-idea-to-release>. See also Gavin Wood, Ethereum: A Secure Decentralised Generalised Transaction Ledger (EIP-150 Revision), pp. 1-32, at p. 1, available at <http://gavwood.com/Paper.pdf> (providing Ethereum, a system such that users can be guaranteed that no matter with which other individuals, systems or organizations they interact, they can do so with absolute confidence in the possible outcomes and how those outcomes might come about).

⁸⁰ Balázs Bodó & Joao Pedro Quintais, Blockchain Copyright Symposium, Institute for Information Law (IViR), June 27, 2017, available at <http://copyrightblog.kluweriplaw.com/2017/06/27/blockchain-copyright-symposium/>.

that no intermediaries need to be involved and, hence, the network can have speed⁸¹ and lower transaction costs; this emerging “*beating heart of the global financial system*”⁸² could reduce organizational complexity⁸³ and verification and networking costs⁸⁴.

Blockchain has been regarded as a meta-technology that involves game theory, cryptography, and software engineering⁸⁵. Simply put, the process can be understood as follows: A wants to send coins to B; the transaction is represented online as a block; the block is broadcasted to every party in the network; those in the network approve this transaction is valid; the block can be added to the chain that provides a transparent record of transactions; coins move from A to B⁸⁶. In this

⁸¹ Marina Niforos, Beyond Fintech: Leveraging Blockchain for More Sustainable and Inclusive Supply Chains, in Ofeoritse Daibo & Matt Benjamin (eds), *Blockchain: Opportunities for Private Enterprises in Emerging Markets*, id, pp. 44-50, at p. 47 (“*Walmart discovered that, while it normally takes more than six days to trace a package of mangoes from the supermarket back to the farm where they were grown, blockchain can reduce this time to seconds*”).

⁸² Peter Vanham, Blockchain Will Become ‘Beating Heart’ of the Global Financial System, Aug. 12, 2016, World Economic Forum, available at <https://www.weforum.org/press/2016/08/blockchain-will-become-beating-heart-of-the-global-financial-system/>.

⁸³ Marco Iansiti & Karim R. Lakhani, The Truth About Blockchain, id; Marina Niforos, Blockchain in Development -How It Can Impact Emerging Markets, in Ofeoritse Daibo & Matt Benjamin (eds), *Blockchain: Opportunities for Private Enterprises in Emerging Markets*, id, pp. 16-22, at p. 16.

⁸⁴ Christian Catalini and Joshua S. Gans, Some Simple Economics of the Blockchain (September 21, 2017), Rotman School of Management Working Paper No. 2874598; MIT Sloan Research Paper No. 5191-16, available at <https://ssrn.com/abstract=2874598> or <http://dx.doi.org/10.2139/ssrn.2874598>.

⁸⁵ Marina Niforos, Blockchain in Development - A New Mechanism of ‘Trust’?, id, at p. 11; Matt Lockyer, Building Blockchain Solutions to Real World Problems - “The revolution will not be centralized”, December 9, 2017, Medium, <https://medium.com/@mattdlockyer/understanding-blockchain-technology-2cb5636823eb>; Staples, M., Chen, S., Falamaki, S., Ponomarev, A., Rimba, P., Tran, A. B., Weber, I., Xu, X., Zhu, J., Risks and opportunities for systems using blockchain and smart contracts, Data61 (CSIRO), Sydney, May 2017, at p. 2 (mentioning that blockchains combine cryptographic, data management, networking, and incentive mechanisms to support the checking, execution, and recording of transactions); Sinclair Davidson, Primavera De Filippi, Jason Potts, Economics of Blockchain, id, at p. 6 (blockchain is a “*product of cryptography, invented as a solution to a problem in the design of digital money*”).

⁸⁶ Lemieux provides a more technical and detailed overview concerning Bitcoin transactions: X proposes the transfer of Bitcoin to Y; the network checks that there is sufficient Bitcoin in X’s wallet; nodes (miners) bundle the proposal with other transactions to create a new block; the blocks are cryptographically hashed (i.e. they are used as input to an algorithm that converts them into an alphanumeric string: the “hash value”); the hash is put into the header of the proposed block; the header becomes the basis for the proof of work performed by the nodes on the network; when a node reaches a solution to the proof-of-work, other nodes check it and then each; the node that confirms the solution updates the blockchain with the hash of the header (of the proposed block); this becomes the new block’s identifying string (and is part of the distributed ledger); the

infrastructure, experts believe that trust is not brokered by intermediaries, but is embodied algorithmically in the transaction and the “algo-consensus” process is the trust agent⁸⁷.

As some authors have argued, the main variants are either private or public closed blockchains (private/public permissioned) versus private or public open blockchains (permissionless)⁸⁸. Whether a ledger is public or private determines who has access to copies of the ledger; the attribute of permission versus permissionless determines who maintains the ledger⁸⁹. It is argued that in permissionless blockchains, like Bitcoin, anyone can participate and anyone, who is willing to pay the fees, can create accounts and propose transactions; a lack of control over who can participate is often the goal of such systems⁹⁰. On the other hand, with regard to permissioned systems, authors state that participation is controlled by an authority; this helps comply with the “know your customer” regulation⁹¹.

In case of copyright management, it seems that blockchain could bring a secure, reliable, and scalable distributed transaction processing to e.g. licensing

transaction is confirmed; X pays Y. Victoria Louise Lemieux, *Trusting records: is Blockchain technology the answer?*, *Records Management Journal*, 2016, Vol. 26, Issue 2, pp. 110-139, at p. 119. See also Vitalik Buterin, *Ethereum White Paper, A Next Generation Smart Contract & Decentralized Application Platform*, 2014, available at <https://coss.io/documents/white-papers/ethereum.pdf>; Eric Funk, Jeff Riddell, Felix Ankel, Daniel Cabrera, *Blockchain Technology: A Data Framework to Improve Validity, Trust, and Accountability of Information Exchange in Health Professions Education*, *Journal of the Association of American Medical Colleges*, DOI: 10.1097/ACM.0000000000002326, June 12, 2018, available at <https://insights.ovid.com/crossref?an=00001888-900000000-97880>, pp. 1-17, at pp. 3-4; Staples, M., Chen, S., Falamaki, S., Ponomarev, A., Rimba, P., Tran, A. B., Weber, I., Xu, X., Zhu, J., *Risks and opportunities for systems using blockchain and smart contracts*, id, at p. 2.

⁸⁷ See, amongst others, Pim Otte, Martijn de Vos, Johan Pouwelse, *TrustChain: A Sybil-resistant scalable blockchain*, *Future Generation Computer Systems*, 2017, doi: 10.1016/j.future.2017.08.048, pp. 1-11.

⁸⁸ See, amongst others, Marina Niforos, *Blockchain in Financial Services in Emerging Markets - Current Trends*, in Ofeoritse Daibo & Matt Benjamin (eds), *Blockchain: Opportunities for Private Enterprises in Emerging Markets*, id, pp. 29-37, at p. 30.

⁸⁹ Michael Mainelli, Mike Smith, *Sharing Ledgers for Sharing Economies: An Exploration of Mutual Distributed Ledgers (Aka Blockchain Technology)*, November 7, 2015, *Journal of Financial Perspectives*, 2015, Vol. 3, No. 3, available at <https://ssrn.com/abstract=3083963>; Government Office for Science, *Distributed Ledger Technology: Beyond block chain*, A report by the UK Government Chief Scientific Adviser, 2016, available at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/492972/gs-16-1-distributed-ledger-technology.pdf.

⁹⁰ Maurice Herlihy, Mark Moir, *Blockchains and the Logic of Accountability: Keynote Address*, *LICS '16 Proceedings of the 31st Annual ACM/IEEE Symposium on Logic in Computer Science*, New York, USA, July 05-08, 2016, pp. 27-30, at p. 27.

⁹¹ Maurice Herlihy, Mark Moir, *Blockchains and the Logic of Accountability: Keynote Address*, id.

works. It could introduce traceable and verifiable ownership⁹² and fair distribution of royalties⁹³. Some state that via such technologies users could directly pay rightsholders⁹⁴. Others mention several advantages that could be achieved⁹⁵: smart contracts⁹⁶ could help rightsholders manage their rights and allocate revenue shares⁹⁷; transparent and secure⁹⁸ peer-to-peer transactions could be established;

⁹² Philip Boucher, Susana Nascimento & Mihalis Kritikos, How blockchain technology could change our lives, In-depth Analysis, February 2017, European Parliamentary Research Service, STOA, available at [http://www.europarl.europa.eu/RegData/etudes/IDAN/2017/581948/EPRS_IDA\(2017\)581948_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/IDAN/2017/581948/EPRS_IDA(2017)581948_EN.pdf), at pp. 8-9; Opal Gough, Blockchain: a new opportunity for record labels, International Journal of Music Business Research, April 2018, Vol. 7, No. 1, pp. 26-44, at p 31; Jessie Willms, Is Blockchain-Powered Copyright Protection Possible?, Aug 9, 2016, Bitcoin Magazine, available at <https://bitcoinmagazine.com/articles/is-blockchain-powered-copyright-protection-possible-1470758430/>.

⁹³ Kim, Ultimate Content Publishing and Monetisation Platform, Whitepaper, May 9, 2018, available at <https://k.im/docs/whitepaper.pdf>; Sarah Perez, Spotify acquires blockchain startup Mediachain to solve music's attribution problem, April 26, 2017, Techcrunch, mentioning that blockchain is the key to solving attribution, empowering creators and rights owners, and enabling a more efficient and sustainable model for creativity. Available at <https://techcrunch.com/2017/04/26/spotify-acquires-blockchain-startup-mediachain-to-solve-musics-attribution-problem/>.

⁹⁴ Sergey Bludov, Blockchain, DDEX, dotBC and OMI – Oh my!, February 9, 2017, Data Art, <https://blog.dataart.com/blockchain-ddex-dotbc-and-omi-oh-my/>.

⁹⁵ Ryo Takahashi, How can creative industries benefit from blockchain?, McKinsey's, Aug. 2017, available at <https://www.mckinsey.com/industries/media-and-entertainment/our-insights/how-can-creative-industries-benefit-from-blockchain>.

⁹⁶ Some have defined the “smart contract” as a computer program that can automatically execute the terms of a contract. By being self-executing and having property ownership information embedded, these contracts may solve the problems of counterparty trust; they are said to be trustless, autonomous, and self-efficient, making their formation and performance more efficient, cost-effective, and transparent. Peter Frøystad & Jarle Holm, Whitepaper, Blockchain: Powering the Internet of Value, 2015, EVERY Labs, at p. 30. Available at <https://www.evry.com/globalassets/insight/bank2020/bank-2020---blockchain-powering-the-internet-of-value---whitepaper.pdf>.

⁹⁷ To some, smart contracts can reduce costs of negotiation, verification, and enforcement by turning legal obligations into “*self-executing transactions*”. Primavera De Filippi, Samer Hassan, Blockchain technology as a regulatory technology: From code is law to law is code, First Monday, Vol. 21, No. 12, December 5, 2016, available at <http://firstmonday.org/ojs/index.php/fm/article/view/7113> (mentioning as earlier examples of “*non blockchain-based*” smart contracts traditional vending machines, DRM systems, and cars with automated speed limitations).

⁹⁸ Neil B. Barnas, Blockchains In National Defense: Trustworthy Systems In A Trustless World, Maxwell Air Force Base, Alabama, Blue Horizons Fellowship Air University, June 2016, at p. 31 (mentioning that “*blockchains are transparently secure*”). Available at http://www.jcs.mil/Portals/36/Documents/Doctrine/Education/jpme_papers/barnas_n.pdf?ver=2017-12-29-142140-393.

tracking⁹⁹ the demand for content might lead to a more dynamic pricing¹⁰⁰; even snippets could be made available; and a reputation system could be built, where producers and consumers would verify¹⁰¹ one another.

So, it seems that the standard ways of producing content could change. Exclusive contracts between rightsholders and entities to e.g. assign copyright¹⁰² could be replaced by smart ones. This new environment could include one or multiple networked databases for copyright information, new file format, fast payment, and transparency¹⁰³.

But some might fear that art, the multibillion dollar¹⁰⁴ unregulated market “*with unclear criteria just waiting to be harnessed*”¹⁰⁵, would then be controlled by “supercomputer” systems that would deploy it, not for aesthetical purposes but, purely for maximized marketability and value¹⁰⁶. To others, risks might occur, as the ability to control works as scarce objects could bring art and science (back) to a *quasi* cyber system characterized by the scarcity of the analogue environment¹⁰⁷.

⁹⁹ Eric Piscini, Joe Guastella, Alex Rozman, Tom Nassim, Blockchain: Democratized trust, Distributed ledgers and the future of value, February 24, 2016 (referring to tracking land titles “[...] *The system [...] tracks [...] every change of ownership, every loan made against a single piece of land, and every contract made against mineral rights [...] Users can track the entire history of a land title instantly [...]*”). Available at <https://www2.deloitte.com/insights/us/en/focus/tech-trends/2016/blockchain-applications-and-trust-in-a-global-economy.html>.

¹⁰⁰ Infinity, Blockchain Labs, Blockchain - A game Changer for the Art Industry?, May 7, 2018, available at <https://www.blockchainlabs.asia/news/blockchain-a-game-changer-for-the-art-industry/> (“[...] *By tracking the demand for creative content, pricing could be more dynamic [...]*”).

¹⁰¹ As regards verification in private and public blockchains, see Kevin Petrasic, Beyond Bitcoin: The blockchain revolution in financial services, March 7, 2016, Insight, available at <https://www.whitecase.com/publications/insight/beyond-bitcoin-blockchain-revolution-financial-services>.

¹⁰² Ewa Fabian, Blockchain, Digital Music and Lex Mercatoria, US-China Law Review, 2017, Vol. 14, pp. 852-863, at p. 853.

¹⁰³ Marcus O’Dair, Music on The Blockchain, Blockchain For Creative Industries Research Cluster, Middlesex University, Report N° 1, July 2016, at pp. 4, 8, available at https://www.mdx.ac.uk/__data/assets/pdf_file/0026/230696/Music-On-The-Blockchain.pdf.

¹⁰⁴ Marcus O’Dair, Music on The Blockchain, id, at p. 5 mentioning that the music industries are worth an estimated 45 billion dollars globally.

¹⁰⁵ Lauren Cornell, Algorithmic Models of Art’s Future, A proposition by João Enxuto and Erica Love for First Look: New Art Online, April 25, 2016, available at <http://rhizome.org/editorial/2016/apr/25/institute-for-southern-contemporary-art/>.

¹⁰⁶ Lauren Cornell, Algorithmic Models of Art’s Future, id.

¹⁰⁷ As some have argued, blockchain essentially allows the reinstatement of artificial scarcity in the online world through tokenization of digital items. Joao Pedro Quintais, Lars Groeneveld, Balázs Bodó, Blockchain Copyright Symposium: Summary Report, Institute for Information Law (IViR), August 3, 2017, available at

Interestingly, recent projects may allow creators or collectors to document or verify the authenticity of digital artefacts in order to secure their commercial value¹⁰⁸. But securing the value is the aim¹⁰⁹, an emergent property of a project; it is not something given, not a feature by construction. Moreover, smart contracts “*may be set*” to enforce rules attached to the artworks “*quasi-autonomously*”¹¹⁰; they do not fully autonomously enforce themselves in any case.

While Blockchain’s advantages are said to be decentralization, cost efficient micro-transactions¹¹¹, lack of complexity¹¹², and information sharing¹¹³, commentators argue that its disadvantages may include: the fact that smart contracts cannot always trigger themselves¹¹⁴; blockchain relies solely on the correctness of predefined rules, which need to be secure, reliable and accurate¹¹⁵; technical

<http://copyrightblog.kluweriplaw.com/2017/08/03/blockchain-copyright-symposium-summary-report/>.

¹⁰⁸ Take, for example, “Monegraph” that allows to verify digital art via a work, a claim (e.g. a public tweet stating the work’s ownership), or a record (an entry in the blockchain recording this information in some format). Anil Dash, A Bitcoin for Digital Art, Currency is boring. Let’s make GIFs!, The Message, May 9, 2014, <https://medium.com/message/a-bitcoin-for-digital-art-8c7db719e495>; Monegraph Project: <https://monegraph.com/#Overview>. Monegraph’s licenses include: an Artwork license (for non-commercial use and personal enjoyment); a News Photo license (for editorial non-commercial use); a Product Image license (a more typical commercial rights-managed license); and a Snapshot license (which is a commercial agreement that virtually gives all rights to one party). See Monegraph’s Support Center, What is a Monegraph license? September 28, 2015: <https://monegraphhelp.zendesk.com/hc/en-us/articles/208202708-What-is-a-Monegraph-license->.

¹⁰⁹ Martin Zeilinger, Digital Art as ‘Monetised Graphics’: Enforcing Intellectual Property on the Blockchain, *Philosophy & Technology*, March 2018, Vol. 31, Issue 1, pp. 15-41, at p. 16 (“[...] *so that, it is hoped, they can more efficiently secure the commercial value [...]*”).

¹¹⁰ Martin Zeilinger, Digital Art as ‘Monetised Graphics’: Enforcing Intellectual Property on the Blockchain, *id.*, at p. 17.

¹¹¹ Roman Beck, Jacob Stenum Czepluch, Nikolaj Lollike, Simon Malone, Blockchain – The Gateway to Trust-free Cryptographic Transactions, Twenty-Fourth European Conference on Information Systems (ECIS), Istanbul, Turkey, 2016, pp. 1-14, at p. 2, available at https://aisel.aisnet.org/cgi/viewcontent.cgi?article=1145&context=ecis2016_rp.

¹¹² Sinclair Davidson, Primavera De Filippi, Jason Potts, Economics of Blockchain, *id.*, at p. 5.

¹¹³ Benedikt Notheisen, Jacob Benjamin Cholewa, Arun Prasad Shanmugam, Trading Real-World Assets on Blockchain, An Application of Trust-Free Transaction Systems in the Market for Lemons, *Business & Information Systems Engineering*, December 2017, Vol. 59, Issue 6, pp. 425-440.

¹¹⁴ To some, these contracts require explicit interventions. Florian Glaser, Pervasive Decentralisation of Digital Infrastructures: A Framework for Blockchain enabled System and Use Case Analysis, in Proceedings of the 50th Hawaii International Conference on System Sciences, 2017, pp. 1543-1552, at p. 1547. Available at <https://pdfs.semanticscholar.org/859d/0535e16095f274df4d69df54954b21258a13.pdf>.

¹¹⁵ Sapumal Ahangama and Danny Chiang Choon Poo, Credibility of Algorithm Based Decentralized Computer Networks Governing Personal Finances: The Case of Cryptocurrency, in International Conference on HCI in Business, Government, and Organizations, HCIBGO 2016:

problems¹¹⁶ might occur with regard to scalability, latency or query issues; and consensus algorithms might involve additional costs¹¹⁷.

To some, the statement that these technologies are “unforgeable” or afford truly trustless transactions is not technically correct, since software flaws could allow for corruption¹¹⁸. So, the blockchain’s trustworthiness could be doubted¹¹⁹. Besides, permissioned blockchains could allow manipulation. This means that immutability and security¹²⁰ may be exaggerated; since blockchain is powered by the consensus protocol (proof-of-work), its “history” could be rewritten by attackers, who would control more than the half of the proof-of-work resources¹²¹.

As commentators argue, most of the features that are stated as intrinsic, like “exact copy”, are not intrinsic, but desired properties of a system that involves many users; not all of them may be trusted¹²². The system can be ordered, digital, or

HCI in Business, Government, and Organizations: eCommerce and Innovation (available at https://link.springer.com/chapter/10.1007/978-3-319-39396-4_15), pp. 165-176, at pp. 166-167, 173.

¹¹⁶ Roman Beck, Jacob Stenum Czepluch, Nikolaj Lollike, Simon Malone, Blockchain – The Gateway to Trust-free Cryptographic Transactions, id, at p. 11.

¹¹⁷ Karl J. O' Dwyert and David Malone, Bitcoin Mining and its Energy Footprint, in 25th IET Irish Signals & Systems Conference 2014 and 2014 China-Ireland International Conference on Information and Communications Technologies, ISSC 2014/CICT 2014 (available at <https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6912770>); Panos Constantinides, Ola Henfridsson, Geoffrey G. Parker, Introduction-Platforms and Infrastructures in the Digital Age, id, at p. 391 (arguing that Bitcoin mining operations in Iceland consume more energy than all Icelandic households combined). But see Sinclair Davidson, Primavera De Filippi, Jason Potts, Economics of Blockchain, id, at p. 3, arguing that the basic economics of blockchain can be thought of the case for why decentralized solutions are likely to become increasingly cost effective, as they run down three exponential cost curves: Moore’s law (cost of processing information halves every 18 months); Kryder’s law (cost of storing information halves every 12 months); and Nielsen’s law (cost of shipping information halves every 24 months).

¹¹⁸ Martin Zeilinger, Digital Art as ‘Monetised Graphics’: Enforcing Intellectual Property on the Blockchain, id, at p. 22.

¹¹⁹ Smart contracts, implemented by code, may contain malicious flaws and, hence, malicious actors might control others’ actions. Kevin Delmolino, Mitchell Arnett, Ahmed Kosba, Andrew Miller, Elaine Shi, Step by Step Towards Creating a Safe Smart Contract: Lessons and Insights from a Cryptocurrency Lab, 2015, pp. 1-15, at pp. 7-8. Available at <https://eprint.iacr.org/2015/460.pdf>.

¹²⁰ Staples, M., Chen, S., Falamaki, S., Ponomarev, A., Rimba, P., Tran, A. B., Weber, I., Xu, X., Zhu, J., Risks and opportunities for systems using blockchain and smart contracts, id, at p. 42 (mentioning that confidentiality, a property of security, means that unauthorized disclosure of information does not take place; this is usually hard to establish in blockchains, since the default is that information is visible for everyone in the network).

¹²¹ Nicola Atzei, Massimo Bartoletti, Tiziana Cimoli, A Survey of Attacks on Ethereum Smart Contracts (SoK), in Maffei M., Ryan M. (eds), Principles of Security and Trust, POST 2017, Lecture Notes in Computer Science, Vol. 10204, Springer, Berlin, Heidelberg, pp. 164-186.

¹²² To some, trust cannot be replaced by algorithms instead of institutions and market authorities; to ensure a trustless infrastructure in financial transactions would require all financial agreements

cryptographically verifiable. But other features, such as “distributed”, are believed to be characteristics added by sharing, distribution, communication, and protocols¹²³. To some, the “immutability” is also an emergent property and the statement that transactions “cannot be modified” is incorrect and misleading¹²⁴. The reduction of energy might also be questionable, since the use of more computing nodes might result in the opposite¹²⁵. And one could further argue that, in the absence of a central authority, integrity of the system is also emergent¹²⁶.

So, it seems that the goals of a blockchain should not be regarded as its existing and intrinsic properties. There are some uncertainties and further experimenting would be needed to fully understand its possibilities and its limitations¹²⁷.

4. What future for copyright management? (Conclusions & discussion)

Regardless of emergent properties and expected goals, it seems that blockchains, like collective management of copyright, may “*come in many shapes and sizes*”. Yet, free entry to some blockchains can be allowed. And this resembles

to be cash-collateralized at 100% that is very challenging from a cost-of-capital perspective. Panos Constantinides, Ola Henfridsson, Geoffrey G. Parker, Introduction-Platforms and Infrastructures in the Digital Age, id, at p. 391. Besides, trust is not created by a technology. Svein Ølnes, Jolien Ubacht, Marijn Janssen, Blockchain in government: Benefits and implications of distributed ledger technology for information sharing, Government Information Quarterly 34, 2017, pp. 355-364, at p. 360 (mentioning that blockchain technology “*can*” facilitate better control and audit which ultimately “*might*” lead to some level of trust).

¹²³ Daniel Conte de Leon, Antonius Q. Stalick, Ananth A. Jillepalli, Michael A. Haney, Frederick T. Sheldon, Blockchain: properties and misconceptions, Asia Pacific Journal of Innovation and Entrepreneurship, 2017, Vol. 11, Issue 3, pp. 286-300, at pp. 288-290.

¹²⁴ Daniel Conte de Leon, Antonius Q. Stalick, Ananth A. Jillepalli, Michael A. Haney, Frederick T. Sheldon, Blockchain: properties and misconceptions, id. See also: at p. 292, where the authors question the “speed of convergence” and the “size of the consensus”, which, to the authors, are not by construction properties; at p. 294, arguing that the blockchain cannot be unique, since not all users may observe the same blockchain at the same time.

¹²⁵ Svein Ølnes, Jolien Ubacht, Marijn Janssen, Blockchain in government: Benefits and implications of distributed ledger technology for information sharing, id, at p. 360.

¹²⁶ For a discussion on blockchain “myths”, see Staples, M., Chen, S., Falamaki, S., Ponomarev, A., Rimba, P., Tran, A. B., Weber, I., Xu, X., Zhu, J., Risks and opportunities for systems using blockchain and smart contracts, id, at pp. 33, 43, challenging, amongst others: trust (users are exposed to risk in their use of the technology); smart contracts (which are not agreements *per se*, and, in case of Ethereum, where smart contracts are written in Turing-complete programming language, it is hard to verify that they correctly implement integrity properties); and costs (electricity is wasted by not leading directly to a successful puzzle solution).

¹²⁷ For a discussion, see Maurice Herlihy, Mark Moir, Blockchains and the Logic of Accountability: Keynote Address, id, at p. 27 (focusing on challenges concerning authorization, fairness, and incentives).

“*voting with one’s feet*”, an environment, where the efficiency advantage derives from the elimination of a centralized monopoly control over the rules of the game¹²⁸. This is some kind of “crypto-secession”¹²⁹, which brings us back to the freedom for copyright owners to “*vote with their feet*”, a main pillar of the European Union’s policy.

Blockchains could be a good fit for copyright management; they could create a “*Commons 3.0*” environment¹³⁰ to algorithmically address the problems of cooperation in production and maintain the benefits of commons-type governance. And it was over a decade ago, when some asked what happens when all books in the world become a single liquid fabric of interconnected words and ideas¹³¹; some answered that a universal library would deepen our grasp of history¹³², transforming isolated books into the universal space of all human knowledge¹³³. In this context, one could argue for a potential single 24/7 “*all-you-can-eat and whatever-you-want restaurant*”¹³⁴ of all arts and science ever produced.

To some, the tokens could be digital copies of the works¹³⁵. If this were the case, works could be subjected to a radical regime; an extreme alternative to copyright, under which all intellectual products would remain non-owned, or would be used by all participants of the blockchain, who would have a copy of a given work. Products of human intellect would not be owned by individuals, firms, or governments; ideas and the expressions of them would be available to be used by

¹²⁸ Sinclair Davidson, Primavera De Filippi, Jason Potts, *Economics of Blockchain*, id, at p. 14 (arguing that the political economy of blockchain is a kind of private order competitive federalism).

¹²⁹ Trent MacDonald, *Theory of Non-Territorial Internal Exit*, February 1, 2015, available at <https://ssrn.com/abstract=2661226> or <http://dx.doi.org/10.2139/ssrn.2661226>, at pp. 8-9, defining crypto-secession as the process in which citizens secede from an incumbent state and reconstitute in new “virtual states” that are akin to non-territorial public good clubs; it can be described as a form of tax evasion, but it is more accurately classified as a process of partial secession and *de facto* jurisdiction formation. To the author, secession is “permissionless” and non-territorial, while the cost of forming seceding groups is greatly diminished.

¹³⁰ Sinclair Davidson, Primavera De Filippi, Jason Potts, *Economics of Blockchain*, id, at p. 13.

¹³¹ Kevin Kelly, *Scan This Book!*, May 14, 2006, *The New York Times Magazine*, available at <https://www.nytimes.com/2006/05/14/magazine/14publishing.html>.

¹³² William C. Zehringer, “*Sheep May Safely Graze*”: *The Digital Common and the Universal Library*, Johns Hopkins University Press, *Libraries and the Academy*, Vol. 14, Number 1, January 2014, pp. 1-4, at p. 2.

¹³³ Kevin Kelly, *Scan This Book!*, id.

¹³⁴ G.M., *Digital music: Stuck in the middle with Spotify*, *The Economist*, May 27, 2016, available at <https://www.economist.com/prospero/2016/05/27/stuck-in-the-middle-with-spotify>.

¹³⁵ Joao Pedro Quintais, Lars Groeneveld, Balázs Bodó, *Blockchain Copyright Symposium: Summary Report*, id (“*These tokens can be digital copies of copyright works; they can also refer to rights, license terms or payment for the use of works*”).

anyone¹³⁶, who would participate in the blockchain. This might be the “information socialism”¹³⁷ that would expand intellectual commons¹³⁸, foster creativity, and lead to a greater political and economic equality¹³⁹. A utopian universal digital library that would leave no room for intermediaries; CMOs might be left out of the game. And in the absence of intermediaries, markets could, perhaps, work to their full capacity¹⁴⁰.

But it seems that this straightforward alternative to copyright is far from simple and, most probably, we are far from being there. In another scenario, where the tokens would be digital copies of the works, CMOs could be let in. Blockchains could promise an environment similar to registration systems that were proposed in the past¹⁴¹; authors could be required to declare by a clear affirmative action their wish to protect their works. Flexible blockchains¹⁴² might better comply with the digital environment and today’s uses of works, guaranteeing a more equitable, accessible and innovative world. Smart licenses, inspired by Creative Commons, could perhaps become the default. Namely, artworks or scientific works could be made available under open licenses that would foster creation and cultural diversity.

¹³⁶ See Martin Brian, *Information liberation, Challenging the corruptions of information power*, London, Freedom Press, 1998 (available at <https://www.uow.edu.au/~bmartin/pubs/98il/ilall.html#chapter%2010>). The author mentions language and scientific knowledge as examples of non-owned intellectual products and points out that the most dynamic parts of science are those with the least secrecy; turning knowledge into a commodity inhibits science.

¹³⁷ Richard Spinello & Maria Bottis, *A Defense of Intellectual Property Rights*, Edward Elgar, UK, USA, 2009, at p. 6 (with further references).

¹³⁸ Non-owned public spaces have enormous social value, but, on the Internet, everything is owned by some private entity; even these websites independently run by natural persons are hosted on some private server. So, there is no commons on the Internet. See Schneier Bruce, *Data and Goliath, The Hidden Battles to Collect Your Data and Control Your World*, W.W. Norton & Company, NY, London, 2015, at pp. 221-222, arguing that we need places to speak, converse, gather, or protest.

¹³⁹ Richard Spinello & Maria Bottis, *A Defense of Intellectual Property Rights*, id; Martin Brian, *Information liberation*, id.

¹⁴⁰ Simone Schroff & John Street, *The politics of the Digital Single Market: culture vs. competition vs. copyright*, id, at pp. 1305-1306 (mentioning that the European Commission has come to the view that the music market is not working to its full capacity and a “*main source of this underperformance has been attributed to the collective management organisations*”).

¹⁴¹ Sprigman Christopher Jon, *Reform(aliz)ing Copyright*, *Stanford Law Review*, Vol. 57, 2004, pp. 485-568 (Stanford Public Law Working Paper No. 88, available at SSRN: <https://ssrn.com/abstract=578502>), at p. 556.

¹⁴² Joao Pedro Quintais, Lars Groeneveld, Balázs Bodó, *Blockchain Copyright Symposium: Summary Report*, id, (“*blockchain technology is remarkably flexible*”).

However, many scholars argue that the very works could not be stored in a blockchain¹⁴³; only metadata would be stored¹⁴⁴. Storing only a hash of data on-chain and keeping contents off-chain might improve confidentiality and performance, but would perhaps create a point of failure reducing system availability and reliability¹⁴⁵. Another question here would be whether private or public blockchains should be preferred. For instance, using private ones might allow greater control over the admittance of processing nodes and transactions, but would most probably increase barriers to entry for participation and could, hence, reduce some of the benefits of using a blockchain¹⁴⁶. The opposite would be true in case of public blockchains.

In any case, as regards CMOs, it seems that a fair and transparent licensing process to secure an appropriate level of royalties for rightsholders could be achieved in the interest of all parties and, therefore, of cultural diversity. Besides, this was what many big players (including Amazon, Nokia, PRS for Music, Universal Music Publishing) argued for in their joint statement of 19 October 2009 on “General principles for the online distribution of music”¹⁴⁷. So, projects could aim at enabling rightsholders to receive a high percentage of sales income¹⁴⁸. CMOs could resolve ownership uncertainties by using blockchains to create shared and decentralized databases with real-time update and tracking capabilities¹⁴⁹. And one

¹⁴³ Alexander Savelyev, Copyright in the blockchain era: Promises and challenges, *Computer Law & Security Review*, Vol. 34, Issue 3, June 2018, pp. 550-561, at p. 556; Opal Gough, Blockchain: a new opportunity for record labels, *id.*, at p. 33 (“*blockchain is not suitable for storing data at high volumes*”); Staples, M., Chen, S., Falamaki, S., Ponomarev, A., Rimba, P., Tran, A. B., Weber, I., Xu, X., Zhu, J., Risks and opportunities for systems using blockchain and smart contracts, *id.*, at p. 32 (“*they are not suitable for storing Big Data*”).

¹⁴⁴ In the past, CISAC proposed the Global Repertoire Database to, amongst others, save costs by reducing duplication and errors in data registration and processing. See CISAC, Annual Report, 2013, available at <http://www.cisac.org/>. For the failure of the project, see Klementina Milosic, GRD’s Failure, *Berklee College of Music, Music Business Journal*, August 2015, available at <http://www.thembj.org/2015/08/grds-failure/>.

¹⁴⁵ Staples, M., Chen, S., Falamaki, S., Ponomarev, A., Rimba, P., Tran, A. B., Weber, I., Xu, X., Zhu, J., Risks and opportunities for systems using blockchain and smart contracts, *id.*, at p. 36.

¹⁴⁶ Staples, M., Chen, S., Falamaki, S., Ponomarev, A., Rimba, P., Tran, A. B., Weber, I., Xu, X., Zhu, J., Risks and opportunities for systems using blockchain and smart contracts, *id.*, at p. 37.

¹⁴⁷ See Joint statement from the Online Commerce Roundtable participants on “General principles for the online distribution of music”, p. 1, available at http://ec.europa.eu/competition/sectors/media/joint_statement_1.pdf or http://ec.europa.eu/competition/sectors/media/online_commerce.html.

¹⁴⁸ Brendan Howley, The Razor’s Edge, Blockchain, Ledger Legerdemain, and the Public Library, *Information Today*, Nov. 2016, pp. 14-15 (mentioning that MUSE is touted as a “*third generation*” blockchain; it may enable artists to receive a high percentage of sales income; more than 90%).

¹⁴⁹ This seems to be the direction towards which some CMOs are moving. See SACEM, Blockchain: SACEM, ASCAP and PRS for Music join forces to improve the identification of the

or multiple databases could be introduced not only to act as a clearing house for information on rights and ownership, but also to perform as a CMO and, hence, promote competition¹⁵⁰.

But commentators could argue that even metadata would be huge¹⁵¹. There would be too many contracts leading to high computing costs. In case of a public blockchain, while read access to metadata could be achieved¹⁵², users might not be able to pay for these computing resources to execute all smart contracts. On the other hand, if CMOs, as operators of private chains, were willing to pay these costs, the very network might limit access to metadata and contradict the alleged decentralized nature of blockchains; users would need approval from the operators¹⁵³.

So, it seems that the advent of blockchains will most probably bring many new opportunities, but also challenges for copyright management. While a utopian universal library of all arts and science would most probably not be the case, different licensing scenarios could be introduced to meet the standards that the proponents of the *commons* have long been proposing. This would be a copyright-friendly approach that could be brought to the discussion table to let arts and science flow, encourage rightsholders, and let audiences get to share in whatever is going on. But if it were true that only metadata would be stored, then a commons-like management would probably not be introduced. Yet, higher levels of transparency could be guaranteed in the existing regime to benefit rightsholders and the culture itself.

So far, it has been argued that although CMOs' importance is acknowledged by both the academic community and the law, albeit, there is a need for higher levels of transparency. In this context, fiduciary laws were proposed to regard CMOs as trustees that would act for the benefit of the rightsholders. This framework could allow CMOs to better perform their role as promoters of creativity

works, April 13, 2017, available at <https://societe.sacem.fr/en/news/authors-rights/blockchain-sacem-ascap-and-prs-for-music-join-forces-to-improve-the-identification-of-the-works>.

¹⁵⁰ Similarly, the Digital Copyright Exchange was proposed to, amongst others, enable licensees to look for different types of content or define the uses they wish to make. Richard Hooper, Rights and Wrongs, Is copyright licensing fit for purpose for the digital age? The first report of the Digital Copyright Exchange Feasibility Study, Intellectual Property Office, London, UK, March 27, 2012, at p. 12 (available at <http://bufvc.ac.uk/copyright-guidance/mlr/index.php/site/279>); Ruth Towse, The Economic Effects of Digitization on the Administration of Musical Copyrights, id, at p. 56.

¹⁵¹ David Gerard, Why You Can't Put The Music Industry On A Blockchain, 2017, available at <http://www.hypebot.com/hypebot/2017/08/why-you-cant-put-the-music-industry-on-a-blockchain-excerpt.html/>.

¹⁵² David Alexander Savelyev, Copyright in the blockchain era: Promises and challenges, id, at p. 551.

¹⁵³ David Alexander Savelyev, Copyright in the blockchain era: Promises and challenges, id.

and culture. Acting to benefit or even further the rightsholders' interests, CMOs could also reform their strategies through blockchain that would guarantee some higher levels of transparency and trust. While blockchains' potential has not yet been fully predictable, albeit some investment could be promoted to allow experimentation and, hence, better understanding of possibilities and limitations. Perhaps, what all parties could do is cooperate in a spirit of trust, make the best out of technologies, and interpret laws in ways to promote science and arts.