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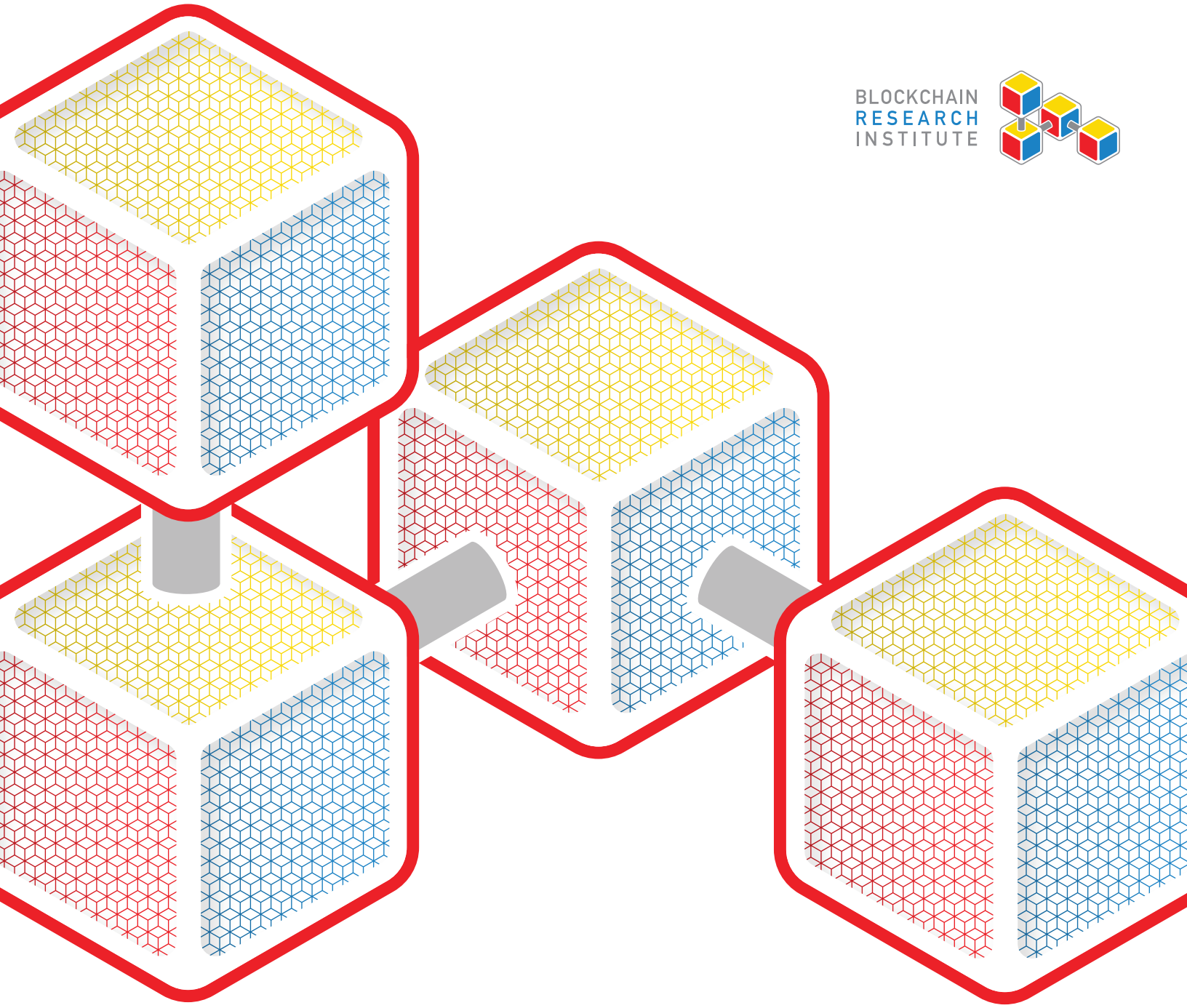

HOW BLOCKCHAIN IS TRANSFORMING THE CREATIVE INDUSTRIES

Copyright and Rights Management in the Second Era of the Internet

Marcus O'Dair
Middlesex University

November 2017

A BLOCKCHAIN RESEARCH INSTITUTE BIG IDEA WHITEPAPER

Realizing the new promise of the digital economy

In 1994, Don Tapscott coined the phrase, "the digital economy," with his book of that title. It discussed how the Web and the Internet of information would bring important changes in business and society. Today the Internet of value creates profound new possibilities.

In 2017, Don and Alex Tapscott launched the Blockchain Research Institute to help realize the new promise of the digital economy. We research the strategic implications of blockchain technology and produce practical insights to contribute global blockchain knowledge and help our members navigate this revolution.

Our findings, conclusions, and recommendations are initially proprietary to our members and ultimately released to the public in support of our mission. To find out more, please visit www.blockchainresearchinstitute.org.

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> Marcus O'Dair, "How Blockchain is Transforming the Creative Industries: Copyright and Rights Management in the Second Era of the Internet," foreword by Don Tapscott, Blockchain Research Institute, 10 Nov. 2017.

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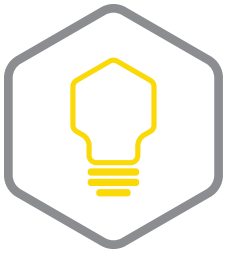

Foreword

As a medium of creativity and a channel for cultural expression, the Internet has been a marvelous muse. Talented artists, designers, and musicians—and their many fans—have no shortage of ideas for working together on the World Wide Web. Film, TV, games, and music publishing have been tapping new sources of revenue streams such as digital downloads and content streaming. But there's a catch: with each new intermediary, artists receive less money and have less say over what happens to their art.

Enter the blockchain. In this project, Marcus O'Dair shows how blockchain technologies are putting these creators at the center of their industry as core beneficiaries of their intellectual property (IP). The artist becomes what we call a "rights monetizer" who uses blockchain to make deals and collect royalties in real time. Marcus describes the development of a new global IP rights registry for licensing and rights management. He explores new business models—premised on digital scarcity—for automatic resale royalties, smart ticketing, monetization of fan data, and massive open distributed ownership.

We asked Marcus to lead this important research. An expert in this domain, Marcus is the convener of the Blockchain for Creative Industries Cluster at London's Middlesex University, associate professor of music and innovation, an acclaimed recording artist, and the author of a book shortlisted for the Penderyn music prize. In his research, he interviewed four headliners in this space: Primavera De Filippi of COALA, Imogen Heap of Mycelia, Joseph Lubin of ConsenSys, and Trent McConaghy of BigchainDB.

Anyone who creates, manages, or licenses intellectual property should read this work to understand the issues, strategies, and approaches to managing these rights in the second era of the Internet.

DON TAPSCOTT
Co-Founder and Executive Chairman
Blockchain Research Institute

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Idea in brief

» With distributed ledger technology, artists, entrepreneurs, and software developers have an opportunity to lead the next transformation of the creative industries, starting with the ecosystem for copyrighted work (e.g., art, film, music, photographs, and manuscripts).

» Blockchain brings about *digital scarcity*, where digital files are no longer copiable for free without a copyright holder's permission. It also facilitates *transparency*, where rights ownership is easily verifiable and quickly discoverable. Finally, it enables *peer-to-peer exchanges of value*, where royalty revenues from licensing and sales—including resales of a work—could flow directly from licensees and buyers to artists and their collaborators without intermediaries.

» The future holds all-new art forms such as autonomous sculpture, new sources of capital such as crowdfunding through token sales, and new models of production and consumption such as massively distributed online creation and micropayments for snippets of text or streaming audio and video.

» For the first time, the creators of value could maintain control over their intellectual property—or reclaim it from large conglomerates and other copyright clearing houses—and receive full and fair compensation.

Introduction

Globally, the creative industries provide almost 30 million jobs, which are relatively resistant to automation, and generate almost $2.25 trillion annually, roughly three percent of the world's GDP—a bigger share than the global telecommunications industry.[1] The creative industries also represent *soft power* (the ability to achieve outcomes through attraction rather than coercion), which results from a country's culture, its social values, its policies, and its political ideals.[2]

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At the same time, the creative industries are under severe threat. Trent McConaghy, founder and chief technology officer at BigchainDB, explained:

> *The fundamental problem is that creators are having a hard time feeding their families. They're really getting a raw deal; they're not getting paid. It's very bad for people creating digital art, it's very bad for musicians, and it's pretty bad for authors. Throw a rock at a different industry vertical and you'll see problems.*[3]

Three core challenges face the creative industries in the digital era (Figure 1). First, royalty payments are startlingly slow. Revenues might take months to reach contributors to the creation of a film, and musicians might not receive royalties for years.[4] According to McConaghy, there is "gross inefficiency in the system" and "really poor linkage between the creators and the audiences, especially when it comes to compensation."[5]

"The fundamental problem is that creators are having a hard time feeding their families."

TRENT MCCONAGHY
Founder and CTO
BigchainDB

Second, attribution and authorship are easily lost as creative works are copied, edited and disseminated online. The challenge, according to Primavera De Filippi, faculty associate at the Berkman Klein Center for Internet and Society at Harvard University, is one of attribution and accreditation, "How do you find out who has used your work, what it is based on, where it is being displayed?"[6] Creators attempting to receive recognition and remuneration for their works face "a fundamental mismatch between current IP law and the Web,"

Figure 1: Three challenges of the current creative industry model

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which "has cost creators and rights holders the ability to control how their works are used and their efforts compensated."[7] Digital technology has stretched copyright "to breaking point," creating "a gulf between copyright law and everyday practices."[8]

Third, the process of licensing content is needlessly complex. For example, in this era of user-generated content, permission to use a song is likely to require sign-off from numerous stakeholders around the world, stakeholders who could be difficult to identify, let alone to contact. Money is being left on the table.

"The main problem is that we don't have a unified knowledge hub of who has written what, who has played what, and all the others involved in writing and recording a piece of work."

IMOGEN HEAP
Founder
Mycelia

"The main problem is that we don't have a unified knowledge hub of who has written what, who has played what, and all the others involved in writing and recording a piece of work," said Imogen Heap, Grammy-winning recording artist, producer, songwriter, and founder of Mycelia, a non-profit dedicated to enabling a fair and flourishing music industry ecosystem.[9] Instead, metadata about intellectual property reside in discrete data silos, none of which is complete, and occasionally they disagree. "That makes it hard to pay the right people, to do business with people, and to give more work to people whose work you have liked in the past," Heap said. "The long-term goal would be to have a sensible, global, unified approach to copyright—not just for music, but for film and everything else."[10]

The result is a golden age for consumers, who can access content on demand, often for free, sometimes illegally. It is not a golden age for those creating the content; the Internet has undermined the profitability of creative works. True, artists can create and disseminate work easily and cheaply, market themselves to a global audience, and generate significant sums from alternative income streams such as merchandise and concert tickets. But the Internet has broken the old economic model of recognition and payment for their work. If there were a canary in the music industry coalmine, then it should have choked on Napster. The failure of industry leaders to turn Napster into a legitimate service was a pivotal moment for artists.[11] What has been missing is a "native medium for value," and blockchain can provide it.[12]

How the Internet of value is transforming the creative industries

Blockchain technology has the potential to serve as a native medium for value with revolutionary consequences for digital assets across the board from money to music.[13] Its *decentralized* nature, the immutability of its data, the permanence of data records over time, and its means of achieving *consensus* provide a system in which all participants are equally responsible and equally capable.[14] The result is a distributed ledger that records a single source of truth.[15]

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Claims for the technology have been bold. Melanie Swan, founder of the Institute for Blockchain Studies, described blockchain as "the next major disruptive technology and worldwide computing paradigm...with the potential for reconfiguring all human activity as pervasively as did the Web."[16] William Mougayar, general partner at Virtual Capital Ventures, put blockchain technology "at the same level as the World Wide Web in terms of importance."[17] Phil Godsiff, senior research fellow at the University of Surrey in the United Kingdom, stated that blockchain technologies "represent a significant challenge to existing business and governance models."[18]

Smart contracts offer a means of making deals and locking in the details through the fairness and security of the blockchain, but they are only as smart as what we program into them.

Blockchain emerged as the architecture underlying bitcoin, a "peer-to-peer electronic cash system."[19] The peer-to-peer (P2P) aspect is crucial: bitcoin's main innovation was to remove the need for *trusted third parties* such as banks. Instead, bitcoin runs on a mesh of nodes, arranged horizontally rather than hierarchically. Like BitTorrent, the Bitcoin blockchain combines peer-to-peer file sharing with public key cryptography.[20]

If bitcoin was the first innovation in the ecosystem, the second innovation was "the realization that the underlying technology could be separated from the currency and used for all kinds of other interorganizational cooperation," according to Vinay Gupta, founder of Hexayurt Capital.[21] Blockchain represents what Sandra Braman calls a meta-technology: an innovation in technological systems, with impact across numerous sectors.[22] Applications extend far beyond financial services to intellectual property rights management. If the old creative industry business models were broken by P2P networks such as Napster and BitTorrent, there is certain poetry in the idea that blockchain—offering a new type of P2P network—could help fix the system.

The third innovation is the *smart contract*, a kind of programmable transaction or a cryptographic box containing value that unlocks and executes automatically when certain conditions are met, free of third-party interference or counterparty risk.[23] They offer a way of making a deal and locking in the details using the fairness and security of the blockchain. "They are only as smart as what is programmed into them."[24]

While information stored on a blockchain is immutable, we can still log changes by using multisignature functionality for approval of multiple stakeholders.

Smart contracts in the creative industries would require flexibility, since titles of works and parties involved often change during the creative process. We might want to renegotiate or delete a smart contract.[25] While information stored on a blockchain is immutable, we can still log changes by using multisignature functionality for approval of multiple stakeholders. We could write a smart contract to terminate if conditions changed and establish a new one in its place.

Blockchain and creative works: Payments, attribution, and licensing

Blockchain facilitates new economic models. It represents a revolution not simply in information and communications technology,

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but also in institutions, organization, and governance.[26] It could transform IP rights preservation and management.[27] The most significant capabilities relate to payments, attribution and digital scarcity, and licensing of subsidiary rights.

Fast, transparent royalties, and direct payments from fans

Permissioned blockchains are restricted to a group of known, vetted participants, whereas permissionless blockchains are accessible to all.

The potential to increase the speed and efficiency of payments is clear. Bitcoin payments occur within minutes, a dramatic improvement on the current system of royalty payments, and transactions using cryptocurrencies other than bitcoin (for instance, litecoin; XRP, which runs on the Ripple platform; or ether, the currency used on Ethereum) are faster still.[28]

Collecting royalties has been the purview of collecting societies and others who have imprecise systems to count *sampling*, when one artist repurposes a snippet of another artist's sound recording in a new composition. Blockchain could help to solve the problem of inefficient royalty collecting infrastructure and those caused by sampling formulae that have a bias for well-known artists and may miss the works of lesser-known creators.[29] Internet delivery of content facilitates precise tracking of usage; smart contracts could go a step further, first tracking radio plays of a song, and then automatically issuing royalty payments.[30]

Compared to the opacity of the existing system, blockchain transactions are completely transparent, even when users are pseudonymous.[31] *Permissioned* blockchains are restricted to a group of known, vetted participants, whereas *permissionless* blockchains are accessible to all. The music industry, for example, might use permissioned blockchains for collection societies and major labels.[32] While public and private blockchains are distinct, recent technological developments (such as role-based access and control) could enable the storage of private information on a public ledger. The key point is that blockchain-based registries can be as transparent as their users desire.[33] This selective transparency could allow artists and their managers to see, for example, whether their payments were being processed efficiently.[34]

Fundamental to blockchain technology is the notion of disintermediation—the ingenious ability for parties to transact directly without the need for a trusted third party.

Blockchain technology could do more than speed up payments from middlemen: it could cut out the middlemen altogether. Fundamental to blockchain technology is the notion of disintermediation—the ingenious ability for parties to transact directly without the need for a trusted third party.[35] We can think of blockchain as a new way to implement trusted transactions without needing trusted intermediaries.[36] Blockchain does not remove the need for trust; rather, it *decentralizes* trust.[37] Without middlemen, transactions become more efficient, sometimes in unexpected ways.[38]

Blockchain technology can facilitate new payment models, such as "pay what you want" model used by Radiohead in the launch of its 2008 album, *In Rainbows*, for which fans paid $3 million.[39] These payments could be small—cryptocurrencies allow for micropayments—and go directly to artists.[40] Consider the "tip jar"

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"My next album could be funded by 1,000 Imogen Heap fans, and they would receive a percentage of the profits, like the record label would have done."

IMOGEN HEAP
Founder
Mycelia
Grammy-winning artist, producer, and songwriter

model: artists could assign a bitcoin address to a piece of intellectual property, and those who appreciate the work could tip the artist in cryptocurrency without transaction fees.[41] Bitcoin is arguably less appropriate than it once was for micropayments, since the relative cost of transaction fees has become high; but other cryptocurrencies with different fee structures such as IOTA could suit this type of activity. The IOTA tangle, for example, is an evolution of blockchain technology that enables micropayments among machines at potentially greater speed and lower cost than the global blockchain.[42] In general, blockchain technology is associated with the lowering of transaction costs.[43]

The start-up Smoogs has developed such a micropayment solution for creators of digital content. Filmmakers can charge for content by the hour, minute, or second. Writers can charge by the chapter, page, or paragraph. Both filmmakers and writers can receive detailed content analytics, minute by minute or page by page. Smoogs' media players, with their built-in micropayment system, allow users to pay for content as it streams. A musician could also design a smart contract to collect payment until a certain threshold is reached, and then automatically unlock the download of a new album.[44] With the smart contract paywall, anyone wishing to access a particular work must make a micropayment to the author.[45] Artists could set up their own mechanisms to collect funds directly from their fans without the added time and cost of traditional intermediaries.

The start-up Smoogs has developed a micropayment solution for creators of digital content. Filmmakers can charge for video by the hour, minute, or second. Writers can charge by the chapter, page, or paragraph.

Some foresee disintermediation. For example, in the United States, performance rights organizations—organizations that monitor public performances of music and collect performance royalties such as ASCAP, BMI, SESAC—as well as the Copyright Clearance Center, the Motion Picture Licensing Corporation, and VAGA (for visual artists) that have served as traditional clearing houses for the creative industries might need to change their role.[46] These groups license members' works to third parties and collect royalties on behalf of members. They might serve as accreditors to audit the metadata, but even that could be tokenized, meaning that the metadata could be replaced with unique IDs in the form of a bitcoin-like token.[47] Still, what is technologically possible is not always desirable. Withdrawal from collection societies could diminish an artist's capacity for blanket licensing; star songwriters might benefit from the streamlining of blockchain in the model, but smaller artists would lose out. Collection societies will likely remain important as long as collective licensing is important.

Heap is keen to point out that blockchain technology does not spell the end of record labels either: "My next album could be funded by 1,000 Imogen Heap fans, and they would receive a percentage of the profits, as the record label would have done," she said. But artists might still hire a record label for certain services that they choose not to do themselves, such as promotion, marketing, or push to radio. Artificial intelligence will likely assist discovery, "but the creative jobs will still need to be done—more than ever as there's so much music out there."[48]

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Heap envisions a role for collection societies, too. In her Mycelia model, the featured artists—those "named on the cover" as opposed to session musicians—are tasked with uploading metadata. Many might wish to delegate that responsibility to a manager, publisher, or collection society. "If whoever puts that title to the blockchain is responsible for it, I think people will end up paying services to make sure it is correct and to take the hit if it isn't—to be insured, basically. I think we'll see a lot of collection societies turning into that kind of a service," Heap said.[49]

Joseph Lubin, co-founder of Ethereum and founder of the blockchain production studio ConsenSys, said intermediaries will remain "when they add value to a transaction."[50] Yet in both the music and film industries, Lubin envisions the end of "monster intermediaries" capturing a large share of value:

> *There may be alternative systems that artists can use so that they charge the consumer much less than the consumer is currently paying but end up making much more as artists and content creators, because that 70 percent or 80 percent chunk that the lawyers and business people take will not be removed from the transaction.*[51]

Attribution and digital scarcity

Actually preventing the copying and disseminating of digital works is extremely difficult. Traditional digital rights management (DRM) is also controversial. It was highly unpopular with consumers when introduced in the first decade of this century for musical works issued on CD, and is often regarded as invasive by users and regulatory bodies alike.[52] Blockchain technology offers an alternative solution: the introduction of digital scarcity. Bitcoin introduced digital scarcity to solve the double-spend problem of digital currencies. We can apply the same process to assets, including digital cultural goods, the authenticity of which can be guaranteed by code.[53] De Filippi explained,

> *It's not about locking up content because the content itself is not touched. Yet, one can create specific software that interacts with the blockchain and allows users to access only the content if a license has been granted to them and registered on the blockchain.*[54]

Joseph Lubin, co-founder of Ethereum and founder of the blockchain production studio ConsenSys, said intermediaries will remain "when they add value to a transaction."

Artists need not apply any technical protection to any given digital content, such as a movie or an e-book. They need only to register content with a hash or unique identifier on a blockchain, along with the licenses users might acquire. The software itself checks the blockchain for who has acquired a license to access a movie or an e-book, independent of the content file. People could share their digital works with anyone if they used blockchain to record the licenses to those works.

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Monegraph, a content monetization platform, allows users to authenticate a particular digital file, thereby establishing a unique original copy, rather than attempting to limit the ability to copy images, as with traditional DRM.[55] Ascribe.io is a service that allows artists to limit the number of copies available of a digital work and then issue each copy its own cryptographic certificate of authenticity that includes a cryptographic ID. The artist maintains copyright. Collectors can be confident that they are getting an authentic work even though the files themselves are not restricted by DRM; it is the authenticity of the cryptographic ID that creates value.[56]

"They can make a living and keep creating more art without having the middlemen take a big chunk."

TRENT MCCONAGHY
Founder and CTO
BigchainDB

McConaghy, who co-founded Ascribe before launching BigchainDB, acknowledged that different people have different motivations. In his view, no solution should lock down anything in terms of creative content. Instead, the defaults of a platform should make getting compensated very easy for content creators. Tipping an artist or paying for streaming should be low to no friction for content users, and a large chunk of that value should go directly to the artist. "Most of the money and most of the value can be flowing to the creators," he said. "They can make a living and keep creating more art without having the middlemen take a big chunk."[57]

Blockchain technology can ensure attribution by creating an unbreakable link between artists and their work. Alongside the hash of the file, artists can write a small amount of metadata—the creator's name, the date of the work, and the license under which it is available—to the blockchain. If it is necessary to store a larger amount of metadata such as licensing terms, then users can place that information in a document and write a hash of that document to a blockchain, thereby incorporating it into a permanent transaction record.[58]

Copyright is automatic upon creation of a work, but artists often choose to register their copyright, should there be any dispute. The current registration process can be costly and time-consuming and involves systems of multiple jurisdictions. The blockchain makes global registration comparatively easy. First, an artist registers a work by uploading a digital file. Then Ascribe generates a *hash*—an alphanumerical string that serves as a unique identifier, or digital fingerprint—of that file and writes it to the blockchain. By registering a work on Ascribe, a creator secures attribution and time-stamps possession of a file, which could be critical in a dispute over authorship.[59]

The current copyright registration process can be costly and time-consuming and involves the systems of multiple jurisdictions. The blockchain makes global registration comparatively easy.

The original data cannot be retrieved from the hash; but the original data will always produce the same hash. As long as the content in the file has not been altered, anyone using the same algorithm will generate the same hash, which serves to confirm the authenticity of the file. By combining hashing and secure time-stamping, blockchain technology shifts the paradigm for storage of IP metadata.[60] If we think of blockchain as a distributed database that functions as a global network, then we would have a global IP registry accessible to everyone rather than discrete, redundant, and sometimes inconsistent or out-of-date silos of metadata (Figure 2).[61] Said Lubin:

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It's very revolutionary. It's going to enable the world to move away from building siloed information systems—where a business builds on a legacy database technology and has, essentially, an adversarial relationship with the customer—to a context in which the foundational unit of information technology systems is shared infrastructure.…It's going to change everything.[62]

"Blockchains are politically decentralized (no one controls them) and architecturally decentralized (no infrastructural central point of failure) but they are logically centralized (there is one commonly agreed state and the system behaves like a single computer)."

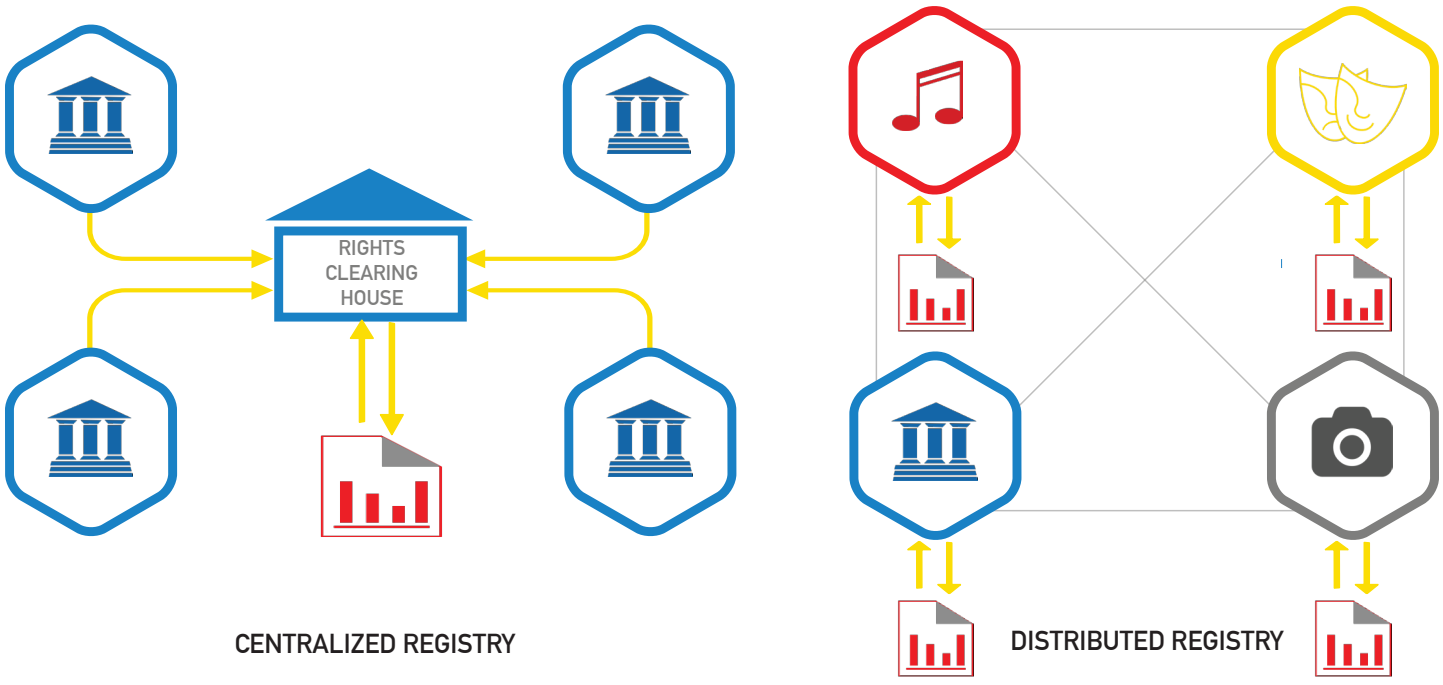
VITALIK BUTERIN
Co-creator
Ethereum

According to Vitalik Buterin, co-creator of the Ethereum blockchain, "Blockchains are politically decentralized (no one controls them) and architecturally decentralized (no infrastructural central point of failure) but they are logically centralized (there is one commonly agreed state and the system *behaves* like a single computer)."[63]

There have been attempts to create a single global registry such as the Global Repertoire Database in music. The challenges of creating such a registry are colossal we would be naive to assume that blockchains will fix every problem. Previous attempts have failed, in part, because of a failure to align incentives. On a blockchain, however, the motives of participants are aligned with the goals of the registry, since the system is operated by its stakeholders.[64] By tokenizing a registry, that is, by attaching value to the data, all users are aligned in their incentives to make it successful.[65]

Figure 2: Centralized versus decentralized IP database

Rather than housing metadata about intellectual property in discrete data silos in different jurisdictions, the creative industries could share a distributed database of data on authorship, provenance, subsidiary rights, pricing, terms of licensing, and other information useful for recognizing artists, preserving rights, and expediting transactions.



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A shared global database would directly store both hashes of the works themselves and their metadata. It would be distributed (not residing with a single entity), available to anyone, anywhere, and scalable to billions of creative works.[66] It would help creators get paid for their works and help audiences locate the content they want to consume, with low-friction payments. It would also help connectors focus on helping audiences discover creative works, rather than slogging through legal issues.[67]

"It's solving a real problem, we have real users, and it's a big benefit."

TRENT MCCONAGHY
Founder and CTO
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According to McConaghy, Ascribe has more than 10,000 users, among them professional artists (who are selling works for $50,000-plus) and galleries (e.g., the National Gallery Singapore). "People sometimes say there are no real apps for blockchain, yet this isn't true," said McConaghy. "We've had [Ascribe] in production for two and a half years, in beta for a year before that. It's solving a real problem, we have real users, and it's a big benefit."[68]

Ascribe was built on the Bitcoin blockchain, the only real option in 2013 when the project was conceived, and so it tends to direct people to a more sophisticated stack comprised of a standardized, interoperable data format for attribution and licensing of intellectual property (Coala IP); a queriable global decentralized database (InterPlanetary DataBase, or IPDB) to locate the desired content; a global decentralized file system (InterPlanetary File System, or IPFS) where original content files are stored; and a blockchain for permissions and business/licensing logic (Ethereum) for gaining access to those files.[69]

Licensing and digital rights management

A decentralized—but logically centralized—database, containing creative works and associated metadata, is only step one. Step two is to include pre-set licensing terms, allowing creators not only to claim copyright but also to license their works easily as the complexity of licensing works remains a barrier to user-generated content.

Digital certificates registered on a blockchain could contain information on the rights status of a particular work, including conditions for use and re-use.

Boundaries between consumption and production are blurring, yet the average YouTube user has no idea of the need, let alone the know-how, to license a song for a fan-made video.[70] Digital certificates registered on a blockchain could contain information on the rights status of a particular work, including conditions for use and re-use. This data could unlock new revenue streams for creators and encourage the creation of derivative works through sampling or remixing.

"The Beastie Boys have said it would have been really tough for them to get going now," said McConaghy, "because getting licenses would be super hard – whereas when they got going, there was a lot less litigation. With this sort of system, the next Beastie Boys could easily see what was licensed for remix and could create these new pieces of music that sample from various songs."[71] What's more, such new work would be entirely legal. One consequence of blockchain technology could be "an explosion in tradable assets."[72] Said Heap,

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> *I like it when people sample my work, and play with it and sing it and cover it and mess about it with it and remix it….as long as it's fair in the sharing, if there's any money connected to it. If there isn't any money, I want to be acknowledged for the work that I've done. So having a database with this copyright information in it would really help alleviate a lot of the current problems.*[73]

Heap also points out that the ether she received in return for those 222 downloads of Tiny Human—then worth about £100—is now worth about £35,000.

For her track, *Tiny Human*, released in 2015, Heap worked with the start-up, Ujo Music, to distribute payments automatically via a smart contract to everyone—session musicians, songwriters, mixing and mastering engineers, video artists, graphic designers—involved in making and recording the song.[74] The blockchain served as both content registry and settlement layer.[75] Heap also made the *stems* (instrumental and vocal parts) of *Tiny Human* available to remixers via Ujo Music website. Heap said, "We put up all the names of the musicians, and what percentages they were going to get every time someone downloaded that song, into a smart contract. We sold 222 copies and, for me, that was a success." It was the first automated disbursement of its kind.[76] "It's not saying that we solved everything. It's saying, this is a tiny seed of an idea that hopefully will grow and grow and excite people. Because that's another thing blockchain has done: it's given musicians something positive to latch onto," she said.[77]

Heap also points out that the ether she received in return for those 222 downloads of *Tiny Human*—then worth about £100—is now worth about £35,000. She is investing this money into the Mycelia project.[78]

Let's turn to gaming, where digital goods can be worth significant sums in the real world. Virtual swords and armor, for instance, change hands between gamers for significant sums, but these goods are valuable only within a given game. The system is centralized. If the game becomes obsolete, so do the digital assets. Blockchain technology could allow digital goods to maintain value even when a game has become defunct.

Spells of Genesis, developed by the company EverdreamSoft, is a trading-card game based on blockchain technology for both its storyline and its mechanics. The blockchain cards are based on Counterparty, a platform that uses the Bitcoin blockchain to create custom tokens. Used within *Spells of Genesis*, the blockchain cards can also be traded using the *Book of Orbs* (ORB being an acronym for Ownership Revolution on the Blockchain). The cards trade for up to $3,000, with other rare in-game assets worth up to $5,000.[79] The game *Force of Will*, which uses digital tokens known as willcoins, operates in a similar manner, and offers cross-game interoperability as well, with some assets playable in *Spells of Genesis*. This field is growing fast, with the recently launched mobileGo tokens, for instance, allowing gamers to trade virtual items from mobile games directly with each other on the Ethereum blockchain.[80]

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In the world of digital design, ease of licensing would also assist, for instance, the content creator searching for an image to use in a slide presentation, or those galleries, libraries, and museums (GLAMs) wishing to declare a particular work to be in the public domain within a particular jurisdiction. Monegraph, for instance, offers a user-friendly means of specifying rights, allowing artists and photographers to license content for commercial and editorial use.[81] Monegraph envisions digital artworks, each issued with a unique ID, as tradable assets.

Monegraph envisions digital artworks, each issued with a unique ID, as tradable assets.

Trading digital assets in this manner also provides perfect provenance, since every transaction related to a registered work is recorded on the distributed ledger. (Off-blockchain sales, though theoretically possible, would be unlikely, since breaking the chain of provenance would reduce the value of the work significantly.[82]) Ascribe has allowed some GLAMs to issue licenses on a blockchain, introducing the possibility of smart contracts (acting on the rights that have been licensed) as well as sub-licensing.[83] Ascribe provides functionality for bequeathing rights, that is, transferring ownership of any given edition from one person to another. Artists could consign their work to a gallery, and the gallery then could sell it on the artists' behalves.[84]

A blockchain could provide a reliable statement about use and re-use, leaving no doubt as to the Creative Commons license under which a particular work was issued.

Ascribe's default framework for transferring ownership leverages existing contract and copyright law so that Ascribe can operate as a Creative Commons and enable creators to grant copyright permissions to their works. But Creative Commons covers only certain works, and determining whether a given work is available under a Creative Commons license is not always clear. A blockchain could provide a reliable statement about use and re-use, leaving no doubt as to the Creative Commons license under which a particular work was issued. These conditions would be tamperproof and immutable, and all users could verify the authenticity of a certificate themselves—no third party.

Smart contracts could also allow artists to issue their work under a Creative Commons license at a given point in time. In this way, the work becomes *smart property*—cryptographically defined property rights enforced by code—its ownership controlled via a blockchain. Within the creative industries, a photojournalist might market work commercially for a period to be certain that the public will see the benefit of the work before the copyright formally expires.[85] Alternatively, a collector might pay for an artwork in regular installments, with ownership transferred once a set amount is reached.

Smart property is a new concept with transformative potential, according to author Melanie Swan.

Ascribe has been conducting an experiment with Creative Commons France to see how such licenses, issued on a blockchain, might work in practice. On the CC France website, users can upload a work and its associated metadata, using Ascribe, then select an appropriate Creative Commons license. A hash of the license is written to a blockchain along with the hash of the file and the metadata.[86] McConaghy explained, "We wanted to make it really easy to claim a copyright and immediately attach one of the Creative Commons

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licenses to it." An artist claims copyright, enters her name and other metadata, and then chooses a license that allows certain people in the world to have certain rights. Users can do what the license permits them to do, as long as they give the artist attribution. "That's CC.Ascribe.io," said McConaghy. "To this day, about 25 percent of the traffic going through Ascribe is through Creative Commons. There's been a nice steady growth and there are diehard users who have uploaded hundred or even thousands of works over the years."[88]

The technology could prove revolutionary in other areas, from automatic resale royalties to smart ticketing.

New business models for the creative industries

Blockchain technology has the potential to transform attribution and digital scarcity, royalty payments, and licensing. But the technology could also prove revolutionary in other areas, from automatic resale royalties to smart ticketing. It could transform the monetization of fan data and help create a more inclusive model for rights data. The technology could even facilitate new sources of capital for creators and new models of distributed ownership.

Automatic resale royalties

Blockchain technology can facilitate payments to stakeholders every time a work is sold, as with streamed media such as music and film. What about visual arts? The concept of *droit de suite* (French for "right to follow") or the artist's resale right is said to have emerged when the family of the French artist Jean-François Millet was found to be living in poverty while his painting, *The Angelus*, which was originally sold for a modest sum, was changing hands for a vast sum. In those few jurisdictions that recognize *droit de suite*, artists or their heirs receive a small royalty each time their works are resold, but the right is inconsistently applied, and artists have no direct way of knowing whether their works have been resold or for what amount.

Blockchain would give artists visibility into sales and could allow for automatic *droit de suite* payment with cryptocurrency.[88] An artist could sell a work for £100 and maintain a right in that work. Were that painting to be sold at some point for £1,000 or £100,000, the artist would automatically receive a royalty. The company Artlery, for instance, pays *droit de suite* automatically to artists and other stakeholders via smart contracts, so that *all* stakeholders are paid when an artwork is sold or resold. With the introduction of digital scarcity, what goes for physical art goes for digital art too. Similarly, each time a work registered through Monegraph is circulated, artists earn a fee.[89]

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Smart ticketing

Ticket sales are critical in the performance arts—music, film, theatre, dance, and even sporting events. But performers face two major challenges. First, bots purchase tickets online at speed and in bulk, then resell them on secondary ticketing websites, often at vastly inflated prices. Second, fans purchasing tickets from unofficial sites have no way of verifying whether the tickets are counterfeit.

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TicketChain, HelloSugoi, and Aventus are among the start-ups attempting to solve these problems using blockchain technology, all leveraging Ethereum smart contracts. Aventus, for instance, offers an open standard for the exchange of tickets that allows event organizers to manage their business with dramatically reduced costs, and rewards ticket buyers for promoting events and identifying fraudulent activity.[90]

We can think of an event ticket as smart property that gives us access to a venue, just as our fingerprint affirms our identity and unlocks our smartphone.

Aventus uses a token, aventcoin, not only to reward early adopters of the Aventus Protocol but also to provide an incentive layer to enable self-regulation. Users are rewarded for buying tickets, promoting events, and voting on the legitimacy of events. Each ticket has a unique identifier, recorded on a blockchain, thereby solving the *double-spending problem* of counterfeit tickets. Each ticket also has an associated identity—though no private information is publicly visible—that is checked before the holder gains access to an event. Changes to identities are possible, but only if the ticket is resold through an approved secondary market. The result, Aventus claims, is to bring oversight and transparency to ticketing life-cycle, security to the transfer, and validity to tickets, new revenue streams for event organizers, and greater promotional capabilities'.[91]

With the growth of the Internet of Things, we can think of an event ticket as smart property that gives us access to a venue, just as our fingerprint affirms our identity and unlocks our smartphone, which in turn becomes an access key to other smart properties (vehicles, homes), controlled through smart contracts.[92]

Monetization of fan data

One issue facing creators across creative industries is lack of access to valuable aggregate data relating to how and where their work is being consumed.[93] According to Rachel O'Dwyer, data analytics about user behavior—streaming, liking, and sharing an artist's work over the Internet—can indicate the overall value of an artist outside traditional business models or sales channels. The data may ultimately be more valuable than the artist's work in generating additional revenue streams.[94]

With the growth of blockchain technology, we can identify "shifts in the monetization of culture from the sale and production of scarce goods toward artists instead financializing data associated with their use and circulation."[95] As social media data, not just record sales, become the measure of an artist's popularity, that artist should be able to leverage the data to attract concert sponsors, spokesperson opportunities, invitations to gigs, and other remuneration from organizations that value the artist's fan demographics.[96]

An inclusive model for rights data

Fan data is only one piece of the puzzle. Also critical are data relating to rights, which are currently scattered among discrete databases. Blockchains offer a more inclusive alternative.

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"My image for the technology is something that already exists in the travel industry," McConaghy declared. "It's a database called Sabre [for "semi-automated business research environment"] in North America or Amadeus in Europe. Together these are a common substrate of flight information." This database, he said, allows airlines to list their flights for individual airlines, travel agents, and companies like Trivago and Expedia to access. "The Sabre substrate," as he called it, has two main components: *metadata* about the flights and *prices*.

This Sabre-like substrate would include metadata on who created what and the pricing and usage terms for licensing. "Call it a Sabre for music, a Sabre for digital art, a Sabre for books."

TRENT MCCONAGHY
Founder and CTO
BigchainDB

This substrate or layer of data "is exactly what I envision for each different creative industry, all the different verticals." Users would have access to the metadata on who created what and the pricing and usage terms for licensing. "Call it a Sabre for music, a Sabre for digital art, a Sabre for books," he said. "If we have this basic substrate, with links to the actual media themselves in the file systems, then we can build all kinds of new applications on top."[97]

Heap shared her vision of a comprehensive music registry that would list not only everyone involved in the making of a song but also the equipment used and the place of recording. These data, she said, "could help spawn new apps and services atop of those datasets, and with them, new revenue streams for everyone involved."[98]

New sources of capital for creators

While the do-it-yourself potential of the digital era is considerable, it is restricted by a lack of access to capital. Musicians can record and disseminate their music easily and cheaply, but most are still obliged to sign with record labels in order to secure advances.

Crowdfunding is one alternative and at least five models can be identified: donation, reward, debt, equity and royalty.[99] Crowdfunding in the creative industries, however, has largely been restricted to the *reward model*, in which funders receive a pre-determined product or service for their contribution. This model appeals only to a limited number of committed fans whose support of certain genres is semi-philanthropic. Fraud is a challenge, as is sustainability, and a strong reliance on the emotional investment of fans can result in cynicism towards repeated campaigns. Finally, the reward model might not reward funders with a fair share of total value.

New sources of capital for artists and creative industry start-ups include cryptoequity crowdfunding, which uses smart contracts to provide a guarantee that funds will be used as promised and gives funders a fair share of the ventures in which they invest. Blockchain-based crowdfunding platforms enable start-ups to raise funds by creating and selling their own digital tokens representing cryptographic shares to early backers.[100] In other words, artists and entrepreneurs can bypass traditional crowdfunding platforms.

How would crowdfunding work on a blockchain? Let's imagine a blockchain-based Kickstarter encoded with some rules so that, if

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users reached their funding objectives, they would get the money; otherwise, the money would return to the backers. Or how about a decentralized patronage system, where people funded artists to help them pursue their creative activities? Said De Filippi, "Artists could also provide specific benefits" to their patrons such as "voting rights, access to concerts, a preview of new works, or even a share of their profits."[101]

Token sales are essentially crowdfunding campaigns for cryptocurrency start-ups in which the developers auction tokens to investors.

The form of crowdfunding that has gained the most publicity of late is the token sale—popularly known as the ICO or *initial coin offering*, although the term is not universally accepted. Token sales are essentially crowdfunding campaigns for cryptocurrency start-ups in which the developers auction tokens to investors. Often there is no return on this investment unless the value of the token increases, though some have offered tokens that cryptographically guarantee the holder a share of return.[102]

Token sales have emerged as alternative to venture capital funding in numerous sectors, and the sums raised are significant. In 2016, token sellers raised almost $200 million.[103] That sum was superseded by amounts raised during individual *months* in 2017: $232 million in May, $462 million in June, and $574 million in July.[104] In total, start-ups have raised close to $2.3 billion through ICOs.[105]

Singular DTV is one such company, a blockchain entertainment studio, rights management platform, and TVOD (transactional video on demand) portal. It raised the equivalent of $7.5 million in ether in just 17 minutes.[106] The computer game, *Beyond the Void,* also ran a token sale for its game currency, nexium, and raised €110,000 in ether.[107]

"What is the role of the VC, if this becomes the way people are funded?" Heap asked. It's a great question. "I guess it's an anomaly because it's the first time it's ever happened, but this year more was raised via ICOs than from VCs and that is amazing. It's really amazing."[108] She is currently planning a token sale for Mycelia.

"Token sales are a game changer," said Lubin, although he was careful to distinguish among security tokens, protocol tokens, and utility tokens. "Pairs of entrepreneurs in dorm rooms who couldn't get an email back from a VC will be able to raise money if they have an exciting project." He explained:

> *The mechanism essentially represents the ability for people, in any country in the world, who appreciate a project and who in most cases would have trouble investing money in a start-up, to invest money. Anybody who's aware of these projects, anywhere in the world, can essentially put some capital toward an exciting project by purchasing a token that has intrinsic utility in the system being built.*[109]

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WeiFund (rebranded as ConsenSys Token Foundry) aims to transform how the film industry works by facilitating investment from thousands of individuals rather than a single large studio.

Consider *BRAID,* a psychological thriller about two artists on the run from a vengeful drug dealer. Its creators used WeiFund, a decentralized equity crowdfunding portal that deployed blockchain technology to secure funds through a wallet governed by smart contracts. Those who wanted to invest in the film created an Ethereum compatible wallet, from which they would send ether to the Braid smart contract, which then issued Braid tokens that the investors could claim when the campaign ended.[110]

When the project reached its $1.7 million target, WeiFund released the funds to the project owner. It was the first major feature film fully funded through a cryptocurrency crowdsale. The film is due to screen at the Sundance Film Festival in 2018.[111]

BRAID equity holders have incentive to promote the film, increasing its chances of success. WeiFund—which has since been rebranded (with other offerings) as ConsenSys Token Foundry for delivering comprehensive token launch services to internal ConsenSys projects and external companies—will pay 100 percent of adjusted gross proceeds, plus 15 percent interest, to token holders until they recover their initial investment, after which token holders will receive 30 percent of profits.[112] It's good for funders and good for the filmmakers, since they maintain creative control.

"The director, Mitzi Peirone, was very interested in taking a new approach to filmmaking," said Lubin who was involved in the *BRAID* crowdsale. For Lubin, tokens "create positive feedback loops and incentivize the project founders, people on the project, and the stakeholders in the project, to add value to the ecosystem."[113]

Initial coin offerings versus initial public offerings

Some have pointed out that, while the acronym *ICO* is intended to liken token sales to *IPOs* (initial public offerings), there is an important distinction: IPOs are highly regulated, whereas ICOs are not—at least, not always.[114] While IPOs involve the issuance of securities—typically equities—ICOs can be equity-like, where tokens represent fractional ownership in the underlying value of an organization, subject to profit or loss, and presumably entitlement to shares of profits. However, often ICOs are not offering equity-like value at all.[115] We need more guidance on the legal and regulatory aspects of token sales.

Imagine thousands of people collaborating to write and self-publish a book, or a large number of freelance journalists operating as a decentralized news collective.

Distributed ownership

One crucial feature of blockchain is the ability to encourage good behavior between parties who do not know or trust one another, enabling new forms of incentivized collaboration.[116] An early example of this potential was the Cypherfunks, a globally distributed group of musicians who used cryptocurrency to share ownership of the music they collectively created.[117] At a more sophisticated level, we can imagine thousands of people collaborating to write and self-publish a book, or a large number of freelance journalists operating as a decentralized news collective.[118]

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We can consider the Plantoid the first instantiation of distributed autonomous art.

Backfeed is an initiative that relies on blockchain technology to encourage massive, open-source collaboration among a network of peers operating free of centralized control. The Backfeed system could provide the means for peers to evaluate contributions to a collaborative project, so that individuals would receive rewards according to the perceived value of their contribution. A new incarnation of commons-based peer-production, Backfeed uses cryptographic consensus to solve the challenges of large-scale cooperation, while maintaining the benefits of commons-based, institutional governance.[119] The emergence of decentralized collaborative organizations consisting of a large number of individuals but not controlled by any single entity could support large-scale and systematic collaboration in potentially every creative sector.[120]

A similar impulse lies behind the Plantoid project, conceived of and implemented by Primavera De Filippi, who called the Plantoid an artistic representation of a "blockchain-based life-form." Its body consists of an Internet-enabled mechanical sculpture of a plant that collects bitcoin donations and responds with some form of appreciation—playing a song, displaying a light show, or performing a mechanical dance. Its spirit or soul is represented by a smart contract on the Ethereum blockchain, which implements the governance structure of the Plantoid. Upon reaching a target amount, the smart contract issues a request for proposals for creating the next generation of Plantoid. Donors vote on the various proposals and Plantoid eventually hires the artist whose submission received the most votes to create an offspring.[121] In other words, the Plantoid is a self-propagating artwork that acts as an artist, art dealer, and agent.[122] The idea of having an artwork acquire its own financial autonomy introduces a new set of possibilities for making, commissioning, and monetizing works of art. We can consider the Plantoid the first instantiation of *distributed autonomous art*.[123]

Implementation challenges and opportunities

Blockchain cannot solve the "garbage in, garbage out" problem. We might need to verify the authenticity of works before entering them into a registry.

Blockchain and distributed ledger technologies are in their nascent stages. Lost in the hype are significant challenges, among them the perceived risks in early adoption, uncertainty around regulation, the energy-intensive nature of the technology, the lack of clarity regarding smart contracts, and the costs of maintaining two systems.[124]

Digitizing physical assets remains a challenge. Who does the digitizing and what might be their incentives? Remember that blockchain cannot solve the "garbage in, garbage out" problem. We might need to verify the authenticity of works before entering them into a registry, for instance, by introducing a governance layer or a reputation-based system.

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Why might people adopt the technology? We can see why creators would want to adopt the technology, but what incentives would other stakeholders have? A decentralized IP database would allow start-ups to focus on their core business, such as helping audiences discover new works, rather than on legal issues. Such a database could help rights holders gain increased value from content by making it available to developers and entrepreneurs, and it could help government agencies to maintain an IP registry that interoperates with registries in other nations, reducing administrative and legal costs.[125] Collectors and galleries would value the ability to record the provenance of an artwork, for instance, and music-streaming services would welcome a reliable database of the parties to pay for every song, not least because it might help them to avoid litigation.[126]

Yet, we should expect resistance—and no technology is of any use unless people engage with it. The user interface and user experience need a lot of work. More critically, we need more developers and greater diversity, with people currently underrepresented in the blockchain ecosystem.[127] Technology, after all, reflects the values of those who engineer it.[128]

Beyond challenges and barriers to adoption, we can identify the risks and potential disadvantages of adopting blockchain technology. The censorship-resistance of distributed ledgers could complicate the removal of illegal content once it is recorded on the system. Will commercial digital art markets based on blockchain technologies really empower artists? According to Martin Zeilinger,

> *Once decentralized technologies are folded into proprietary, commercial products and services, models of centralized finance will be…reinforced. The fact that such technologies are cryptographically secure might simply mean that the centralization efforts they ultimately represent would be difficult, if not impossible, to counteract.*[129]

We need more developers and greater diversity, with people currently underrepresented in the blockchain ecosystem. Technology, after all, reflects the values of those who engineer it.

Given the tension between algorithmic decentralization and regulatory structures, prospective users are wary of smart contracts, presumed to be resistant to manipulation.[130] In the creative industries, participants could end up using smart contracts to replicate the worst aspects of DRM, restricting the use of content, for instance, by charging a fee every time a reader turns an e-book page or a gamer saves content in a video game.[131]

MIT academics Andrew McAfee and Erik Brynjolfsson see blockchain technology as critical the general drift towards decentralization, "moving important aspects of market-based economics from the core to the crowd – from central banks, companies, and the legal system to a huge number of computers humming away around the world, running code that attempted to decentralize all the things."[132]

At the same time, McAfee and Brynjolfsson have expressed doubt as to whether totally decentralized, purely crowd-based entities will ever be economically dominant. So unpredictable is the world,

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they suggest, that it is simply not possible for contracts to specify all possible contingencies. "Companies," they assert, "exist in large part because well-functioning complete contracts are impossible to write, not because they're too difficult or costly to enforce."[133] McAfee and Brynjolfsson are confident that companies will be part of the economic landscape "for a long time to come."[134]

By one estimate, ten percent of global GDP might be stored on blockchains by 2025.

There are significant concerns relating to token sales, the recent growth of which raises important questions of regulation, governance, and stewardship.[135] Certainly, we need standards at both platform and application levels. Some have argued that multiple blockchains within the music industry, for instance, could be a nightmare.[136] Others have suggested that every company could participate in a number of blockchains, be they private, semi-private, or public.[137] Indeed, we could end up with not one but many blockchains, and so the need for interoperability will be acute.[138] Standards and delivery will require multi-stakeholder stewardship at the platform level, the application level, and for the ecosystem as a whole.[139]

The list of implementation challenges, then, is substantial.[140] Still, our current IP system is broken, with the notice-and-takedown practice resembling an unwinnable game of whack-a-mole. Blockchain technology, though still emergent, seems to have revolutionary potential with diverse socio-economic applications.[141] By one estimate, ten percent of global gross domestic product (GDP) might be stored on blockchains by 2025.[142]

The technology, with its "unprecedented capabilities to create and trade value in society," might be "the foundational platform of the Fourth Industrial Revolution," underpinning other innovations from artificial intelligence to the Internet of Things.[143] Blockchain has sparked a wave of innovation and entrepreneurship; it might "make existing business processes cheaper and faster and…enable new ones."[144] The space has cleared major hurdles in the last two or three years, in terms of both technology and the flexibility of IP licensing. Improving the user experience will take time. Lubin reflected,

> *The Internet took about ten years before certain applications were mature enough to be pretty usable by the average consumer. Yet I think we'll get real traction a year from now, two years from now for certain kinds of applications. And ten years from now the World Wide Web will be possibly unrecognizable in the sense that it will be a radically decentralized World Wide Web.*[145]

Members of the creative industries could address these challenges through non-state, multistakeholder networks or what Don Tapscott and Alex Tapscott call "global solution networks," of which there are several types, each with a distinct purpose (Table 1).[146] The main point is engagement in governance. "Artists need to be at the table, and to make it as easy as possible for developers to interact with us," Heap said.[147]

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Table 1: Governance challenges: Proposed network solution model

Type of network	Purpose	Examples of the issues addressed
Standards • Ecosystem level • Platform level • Application level	To develop technical specifications and standards, the building blocks that lead to mass adoption	• Interoperability • Scalability • Usability
Knowledge	To conduct research and develop new ideas that can help solve global problems	• Train developers and retrain workers • Iterate on project ideas • Establish proofs of concept • Onboard new users • Determine trade-offs with databases • Develop best practices for moving assets to the blockchain
Delivery	To deliver the change sought, supplementing or bypassing the efforts of traditional institutions	• Scalability and interoperability • User interfaces • Applications and middleware • Migration path from legacy systems • Ecosystem infrastructure
Policy	To inform or shape policy development or seek alternatives for policy	• Financial reporting • Regulation • Taxation • Jurisdiction • Policy-making process itself
Advocacy	To change the agenda or policies of governments, corporations, and other institutions	• Promote vision • Explain potential value • Share best practices • Attract funding to the space • Promote top app developers • Contextualize hype and news of failure
Watchdog	To scrutinize organizations to ensure that they behave appropriately on key issues	• Privacy • Security • Compliance • Human rights • Quality of start-ups and ICOs

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Conclusions and recommendations

In relation to the creative industries, blockchain's ability to manage the fruits of imagination and the associated rights is revolutionary. It will affect any business engaged in the production or distribution of intellectual property. Such a disruptive technology will create winners and losers, and the inherently disintermediating properties of blockchain technology will challenge established players.

- **"Assume that this will exist,"** said McConaghy. "Don't look at bitcoin and then dismiss blockchain because it doesn't scale and has bad governance…. Look at the modern technology and realize that there's a stack there already." For anyone new to the space, he advised, "Imagine there's a Sabre for art and for music and so on. That's a very concrete thing. Then think, 'Ok, if there's a Sabre for this, what do I do? How does this affect me?'"[148]

- **Prepare to re-invent your role.** Intermediaries that add value will surely remain, but they likely need to prepare themselves for re-invention. "Blockchain will redefine the role of existing intermediaries (if they accept to change), while creating new intermediaries," William Mouyagar wrote. "Therefore, it will disrupt the traditional boundaries of value."[149] The challenge facing current intermediaries, then, is that of *re-intermediation*.[150]

- **Create all new value.** This is highly fertile ground for start-ups. While blockchain technology may challenge some exiting intermediaries, it also enables the creation of new players.[151]

- **Replace the fragmented and proprietary data system with a more inclusive model.** Creating an open distributed IP rights registry will require improved standardization and increased availability. Yet the effects could unleash a new wave of start-ups. "We can't innovate any further until we create an open database of songs and creators, because it will always come back to certain organizations holding the strings," Heap wrote. "We need to create opportunities for great new services, not only the ones who have managed to raise enough money from VCs or got enough money from record labels."[152]

- **Reimagine business models.** Artists could design whatever model they wanted, said De Filippi, and they could do so without having to go through the traditional intermediaries that are in charge of providing those services.[153] Heap cautioned artists not to replicate existing systems on the blockchain, thereby recreating existing problems. "We need to think of it in terms of a completely new transport system, a completely new beast," she said.[154] Equally important, we ought not underestimate the risks and challenges.

- **Take action.** The genie is out of the bottle, and this is no time to bury our heads in the sand. We cannot, in other words, repeat the music industry's (or at least the Recording Industry Association of America's) decision to attempt to crush Napster, a new application of a new technology, rather than to explore how we might legally apply it.[155] Table 2 provides some possible action items for every member of the creative community.

In blockchain, we have another P2P network and another chance. Let's strive to use it to create a golden age for creators to match that currently enjoyed by consumers.

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Table 2: Action items for the creative community

For creators	For intermediaries	For policymakers	For all stakeholders
Try facilitating direct payments from fans by means of, say, a digital tip jar.	Study how new models of attribution for digital works—and digital scarcity—might benefit your business.	Avoid premature regulation, which could stifle innovation.	Familiarize yourself with the difference between Bitcoin- and Ethereum-based blockchains. Examine Hyperledger and IOTA tangle.
Experiment with registering creative works on a blockchain via, for instance, Ascribe.	Explore how you might use blockchain to offer faster, more transparent royalty payments and the business advantages of doing so.	Adopt a holistic approach, encompassing technology, law and economics.	Read white papers and reports about the potential impact of blockchain technology on specific industries and beyond.
Explore launching your own artist coin or crowdfunding beyond the reward model. Approach token sales with caution.	Examine and approach token sales with caution. Be aware that new ventures have access to capital beyond the traditional VC model.	Provide clarity over the status of initial coin offerings (ICOs).	Think collaboratively and align incentives for large-scale collaboration. Consider which other parties to involve and identify areas of mutual interest.
Examine and consider monetizing your data in terms of touring and sponsorship deals.	Consider how the technology could facilitate licensing and give you competitive advantage.	Collaborate with peers across jurisdictions to address cross-border challenges of blockchain.	Participate in standards-development process. Interoperability, usability, and the preservation of individual rights will be key.
Identify which assets you could trade on a secondary market and how this market would work.	Examine how industry decentralization and the shift of power from the core to the crowd will affect your business.	Give careful consideration to identity, still an important missing link in the blockchain space.	Whatever you envision, consider who is going to build it and develop it over time. If you have expertise, consider how to scale it.
Push for faster, more transparent royalty payments and, if appropriate, automatic resale royalties.	Determine the extent to which your business is vulnerable to disintermediation and your potential for re-intermediation.	Engage with members of the blockchain space at all levels: ecosystem, platform, and application.	Engage in governance issues: not just standards and knowledge networks but advocacy, policy, delivery, and watchdog networks.

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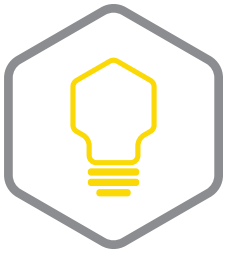

About the author

Marcus O'Dair is an associate professor of music and innovation at Middlesex University in London and convenor of the Blockchain for Creative Industries research cluster. He was lead author of cluster's 2016 *Music on the Blockchain* report and is about to take up a position as researcher in residence at Digital Catapult, researching the impact of blockchain on the creative economy. He serves on related working groups for Tech UK and the British Standards Institution.

Marcus has written for such publications as the *Guardian*, the *Independent*, the *Times*, the *Financial Times*, the *Irish Times,* the *Wire*, *Uncut,* and *City Metric* (*New Statesman*); appeared on CNN and the BBC; and given talks at the Edinburgh International Book Festival and at venues including the Queen Elizabeth Hall, the Barbican and the V&A.

He has published in peer-reviewed journals on both business strategy (*Strategic Change*) and music (*Popular Music*, *IASPM@Journal*), and contributed to edited collections including *Jazz and Totalitarianism* (Routledge, 2017) and *Punk Pedagogies* (Routledge, 2018). He is co-editing a book on the Mute record label. *Different Every Time*, his biography of Robert Wyatt, was shortlisted for the Penderyn music book prize and named a book of the year in the *Guardian*, the *Independent*, the *Times*, the *Sunday Times*, the *Evening Standard,* and *Uncut*.

A former session musician with Passenger, Marcus has released three acclaimed albums and toured Europe as one half of Grasscut, performing at such venues as Royal Albert Hall, Tate Britain, and the Pompidou Centre.

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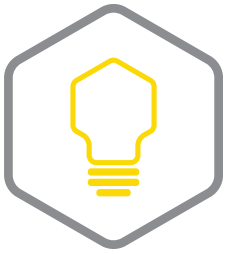

About the Blockchain Research Institute

Co-founded in 2017 by Don and Alex Tapscott, the Blockchain Research Institute is a knowledge network organized to help realize the new promise of the digital economy. It builds on their yearlong investigation of distributed ledger technology, which culminated in the publication of their critically acclaimed book, *Blockchain Revolution* (Portfolio|Penguin).

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