Developments in Web3 for the Creative Industries

A Research Report for the Australia Council for the Arts

By Ellie Rennie & Indigo Holcombe-James

with contributions from Alana Kushnir, Tim Webster, and Benjamin A. Morgan

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Blockchain Innovation Hub

About the Researchers

Professor Ellie Rennie

Ellie is a Professor at RMIT University. Her current research is looking at the social and policy issues arising from automation technologies, including blockchain. She is an ARC Future Fellow, working across RMIT's Blockchain Innovation Hub, the Digital Ethnography Research Centre, and the ARC Centre of Excellence for Automated Decision-Making and Society. Prior to commencing her Future Fellowship, Ellie's research was focused on the topic of digital inclusion. She has written five books.

Dr Indigo Holcombe-James

Indigo is a Research Fellow in the ARC Centre of Excellence for Automated Decision-Making and Society at RMIT University. Indigo's research examines digital inequalities and transformation in creative and cultural industries and institutions. She has worked with more than 100 cultural institutions, from remote First Nations art centres to regional community museums, artist-run initiatives, public galleries, and state and national institutions. Her research appears in *Cultural Trends*, *Archival Science*, *Informatics and Telematics*, and the *International Journal of Communication*.

Alana Kushnir

Alana is an art lawyer, advisor, and curator based in Melbourne, Australia. In addition to being the Founder and Director of Guest Work Agency and Guest Club, she is the Principal Investigator of the Serpentine's Legal Lab, a space for investigating legal issues and prototyping accessible legal solutions for the arts technologies field. She is also a Board Director of the Australian Centre for Contemporary Art (ACCA), a member of the Art, Cultural Institutions and Heritage Law Committee of the International Bar Association, and a member of the Coalition of Automated Legal Applications (COALA) NFT Licensing Taskforce.

Tim Webster

Tim works at the intersection of art, technology, and commerce. He has worked as a filmmaker, artist and art organisation director and has spent the past 10 years working with some well-known tech companies in product and commercial roles. Tim founded Hey Pixels, a lab to experiment and critically think about web3 related technology and how we might use it in our everyday.

Dr Benjamin A. Morgan

Ben is a US music business veteran who has worked with international development institutions such as The World Bank and UNICEF. His current research interests intersect creative practice, technology, and media/cultural industries policy. He completed a PhD on Australian music industries and streaming services at RMIT University in 2021.

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Ellie Rennie and Indigo Holcombe-James authored Parts 1, 2, 3, and 4, and designed the survey and interview questions. Alana Kushnir and Ellie Rennie authored Part 5. Tim Webster authored the glossary and assisted with visualisations and project management. Ben Morgan and Ellie Rennie conducted interviews.

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Disclaimer

The contents of this report, including Part 5, are not legal advice and should not be considered as such.

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Executive Summary

Developments in Web3 for the Creative Industries identifies how artists, musicians, games designers, and other creative practitioners are pushing the established boundaries of the creative economy using the tools and platforms of web3. The report steers clear of aspirational 'use cases' and focusses instead on the industrial transformations that have manifested to date, including new ways of manufacturing ownership, rewarding and incentivising fans to sustain creative projects, and the use of web3 for organising and managing collaborative creative endeavours.

This report also looks at *who* is participating, identifying which segments of the creative industries have led the charge into web3. We discuss where art, music, and games are occurring inside web3, including emerging virtual and physical galleries and art collectives, and how existing arts and culture institutions are responding. In this way, this report asks, "what are Australian artists *doing with* web3?" as well as the bigger question of "what have artists from around the world *done to* web3?"

What is Web3?

The term 'web3' suggests a progression from web2.0, in which the internet became dominated by large platform corporations (such as Meta and Google) that trade on user data and so make audiences 'the product' of a transaction. For the creative industries, web2.0 continues to be a double-edged sword. It has created a new, digital creative class of YouTube and Spotify stars and enabled artists to promote themselves on social media. However, these opportunities are determined and constrained by the policies, algorithms, and payment terms of these corporations (Cunningham & Craig, 2019; Healy, 2022). In contrast, web3 describes an online ecosystem based on blockchain technologies (Wood, 2015), characterised by peer-to-peer transactions and an ability for users to decide who they share information with.

Blockchain technology is a means for people and machines to agree on events, including transactions and the order in which they occurred. Without blockchain technology, people need to rely on trusted third parties for many activities (such as banks that exist to maintain a record of who owns what). By enabling this common knowledge, blockchain technology makes it easier for people to coordinate, and to invent new methods for coordination. Non-fungible tokens (NFTs) are an innovation in property, in that they can be used to show proof of ownership. Decentralised Autonomous Organisations (DAOs) are an innovation in governance, whereby a group of people who are unknown to each other can coordinate to vote and impose restrictions on the actions that group members can undertake. Both of these innovations rely on 'smart contracts', meaning software that can be programmed on a blockchain to carry out an action when predefined conditions are met.

These technologies are very new, and we do not know how they will be deployed in the future. As the concerns around the environmental impact of proof-of-work blockchains demonstrate, the evolution of these technologies may also be impacted by social movements and regulatory constraints.

Why Are Creative Practitioners Using Web3 Technology?

Creative practitioners have pioneered the use of blockchain technology, transforming web3 in the process.

Creative practitioners have taken tools that first appeared in the context of finance and repurposed them to address gaps and problems in the creative economy. This includes questioning the very notion of what it means to own art (what you are paying for); giving those who 'earn' within games power over their assets; producing ready-made governance tools that help artists to work together; and strengthening the connection between musicians and their fans.

Who in the Cultural and Creative Industries is Using Web3 Technologies?

Despite the swell of NFT activity seen over 2021, take-up and use of web3 technologies in Australia remains nascent.

However, some Australian creative practitioners are using web3 technologies and they are using them to make money. Those with traditionally marginalised practices like street artists and commercial practitioners have been early adopters, finding prestige and buyers through web3. Traditional artists are increasingly getting involved, navigating the fraught field of crypto art investors and speculators.

Despite these uses, attitudes towards web3 technologies remain polarised among creative practitioners. Where some see blockchain technologies as a means for correcting the inequities and exclusions of the contemporary cultural economy, others see these same technologies as degrading cultural value and wasting limited natural resources. For others, access to web3 requires negotiating barriers of digital inequality. In response, a range of new and old cultural intermediaries are taking up educational practices, raising urgent questions about who holds expertise and authority within this new creative economy.

Where Are Web3 Technologies Being Used?

Much discussion around web3 has focussed on the potential for income generation for creative practitioners and intermediaries.

Cultural intermediaries are engaging with web3 – from public to commercial institutions, from traditional to new spaces – but some are more invested than others. Blockchain technologies like NFTs offer cultural intermediaries a range of opportunities, facilitating innovations in tracing and documenting provenance, and enabling ownership of and generating income from cultural works. Blockchain technologies also facilitate (digital) mobility of cultural works, collaboration across and between intermediaries, as well as offering mechanisms for restitution and repatriation of culturally significant collections. These opportunities do not, however, come without risks. Collecting, storing, and preserving web3 works will require careful consideration.

Legal Considerations

Blockchains and smart contracts should, in theory, reduce the administrative burden on creative practitioners by automating processes. Unfortunately, legal issues do not disappear by selling works as NFTs and it could take many years to achieve legal clarity let alone arrive at easier legal processes.

The law has always played catch up with technology. In this sense, the legal complexities of NFTs are not new. Just as web2.0 required law-making to deal with new problems in piracy, privacy, the right to be forgotten, intermediary (platform) liability, and online harm, so web3 is raising a new set of challenges and opportunities. These include questions about who has authorship when an artwork is created by a non-human entity (e.g., artificial intelligence (AI) and generative art); how or whether licences can be transferred along with a token; and whether a DAO can own intellectual property. Some of the legal grey areas will only be resolved through the courts and legislature over time, and some may require amendments to existing laws before any certainty can be achieved. In the meantime, the onus is on creators and buyers to assess the risks and seek legal advice where necessary.

Conclusion

In 2019, researchers at the RMIT Blockchain Innovation Hub published a provocation paper for the Australia Council, Australian Film Television and Radio School, and Screen Australia on the opportunities and challenges of blockchain for Australia's cultural sector. That report called for a coordinated approach to blockchain to ensure that Australian creative practitioners experience the benefits.

The conclusion of *Developments in Web3 for the Creative Industries* is that coordination is now happening from the bottom up by way of new governance tools and technical standards. The flow of value through the cultural economy is becoming explicit through web3 and those who choose to see it have much to gain. However, web3 is not replacing the established cultural economy (or not yet). If the last three years have shown anything, it's not that creative practitioners need web3, but that web3 needs creative practitioners if it is to emerge in a culturally innovative and socially responsive way.

Introduction

The cultural and creative industries involve the production, circulation, and consumption of symbolic texts (Hesmondhalgh, 2012). In this domain, aesthetics, historical value, authenticity, and social value coexist with, and sometimes resist, economic value (Throsby, 2001). These industries are also prone to technological disruption, connected to social movements, and reliant on intellectual property (IP). Web3 introduces the ability to move value in a peer-to-peer fashion across the internet. So, what happens when 'the internet of value' meets 'symbolic value' as generated through the cultural and creative industries?

This report identifies how artists, musicians, games designers, and other creative practitioners are pushing the established boundaries of the creative economy using the tools and platforms of web3. We steer clear of aspirational 'use cases' and focus instead on the industrial transformations that have manifested to date, including new ways of manufacturing ownership, rewarding and incentivising fans to sustain creative projects, and the use of web3 for organising and managing collaborative creative endeavours.

We also look at *who* is participating, identifying which segments of the creative industries have led the charge into web3. Creative practitioners whose works were previously considered either too commercial or too digital (i.e., easily replicable) for the arts have found prestige and buyers through web3. Meanwhile, some who have achieved or strived for acclaim within prestige art markets are now beginning to navigate their way into the fraught field of crypto art investors and speculators. We also look at where art, music, and games are occurring inside web3, identifying emerging virtual and physical galleries and art collectives, and how existing arts and culture institutions are responding.

This report asks, "what are Australian artists *doing with* web3?" But we also address the bigger question of "what have artists around the world *done to* web3?" The evidence shows that arts and culture, including games and brands, have transformed web3 by drawing the public's attention to the technology and its use beyond finance. Creative practitioners have made web3 fun for people other than coders. At the same time, they have raised concerns about the social consequences of infrastructures built on financial incentives and drawn attention to the relationship between blockchains and carbon extraction. Through their use of web3, creative practitioners and cultural intermediaries have also pushed legal boundaries (creating 'fun' for lawyers).

We are researchers who study the adoption of new technologies. We undertook a two-staged research program of desk research and empirical data collection that aimed to address the state of the field, including issues of inclusion and exclusion. **Our key message is this: the technology adoption curve could be different this time.** We should not assume a typical bell curve, whereby innovators and early adopters are the first to take it up, followed by the rest of the population.

While web3 might never be for everyone, those creative practitioners who immerse themselves in it will experience radically different capabilities and outcomes. They will need different skills and a willingness to search out fans across a globally networked internet of value. Those who stay away may remain happily unaffected as this doesn't have to replace what is already there. The danger, if anything, is that we will see more polarisation between those who are willing to engage and benefit and those who vehemently resist it. If you are a creative practitioner, this report may help you decide whether web3 is for you.

1. What is Web3?

Ellie Rennie

The term ‘web3’ suggests a progression from web2.0, in which the internet became dominated by large platform corporations (such as Meta and Google) who derive power from advanced data capabilities that make audiences and users the product. For the creative industries, web2.0 continues to be a double-edged sword. It has created a new digital creative working class of YouTube and Spotify stars and enabled artists to promote themselves on social media. However, these opportunities are determined and constrained by the policies, algorithms, and payment terms of these corporations (Cunningham & Craig, 2019; Healy, 2022). In contrast, web3 describes an online ecosystem based on blockchain technologies (Wood, 2015), characterised by peer-to-peer transactions and users deciding who they share information with.

In this part of the report, we give a non-technical account of what blockchain technologies do and point to some useful resources for those who wish to dig deeper. We explain the key components of blockchain technology that provide the foundations for economic activity: common knowledge, automated agreements, uniqueness, and coordination. As the creative industries’ uses of web3 first became dominant on the Ethereum blockchain, we refer to Ethereum for the sake of simplicity. As discussed elsewhere in this report, some creative practitioners now utilise other blockchains (including Tezos, Solana, WAX, and Flow).

1.1 Creating Common Knowledge: Blockchains

MIT Professor and founder of the Algorand blockchain, Silvio Micali, describes blockchain as a database where “you can write, I can write, and everybody can read and you have a guarantee that everybody has the same copy of the ledger that is in front of you” (in Fridman, 2021, 02:23). The result is “a common knowledge” (Micali in Fridman, 2021, 2:36).

An important part of this process is that the database – or ledger – of transactions is updated across a network of computers at the same time, with no central entity controlling that process. The events recorded on that ledger can be accepted as truthful by all because it would be incredibly difficult and expensive to rewrite (Casey & Vigna, 2018).

Events, including token transactions, occur when users interact with each other and with smart contracts (see section 1.2) (Figure 1.1). By way of a hypothetical example, let’s say Alice’s account has 1 Ether associated with it and Bob’s has 0 Ether. If Alice sends Bob 0.5 of an Ether, the ledger will update to show that they both have 0.5 of an Ether. While this might seem like any other electronic payment, it occurs without any bank or payment service provider. Instead, the transaction relies on public-private key encryption technology, which means only the person holding the private key to an account can send a transaction from that account. Software wallets make this process reasonably straightforward. However, users need to be extremely careful to keep the private key to their wallet secure as without it they will not be able to access the tokens stored in their wallet. The support pages of MyCrypto are an excellent resource for learning more about wallets, accounts, and security for Ethereum and Ethereum-compatible blockchains (MyCrypto, n.d.).

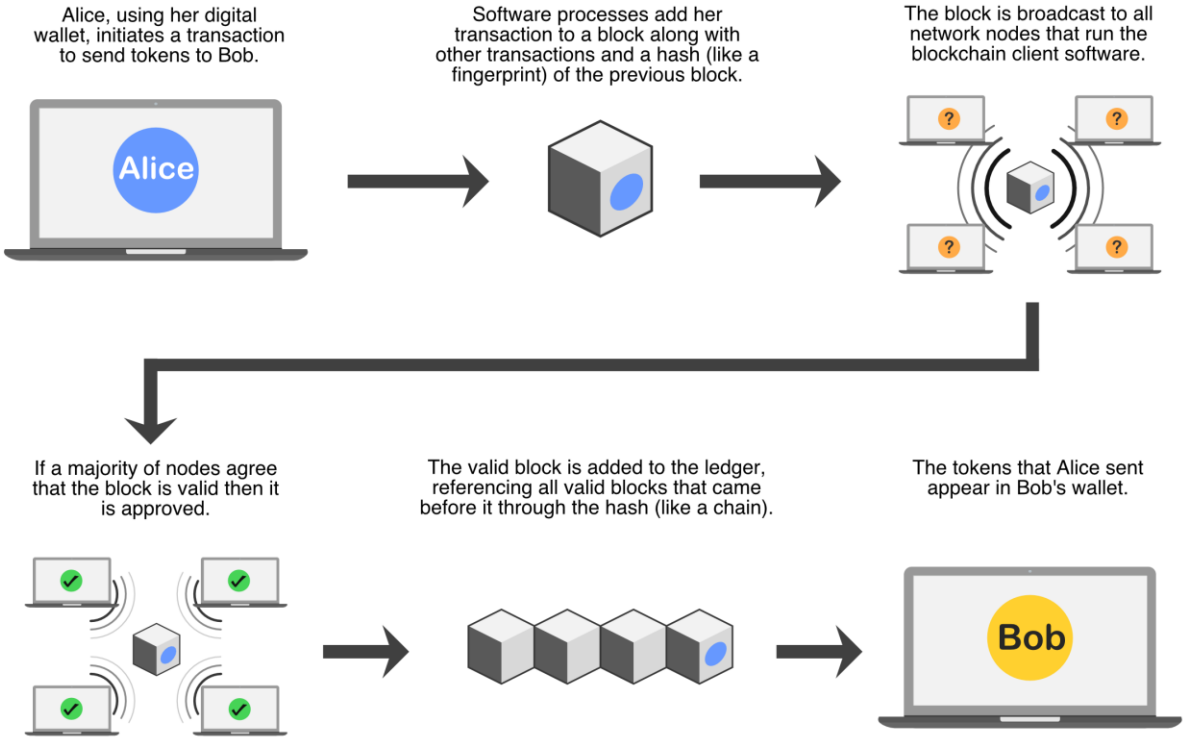

Figure 1.1: A simple depiction of a mainnet blockchain transaction.

Are blockchains secure? A necessary attribute of a functional blockchain is that it has enough people involved in running the software to make it impossible for one group to conspire and manipulate the record in their own favour. The blockchains that are most relevant to this report are Ethereum and other smart contract platforms built as 'public' blockchains, meaning that anyone with the right hardware and skills can participate in maintaining the ledger by running a node (although you do need to deposit Ether to a smart contract to participate in the process of block production. See Ethereum, n.d.). As the ledger is generated and maintained by participants across the network it becomes incredibly difficult and costly to change, which makes it secure against hackers and fraud, as well as resistant to state-level censorship. Blockchains therefore enable people to coordinate in a peer-to-peer fashion with assurance that things will work as intended without requiring authorities to keep things in check (so-called trusted intermediaries).

Even though large public blockchains are in themselves very secure, crypto is a target for scammers (see Part 2 section 2.5) and many projects do not deliver on their promises to consumers (intentionally or otherwise). The risks are high because there's no one to turn to when digital assets are stolen (see Part 5 for discussion of legal considerations).

Do I need to be rich to participate? Blockchains achieve common knowledge by being costly to attack. But this does not mean you need a lot of money to participate as a user. Nor does it mean that large token holders have the ultimate decision-making power in every system.

The Ethereum blockchain has been expensive to use at times; it was a victim of its own success, attracting a high volume of transactions before it was ready. Other blockchains have emerged to compete with Ethereum and these offer faster speeds and lower transactions fees (although the trade-off can be reduced security and reliability). In response, the Ethereum ecosystem has spawned what are called 'Layer 2' technologies, which are capable of handling high volumes of transactions with low fees. Notably, Australian web3 games marketplace Immutable X has partnered with technology company Starknet to be able to process 9000 transactions a second with zero fees (it is also carbon neutral).

Will blockchains become centralised like web2.0? Censorship resistance requires a level of decentralisation and openness, but this is more nuanced than common narratives of decentralisation. There may be responsibilities that come with participation in maintaining the ledger, such as the Filecoin blockchain, where consensus is achieved as part of the process of onboarding data onto the storage providers who make up the nodes of the network. Music blockchain Audius needs its validators to handle copyright infringement take down notices. Therefore, while conversations of decentralisation are important, some parts of the blockchain ecosystem still require expertise and entities who are prepared to fulfill that need.

1.2 Automated Agreements: Smart Contracts

A smart contract is "a contract-like arrangement expressed in code" (Sills, 2019, para. 1), which executes an instruction when predetermined conditions have been met. They predate blockchains (see Szabo, 1997) but have been an essential component of blockchain use cases beyond money. An example of a smart contract in action is the Australian music platform Emanate, which records every millisecond of music that is played through the platform and then every six seconds of music played can be converted into payment in that platform's token. In this example, the smart contract contains the terms on which that payment will be made, executing the payment only when someone streams the song. Smart contracts running on a blockchain need to be invoked by information on that blockchain, or from information that is contained in data repositories that are bridged to blockchains (known as 'oracles'). In Emanate's case, the song is not stored 'on' the blockchain (Polygon within the Ethereum ecosystem in this case), but the data from the streaming platform is bridged to the smart contract.

Are smart contracts legal contracts? No, smart contracts are not legally enforceable in the way a legal contract is. However, as former Agoric software engineer Kate Sills (2019, para. 3) points out, smart contracts "are able to solve some of the fundamental social problems that have traditionally been solved by legal contracts", such as ensuring that one party does not walk away from a deal after they have received the goods from the other party.

The two major blockchain innovations discussed in this report – NFTs and DAOs – make use of smart contracts. We turn to these now.

1.3 Uniqueness: NFTs

A token is a transferrable asset that does not exist in physical form but is represented on a blockchain. There are fungible and non-fungible tokens. One bitcoin is the equivalent of another, like other fungible assets including money and precious metals. NFTs, or non-fungible tokens, are important for the creative industries as they can be transferred from one owner to another as unique (one of a kind or one of a series), non-interchangeable assets.

As one Australian developer we interviewed who contributed to the original NFT standard describes it:

> A dollar coin is fungible, because if I give you a dollar coin and you give me a dollar coin, neither of us are better or worse off – a dollar is a dollar. However, if I give you my pet cat and you give me your pet cat, we may not be happy, because pet cats are not completely interchangeable – they are non-fungible. (Parker, 2018, para. 4)

NFTs are token standards, which means they can be recognised and used by different applications on the same blockchain, in the same way that electronic goods need particular plugs to be compatible with a wall socket (the original ERC721 NFT standard can be viewed here). However, an NFT created on one chain is not necessarily going to work on another, just like different countries have different plugs (unless the two chains are compatible. For instance, Avalanche is compatible with Ethereum). The Mimics example in Part 3 section 3.5 of this report discusses some of the technical features of NFTs. A good technical description of the first NFT standard can also be viewed here.

Some NFTs contain the art in the token itself, in that the description of the NFT contains code that will display as an image when it interacts with a website. One example of this is POWNFT (Figure 1.2), created by Andy Parker (with design assistance from Ghostagent). The NFT is generated from the code contained in the smart contract, in this case "rendered based on the token's hash" (POWNFT, n.d., para. 5), which determines the element, its ionic charge, the colour palette and the motion of the image. Parker explains that "the element selection algorithm is inspired by natural scarcity laws, meaning some elements are more common than others" (POWNFT, n.d.).[1]

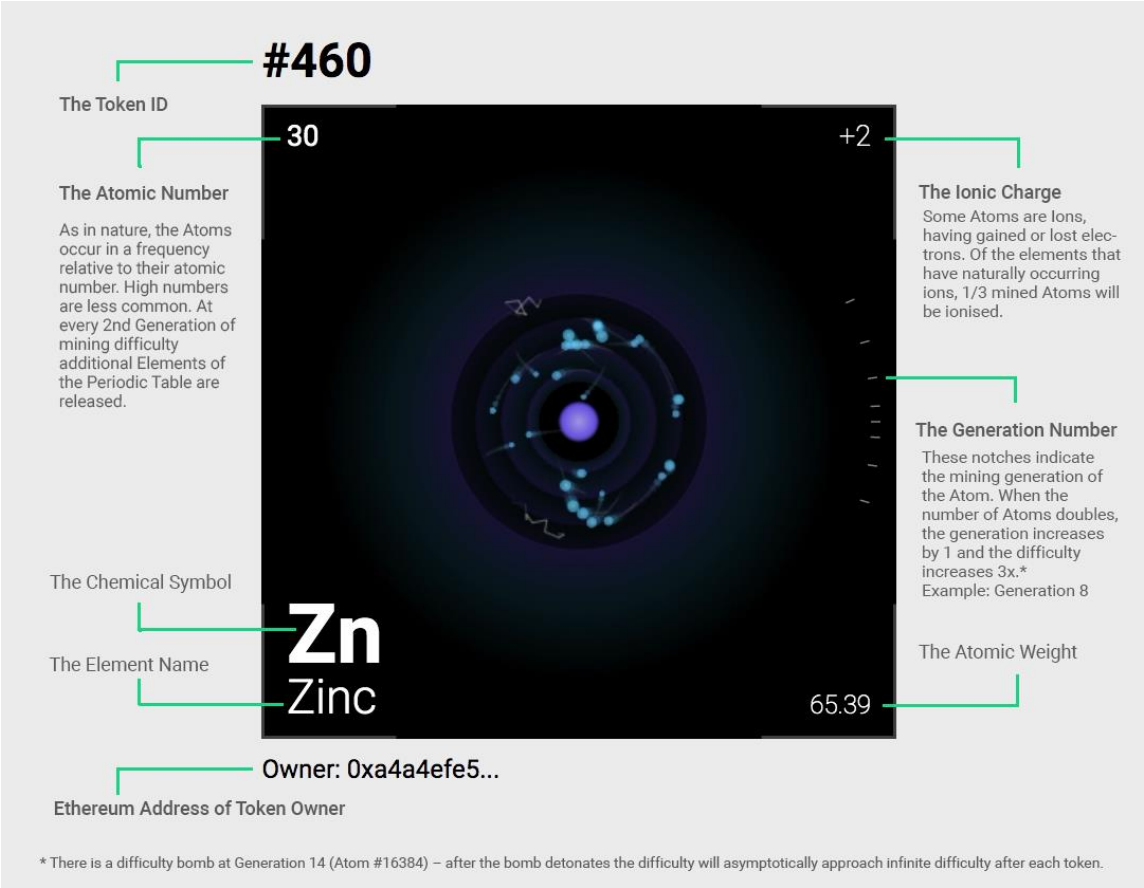

Figure 1.2: A breakdown of the POWNFT constituent parts. Image courtesy of Andy Parker

Others point to a work (such as a visual artwork, song, film, etc.) that is stored in the cloud. Many NFTs use the InterPlanetary File System (IPFS) for storage, which is a decentralised protocol for content addressing, meaning that a file can be located even if the place it is stored (for instance a server or a website) changes (see also Part 7 for a description of NFT.Storage and the decentralised storage network Filecoin).

Do I only make money from the initial sale of an NFT? It depends on your design choices. The "structurally inventive initiatives" (van Haaften-Schick & Whitaker, 2022, p. 2) that web3 technologies enable are critical for understanding their take-up and use. For example, the capacity to 'build in' resale royalties into NFTs (see Part 5) provides creative practitioners "the possibility of earning residual lifetime income from each piece of art they create" (Kugler, 2021, p. 2; van Haaften-Schick & Whitaker, 2022). In practice, this means "artists can spend more time making art rather than working or freelancing to pay the bills" (Kugler, 2021, p. 2).

[1] Source code available at https://etherscan.io/address/0x9abb7bddc43fa67c76a62d8c016513827f59be1b#code

Do I need to know how to code to create or buy an NFT? No. NFTs are often created ('minted') and purchased through marketplaces such as OpenSea, which provide an accessible interface that interacts with the blockchain (see DeMatteo, 2022). We discuss skills further in Parts 2 (section 2.1) and 4.

1.4 Coordination: Decentralised Autonomous Organisations

Blockchains can be useful for undertaking some of the roles and functions that are otherwise performed through organisations and firms. In Aaron Wright's (2021, p. 155) description, DAOs consist of a "network of hard to change rules that establish the standards and procedures of anyone interacting with, or taking part in, a DAO'" (see also Hassan & De Filippi, 2021). While humans set those rules and make decisions within the parameters of what is allowed, DAOs differ from other firms or community organisations in that software actors (smart contracts) do the bureaucratic work of executing decisions (Rennie, 2021a). As such, DAOs enable people to coordinate more easily by providing assurance that a decision will be enacted by the DAO software, providing governance in a permissionless organisational context (meaning anyone can come and go and remain pseudonymous). RMIT researcher Kelsie Nabben (2022, para. 6) sees the primary purpose of a DAO as aiding in the coordination of members:

> DAOs can be defined as a multi-agent system, working towards a shared objective. In these human-machine systems, computational components aid coordination (operational efficiency and/or decision-making, although that latter is less prevalent at this stage).

The Coalition of Automated Legal Applications (2021, p. 3) points out that a DAO is not "functionally equivalent to registration into a corporate entity, but the policy objectives of publicity and certainty are fully achieved". COALA has created a Model Law to assist governments that wish to recognise DAOs as legal persons without requiring a new category within corporations law. We discuss some of the legal issues related to DAOs in Part 5.

DAOs can be set-up through DAO frameworks, which are off-the-shelf smart contracts. In recent years, developers have created a myriad of tools that enable DAOs to disperse tokens to constituents, undertake decision-making, manage wallets with multiple signatories on transactions, split income between members, track contributions by members, and pay people for their work. See Part 2 section 2.2 for some examples of creative industries DAOs.

1.5 What is the Environmental Impact of NFTs?

Artists were not the first group to raise concerns about the environmental impact of blockchain platforms; developers and researchers have been aware of the problem for some years. For instance, Ethereum founder Vitalik Buterin rejected the notion that blockchains need to be high energy consumers in 2016, stating that the dominant method used to make blockchains secure "kills trees" (Buterin, 2016, para. 9). However, artists who were exploring and using NFTs were able to use their influence to amplify the issue, creating a significant social movement that changed popular discourse and spurred some blockchain developers to change course.

The key technical component involved in the environmental cost of blockchains is the 'consensus mechanism', which first appeared in cryptography and computer science research in the 1970s. In basic terms, this is the process by which a network of computers operating asynchronously come to agree on what events have occurred and in what order (achieving common knowledge as described in Part 2 section 2.1). Proof-of-work as used by the Bitcoin blockchain involves running software that performs hard computational work. Those who run this software, known as miners, earn the right to mine a new block, resulting in a new set of transactions being added to the ledger. When a new block is successfully mined, the miner is rewarded with newly minted bitcoin and transaction fees. The work required to mine a new block makes it extremely difficult and costly for an actor to try to manipulate or control the network unilaterally. The more computing power a miner

has, the more likely that miner is to earn rewards. The result is that successful miners are those who can source and consume large amounts of electricity (renewable or otherwise) and who have access to the fastest hardware (known as ASICs).

However, proof-of-work is not the only consensus mechanism. Proof-of-stake, for instance, involves depositing capital (in the form of cryptocurrency) into a smart contract, which can be slashed (taken off the depositor) if they behave maliciously or fail to maintain their node. Ethereum moved from proof-of-work to proof-of-stake in September 2022, which was estimated to reduce the world's energy consumption by 0.2% (Ashraf, 2022).

Brisbane-based new media artist Michelle Brown began releasing NFTs on platforms like SuperRare, MakersPlace, and Known Origin in 2020. As she continued her web3 experimentation, she "became aware of the high-energy use of Ethereum consensus mechanisms" (interview). Michelle is a new media artist (including virtual reality), and much of her work "is actually focussed around climate action", so the environmental consequences of her use of the platform "was a big deal" (Brown, interview).

She told us:

> *The clean energy community formed in February of 2021, just before the Beeple and the big explosion of March. And there were over 3,000 artists from around the world, big name artists who had big concerns about using something that was adding to their energy footprint. We were all researching, providing resources, education around what this all meant – working out what the consensus mechanisms were, why proof-of-stake was better than proof-of-work for the energy and all the rest.* (Brown, interview)

Through her interactions on the Clean NFT Discord Channel, Brown learnt of the Tezos network, a proof-of-stake blockchain that used far less energy than Ethereum at that time. She observed the polarisation that formed around the issue and how she dealt with it:

> *There was a lot of hate going around for NFT artists because everyone had found out about the energy issues ... And I suppose our community were like, "No, we see good in it," but we want to focus on that, where that good is and promoting that.*

Figure 1.3: Strelitzia *by Michelle Brown (still image of 3D work). April 2022. On teia.art. Image courtesy of Michelle Brown.*

As the issue was picked up by the mainstream press, many NFT artists began suffering abuse and harassment. Two information and calculation tools that sparked the movement have since issued statements saying that they did not wish their websites to be used against artists. Artist Memo Atken's (2021, para. 1) website cryptoart.wtf now reads:

> CryptoArt.wtf was designed to share the best available information about the energy use and environmental impact of the growing Proof-of-Work (PoW) based CryptoArt and NFT markets. Just as we can find information regarding the ecological costs of flying, iPhones, watching Netflix, or training Artificial Intelligence models, I believe similar information should be available for CryptoArt, so that we can understand the impact of our actions, and we can make informed decisions. Unfortunately, the information on this website has been used as a tool for abuse and harassment, so I am taking the site offline.

A similar statement can be found on carbon.fyi (n.d.).

Concerns about the carbon footprint of NFTs are understandable given the current context of climate change and the need to reconsider and adjust energy use. However, there are many factors that make calculating the carbon footprint of an NFT a complicated, if not impossible, endeavour. Moreover, most studies into the environmental impact of blockchain focus on the Bitcoin blockchain, which plays a minor role in the NFT arena[2] (such studies also tend to overlook

[2] Aside from coloured coins, which are a lot like NFTs and were first proposed for the Bitcoin blockchain in 2015.

the practices of miners or look at the sources of energy that miners are using (see Carter, 2020; Rennie, 2021b)).

Understanding the carbon footprint of an NFT requires looking at the carbon footprint of the blockchain on which that NFT is minted and transferred. If there is a digital file associated with the NFT, then where that file is stored also matters. Rather than provide an estimate of the environmental cost of an NFT, we now drill down into these two areas and highlight which parts of the system use energy and why.

1.5.1 The Carbon Footprint of a Blockchain

NFTs compete for block space alongside other transactions and rely on the underlying ledger to show ownership. However, the production or transfer of an NFT does not increase the environmental footprint of the blockchain to the same degree each time.

Let's take the Ethereum blockchain as an example. NFTs as we commonly think of them originated through the creation of Ethereum standards (e.g., ERC721). During Ethereum's proof-of-work era (its entire existence prior to September 2022), it was common to read that NFTs were detrimental to the environment, such as the claim that "the amount of CO2 released when generating and storing an NFT is significantly higher than driving 100 miles" (Howell, 2022, para. 15).

However, it is not possible to calculate the environment footprint of a single NFT in this way because one NFT didn't directly translate to an increase in hash power for the Ethereum proof-of-work blockchain. The process of ordering transactions into blocks and proposing that they be added to the ledger is done by miners in a proof-of-work blockchain (or by validators/stakers in a proof-of-stake blockchain). Miners' participation is based on economic incentives. Under Ethereum's proof-of-work model (based on Bitcoin's consensus mechanism), miners would scale up their operations when it was profitable for them to do so. The algorithm was designed to deliver value by creating scarcity, so that mining a new block becomes more difficult as more computing power enters the network (the 'hashrate').

The electricity use of this system depended on the number of miners who competed to mine blocks. Under proof-of-work, we don't need more miners when transactions increase, or when gas fees are higher. An easy way to think of this is like a Melbourne tram that will run regardless of how many passengers are on it. Miners will propose blocks with or without NFTs.

There's an argument to say that congestion pushed up transaction fee prices ('gas' on proof-of-work Ethereum), which might have incentivised more miners to get involved (or the same miners to run more hardware to improve their chances of receiving mining rewards in the form of ETH). However, NFTs made up only a small portion of the total transactions, so boycotting NFTs was unlikely to lead to a reduction in miners (see Escalante-De Mattei, 2021). In addition, some NFT-related marketplaces such as Immutable X were using layer 2 solutions, which process many transactions in one transaction (or similar methods).

When Ethereum moved from proof-of-work to proof-of-stake (in September 2022), the electricity use of that network reduced by over 99% (Beekhuizen, 2021). As described above, under proof-of-stake, those who wish to participate in ordering transactions and proposing blocks must deposit Ethereum into a smart contract. Like mining, these 'validators' receive rewards for their service, but they are randomly chosen to propose blocks rather than in proportion to the amount of computational power they have expended.

1.5.2 Storing Digital Files on a Web3 Storage Provider such as Filecoin

The digital file associated with an NFT (such as an artwork or music file) can be stored in many ways, including on the owner's own device. Increasingly we are seeing NFT marketplaces offer storage solutions such as NFT.Storage, which enables developers to store NFT assets and associated metadata on the Filecoin network so that they remain accessible over time. As of 15 March 2022, NFT.Storage has passed 45 million uploads and 26,000 users.

How much energy is used to store a file on something like NFT.Storage? As Filecoin is a blockchain, it has some of the dynamics of the energy use described above, but with some subtle differences. Firstly, the Filecoin consensus model uses two consensus mechanisms to make the network secure and publicly verifiable. One of these mechanisms proves that data has been received (proof-of-replication) while the other proves that it continues to be stored (proof-of-spacetime). Filecoin participants are randomly selected by the algorithm to propose a block, creating a bundle of information (about storage) to be recorded on the ledger.

Like Bitcoin, participating in the Filecoin network requires capital and energy expenditure. In Filecoin's case, the consensus mechanism was designed so that this is done through the processes of onboarding data (sealing), through which cryptographic proofs are produced and sent to the network. Filecoin claims that the work that goes into achieving consensus in Filecoin thereby produces a positive externality rather than requiring that miners consume energy only to make the cost of attack unattractive (as is the case with Bitcoin). The second mechanism, proof-of-spacetime (PoSt, also known as proof-of-storage), uses a far lower amount of energy, and is comparable with a proof-of-stake blockchain network in its energy use (Ransil, 2021).

Filecoin uses energy for the following processes:

- The file or group of files is transported to a storage provider. Small files can be sent over the internet, but large volumes of data are delivered on hard drives by freight.
- The most energy-intensive part of the Filecoin network's process is when data is received by the storage provider and onboarded on to the network. During this set-up phase, a one-time process called sealing occurs. Sealing produces a cryptographic proof that the storage provider is in possession of the data sector, which is recorded on the Filecoin blockchain. According to Filecoin, sealing a 32 GiB sector takes five hours of compute time (Ransil, 2021).
- For redundancy purposes the data is replicated, and each copy increases the energy use.
- Once sealing has occurred, data storage continues for the term of the contract (minimum 18 months). Factors such as the energy efficiency of hard drives and hard drive configuration will affect energy use.
- Computational processes show proof-of-storage every 24 hours. These use little energy compared to the sealing process. The system is set up to independently verify that the data is stored at a location and for the length of contract that the storage provider and client agreed to. In the event where proofs are missing, storage providers are penalised.

Filecoin storage providers may use several different approaches to reduce their own carbon footprint and that of the network as a whole. For instance, they may choose to:

- install renewable energy infrastructure,
- purchase renewable energy credits,
- upgrade and optimise their hardware, or
- build their facilities in ways that use less heating and cooling.

At the time of writing, Filecoin is in the process of creating incentives that encourage Filecoin storage providers to reduce their carbon footprint and to show this using verifiable claims.

1.5.3 Wider Benefits of Blockchain for the Environment

When considering the environmental impact of blockchain, it is also important to keep in mind that the technology can enable faster, more efficient renewable energy markets. It can also provide visibility over energy use and infrastructures, assisting with carbon accounting. Currently, when companies make claims about their environmental credentials, we are asked to take their word for it. With blockchain technology (including platforms such as Energy Web (n.d.)) these claims can be verified. As the Filecoin example shows, incentives can be built into the design of protocols and applications that encourage those interacting with the blockchain to behave in an environmentally

responsible manner. NFTs are an important component in that wider system, such as when used to represent renewable energy credits (such as Zero Labs, n.d.).

In summary, NFTs undoubtedly come with a carbon footprint, but that is being minimised through various developments including Ethereum's move to proof-of-stake, and networks such as Filecoin building incentives for use of green energy. Any holistic assessment of the environmental impact of NFTs also needs to take into account how blockchains and NFTs in particular are being used to bring greater transparency to energy use, and in the development of easier, more accurate renewable energy markets.

Part 1 Summary

Blockchain technology is a means for people and machines to agree on events, including transactions and the order in which they occurred. Without blockchain technology, people need to rely on trusted third parties for many activities (such as banks that exist to maintain a record of who owns what). By enabling common knowledge, blockchain technology makes it easier for people to coordinate, and to invent new methods for coordination. NFTs are an innovation in property, in that they can be used to show proof of ownership. DAOs are an innovation in governance, whereby a group of people who are unknown to each other can coordinate to vote and impose restrictions on the actions that group members can undertake. Both of these innovations rely on smart contracts, meaning software that can be programmed on a blockchain to carry out an action when predefined conditions are met.

These technologies are very new, and we do not know how they will be deployed in the future. As the concerns around the environmental impact of proof-of-work blockchains demonstrates, these technologies may also be altered through social movements and regulatory constraints. In Part 2 we look at the innovations arising from creative uses of blockchain and how these may alter the creative industries.

2. Why Are Creative Practitioners Using Web3?

Ellie Rennie

Creative practitioners have pioneered the use of blockchain technology, transforming web3 in the process. Here we examine what artists are doing with web3 technologies and what this means for the cultural economy and for innovation. We identify key transformations that span the practices of collecting, connecting with audiences, creative collaboration, and financial speculation.

2.1 Manufacturing Ownership

The most common critique of NFTs is that anyone can 'right click and save' the file or code. While it is true that the work associated with an NFT can be replicated by anyone who wants to enjoy it, only the buyer can claim they have the artist's certificate of authenticity. As such, NFTs are an innovation in collecting and arts patronage.

An NFT is typically a certificate that points to where an artist's work is located (see Part 1 section 1.3). In some cases, the work is contained in the NFT itself as lines of code (for instance, an SVG string) that will be displayed when read by the right interface. In both cases, what is valued is the creativity that can be assigned to an artist (or collaborating artists) who produced the work. The buyer is purchasing the artist's affirmation of having come up with and executed the work rather than exclusive access to or experience of the output.

For buyers, an NFT provides an emotional attachment derived from ownership. It also provides a means to speculate on the value that others will assign to ownership in the future. Both needs are met through scarcity, which the artist can set through the technical task of minting NFT tokens.

Oshi Gallery owner GT Sewell described how he came to re-think ownership through NFTs:

> *I started out as a street artist because of my rebellious nature … I love that aspect of just giving up your art to the world … but it's always nice, if someone appreciates your work, that they then spend their 'hard earned' … I used to laugh off digital art solely because of the ownership thing. I knew it was a cool piece of art, but I didn't feel like I owned it.* CryptoKitties[3] *brought that lightbulb moment.* (Sewell, interview)

***Lost Tablets* (Jan van Schaik)**

Melbourne-based artist and architect Jan van Schaik is exploring where the value of art resides through a project that combines physical sculptures and NFTs. *Lost Tablets* (Figure 2.1) began as a series of sculptures made of Lego, each of which explores "the recognisability of the geometric language of architecture" (van Schaik, 2022, p. v). When he commenced the project in 2019, van Schaik did not envision he would end up producing an NFT series associated with the work. It was a fortuitous coincidence that *Lost Tablets* is a series of 100 unique sculptures (some still to be made) in the same language, which fits with the typical 'one of x (number)' that NFT collections often follow. He was not aware that the composable components of blockchain software are often referred to as 'blockchain Legos'. He selected the material from which the sculptures are made – Lego bricks – because it is a "prosaic material" that anyone can construct with. As van Schaik explains, "the art content of the objects is in the composition of them, and the idea of them. And less in the art of the making" (van Schaik, interview). The *Lost Tablets* sculptures encourage the audience to think about where the value of the art lies, as do the NFTs.

[3] *CryptoKitties* is an Ethereum-based game which allows players to purchase, breed, and sell virtual cats.

As the sculpture series was already partially complete and sold when van Schaik decided to create the NFTs, he decided it was appropriate to gift the NFT associated with a sculpture that had already been sold to its owner. The owner would need to send an Ethereum wallet address to *Lost Tablets* in order to receive the NFT. The project therefore provides a useful snapshot into the willingness of buyers to engage in NFTs. Of the 34 works that had been sold, 20 of the associated NFTs were taken up by the deadline. Those that were not taken up were mostly associated with sculptures that had been sold through galleries. Even buyers with low technical skills were able to establish a wallet with assistance from van Schaik and his assistant Ned Shannon, who created an instruction sheet. While the *Lost Tablets* project only provides insight into the reaction of traditional art buyers to NFTs when the NFT is associated with a work the buyer has already invested in, it shows that the technical requirements may not be a barrier for most buyers if some basic support is offered. We discuss such education practices further in Part 3 section 3.4.3.

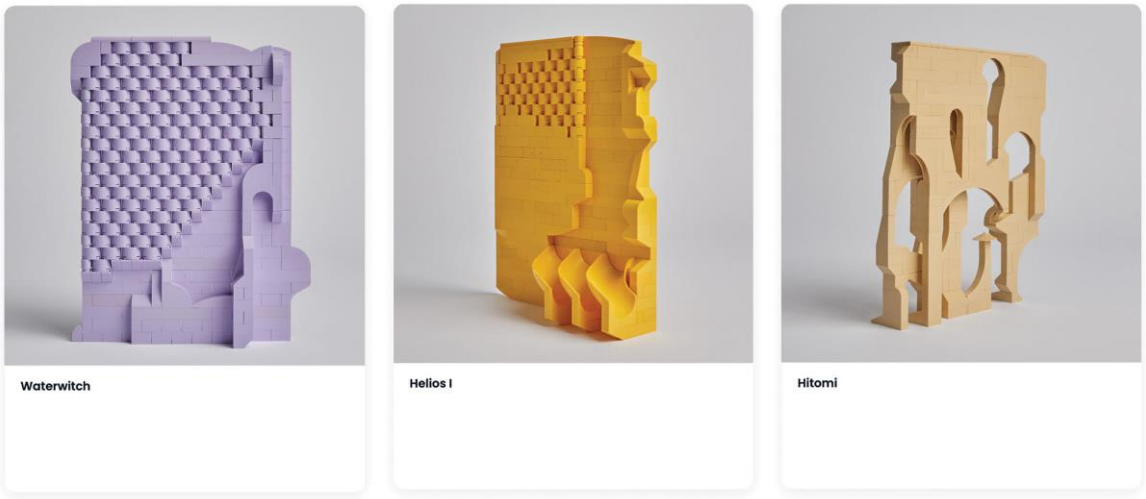

Figure 2.1: Three of van Schaik's Lost Tablets*. Image courtesy of Jan van Schaik*

To new media artist Mitchell F. Chan (2021), generative NFTs are like a Sol LeWitt *Wall Drawing*. In the late 1960s and early 1970s, conceptual artist LeWitt sold works as a set of instructions for how to produce the artwork. The instructions for *work #260A* read: "On blue walls, all two-part combinations of white arcs from corners and sides, and white straight, not straight, and broken lines within a 36-inch (90 cm) grid" (Mass MOCA, n.d., para. 21). The gallery displaying the work could follow the instructions and produce a rendition of the work for audiences to look at, but what was being sold was a certificate with instructions that LeWitt conceived of as the work (Chan, 2021; see also Irvin, 2022). Chan (2021, para. 4) writes that, in the same way, NFTs "separate an artwork's expressive, or artistic form, from its commodity form". In other words, the displayed form from is separated from the owned form.

Chan makes this point specifically in relation to web3 generative art, where an algorithm produces a series of artworks that are sold as NFTs. However, the same principle of ownership applies to NFTs of 'one of one' visual artworks or music. For instance, van Schaik's *Lost Tablets* was always intended to make the audience aware that the value of the art is not the value of its material. The idea that an artwork can be unique and digital is also challenging unless you can separate the value of art from the material form, as NFTs do.

Digital artist Rhea Myers describes NFTs as the "pure art of ownership, but sometimes there are little illustrations to go with it" (Myers in conversation with Wark in Droitcour, 2022, para. 59). She points out that "Everyone knows that's how the art world already works, but it comes with

cumbersome objects that require special handling. NFTs do away with that and just leave a pure system of provenance" (para. 59).

As researchers focused on empirical examination of the uses of technology, we leave it to art critics to trace the pre-history of NFTs back through conceptual art movements. Our observation is that collectors are comfortable with the separation and the new possibilities it offers (as discussed in later Parts). As a result, artists are getting paid for conceptual art, new media art, and other forms that did not previously fit well within existing art markets. NFTs are even providing income for artists working in ways that defy existing systems of copyright, such as generative art pieces (see Part 5).

Further innovation is seen in music NFTs, where creative practitioners are prioritising collection and ownership over restricted access, typically achieved through digital rights management technologies (DRM). During an interview, Richie O'Gorman aka Ghostagent commented:

> *A lot of people come from the idea with music going, "Yeah, I'm going to give this a limited release, and only these people can listen to it." It's a downloadable, unlockable file. A DRM approach, and I don't think that's the solution. That's not the solution.* (O'Gorman, interview).

With many music NFTs, the song remains available to listen to through streaming services. The buyer of the NFT, however, can show ownership and therefore engage in the activity of collecting (spinz808.eth, 2022). Music NFTs are intended to appeal to super-fans or music aficionados who see collecting as an expression of taste or subcultural affiliation (Sean Gardner, interview). In this sense, the NFT plays a similar role to vinyl records, providing enjoyment through accrual of the work and the development of a collection that signifies the owner's aesthetic taste (Gardner, interview).

What is distinctive about NFT art markets is that the wallets of buyers are easy to trace, providing tools for investors to predict which projects may increase in value based on who is buying them. While being in the collection of a well-known gallery or private collection will lift the status of an artist, the traceability and visibility of digital wallets means that tracking these movements can be easily automated. Nansen.ai, for instance, provides access to top wallets to follow and charts them to show the financial performance of projects (e.g., Choe, 2022).

Financial speculation associated with NFTs is perhaps more challenging for the music sector where the vast majority of revenue is derived for access and experiences that cannot be sold in secondary markets. Activities like wash trading – in which an investor buys and sells the same asset to conflate the price – existed in visual art markets before NFTs, as was the case with abstract art in the 1980s (dubbed "zombie formalism" by Robinson (2014, para. 6)). These strategies have become more sophisticated through decentralised finance, such as the case of *CryptoPunk 9998*, which 'sold' for over USD$500million. The transaction on the blockchain shows that the sale was executed through a loan that the owner used to sell the Punk back to themselves. As the entire transaction was viewable on the blockchain, it's likely the action was done to prove a point rather than deceive future buyers. The technical feat was itself turned into an NFT with the description "This is the most powerful display of conceptual or performance art recorded and viewable via a block explorer to date" (Foundation, 2021, para. 3). It's likely that NFTs whose contracts include a return to the artist at every sale are less vulnerable to wash trading.

2.2 Metadata, Metalabels, and Micro (song) DAOs

In 2019, Rennie, Potts, and Pochesneva wrote that without efforts to coordinate practitioners and stakeholders, including shared digital infrastructures and open standards, the benefits of blockchain for the creative industries might never be realised. Since then, developers have worked to expand the ways NFTs and other tokens can be used across a blockchain ecosystem, and these technical improvements are beginning to be accepted by marketplaces and platforms, such as NFT tokens for resale royalties (see Part 5) and NFT rentals. We have also seen the emergence of composable systems, meaning software components from one software application

being able to talk to or be used within others. These technical developments towards openness and interoperability are important for innovation.

However, some challenges in the creative industries cannot be addressed through technology alone, including inconsistencies in metadata, opaque deals between large entities and platforms, and regulatory structures. The music industry is complex and discrepancies and gaps in metadata (data about songs) are common. When these occur, unattributable royalties accrue in the accounts of collecting societies, which are eventually paid out in ways that favour the major players, with some artists receiving nothing while others (or their labels) get paid twice (see Hesmondhalgh et al., 2021). As the UK's inquiry into streaming services found, there is consensus across the music industry "that issues with the metadata are a significant challenge to efficient and correct rightsholder remuneration" (House of Commons: Digital, Culture, Media and Sport Committee, 2019, p. 50).

Attempts to address the problem of metadata and remuneration through blockchain-enabled royalties platforms are continuing (for instance Copyright Delta (n.d.)). These are more likely to succeed if coordination problems in the broader industry are addressed, such as the need to ensure that metadata is up-to-date and resolving rights disputes when they arise. Some pioneers such as Envoke (discussed further below) have turned their attention to assisting artists and those who support them to take control of metadata from the point of creation. Others have chosen instead to 'exit' industry models that favour larger players, forming artist collectives using DAOs to automate some of their governance and administration needs.

MODA DAO

DAOs can be used for coordination in the development of standards and models that benefit everyone. Depending on their structure and openness, they can make it easy for those who might compete to come together to make decisions and align on best practice.

One example of this is MODA DAO, which was founded by the MODA Foundation, an Australian-based limited liability company with a not-for-profit mandate. MODA DAO's intention is to help in building an "infinitely sustainable web3 music industry ecosystem that offers and replaces the benefits of the legacy industry, within an autonomous, fair and transparent environment" (Mogis, 2021, p. 36).

Co-founder Sean Gardner (also of Emanate) explained to us that a DAO was necessary as people want to know "what's in it for you" when undertaking developmental activities that are intended to benefit everyone:

> *[B]y creating a DAO and having all the members as token holders and setting that up on a non-profit foundation, we're able to just go and have open, collaborative, transparent conversations with people that want to move into this space and are building things* (Gardner, interview).

In June 2022 MODA DAO launched a provenance fingerprinting technology for NFTs. Each *Genesis Audio* NFT contains metadata, "recording each composition's unique origins as a distinct recording" (MODA DAO, 2022, para. 4). A visualisation of the encoded data accompanies the NFT. The metadata structure is stored as updatable files in IPFS (see Part 1 section 1.3) and is connected to the NFT via the token (uniform resource identifier (URI)) description.

While it is not a full web3 music metadata standard yet, the updatability will hopefully encourage artists to use it knowing they can update to a new standard if and when that arrives (Gardner, interview). The *Genesis Audio* NFT is compatible with the Ethereum Virtual Machine and is currently being built for the Ethereum and Polygon networks, with integration into Emanate.

MODA DAO hopes that one day "our provenance fingerprinting technology could crawl all available content and bridge this data with other similar platforms so that eventually immutable audit trails can be enabled. Turning this to geolocated activity that surrounds music usage will be a project for the future" (Mogis, 2021, p. 19).

DAOs can be used for what Yancey Strickler calls a "metalabel" (Strickler, 2022, para. 1). These are groups with a common identity that come together to create works, forming a "release club". Metalabels are defined by a core purpose, involve a squad of collaborators, commit to public releases, and have rules for participation. Metalabels are "startups and institutions for culture" that enable "creativity in multiplayer mode" (Strickler, 2022, para. 37).

For instance, the web3 music collective SongCamp involves groups of musicians who come together and collaborate on a collection of songs. The third camp, which they called Chaos, involved 45 musicians collaborating on 45 songs, created over a three-week period. The songs were sold in packs of four randomly selected song NFTs and each song was assigned a different level of rarity. In addition to experimenting with the notion of collectibles, Chaos used a DAO to coordinate the contributions and rewards of the 45 members. Members indicated their own contributions and rated each other's contributions to the DAO using a tool called Coordinape (intentionally holding back 10% so that those who do less visible work or who are not as willing to spruik their own contributions were still rewarded). Grasmayer and Hu (2022, para. 45) write that for Songcamp "experimenting with the economics of art was not only a freeing creative ingredient but was also a necessary step in establishing trust and encoding values into practice, both for participants and for their supporters" (emphasis removed).

DAOs can also be formed at the level of an individual artistic creation. An example of this is Song That Owns Itself (STOI), which is led by George Howard of the Berkeley College of Music. A STOI is a smart contract that can be used by those involved in the creation of a song to form a DAO which disperses income from the song to those in the DAO. Aside from assigning song tokens to themselves and the production team, the song creators might also choose to put aside a portion of the shares for transferring to fans. The project hopes that through this, a "larger recalculation of the value of songs, the concept of ownership, funding, remuneration, and coordination between creators and their consumers, licensors, and fans can take place" (Howard et al., n.d., p. 5). Those who make a song popular can have a stake in a song and be rewarded for activities that promote it and that can be traced through web3 environments. Profits flow to those who are most invested in the success of the song, reducing the need to sign over rights to labels and publishers. As a result, "ownership is no longer about the assignment of exclusive, normative rights, but about derivation of personal meaning" (Howard et al., n.d., p. 2).

It is important to note that DAOs don't negate the need for artists to understand and manage metadata. In fact, the examples above require a willingness to engage in the mechanics of royalties and distributions, even when used to bypass industry and platform backroom deals. In the process of doing so, artists are rethinking where value is generated and who should be rewarded.

Envoke

Merida Sussex has been involved in the music industry as a successful musician (Paradise Motel), the founder of an independent record label (Stolen Recordings) and a board member of an international industry association (Merlin). Merida and her chief collaborator Peter Harris initially set out to create a single source of truth, "a blockchain solution to registering and communicating music rights and metadata", which they named Envoke. As part of her entrepreneurial process, Merida has been interviewing people who create music metadata, including musicians and those working for labels, publishers, distributors and collecting societies as well as managers (co-author Rennie has been observing these interviews).

Sussex found that there are multiple parties involved in the creation of metadata (within and across companies) and no unified agreement on how to implement or work with the existing standards. A comprehensive response (such as the DDEX standards) can be too complex for an unsigned musician or smaller label to engage with. This favours larger companies with greater administrative capacity. Moreover, disconnects and gaps can occur at the creation of a song (getting artists/producers/managers to identify contributors to a track, for instance), onboarding an existing catalogue, having multiple processes for communicating the same data (resulting in duplicates and mistakes), or how digital service providers (DSPs) receive/use information and from whom.

Knowledge about why metadata matters does not often reach artists, and often neither does the metadata itself, which results in financial disempowerment. The conversations between Merida and artists typically ended up with her answering questions as they began to grasp the importance of metadata and how little they knew. One interviewee commented: "[I]t's a bit of a kick in the pants for me, having this discussion with you, because obviously metadata is being thought of in this quite professional, formal way … as if it's an NFT".

While Sussex still sees the need for platforms, she has shifted her focus to the governance of metadata and educating artists in how to collect and retain their metadata. The particular governance problems that Envoke is concerned with include resolving inconsistencies and disputes in metadata and finding mechanisms (including incentives) that empower outsiders (musicians, small labels) to coordinate to minimise the opportunism of insiders (major labels). The power of the technology lies in coordination. To get that right, artists need to know the value of metadata and the tools to manage it. Envoke is therefore commencing with tools that enable artists to generate metadata from the point of creation.

2.3 Festivals and LARPing

Web3 online environments can involve token gateways, whereby a user connects a wallet to gain access to online forums or experiences, and only those with an NFT from a particular collection are granted access. Some commentators have likened these to nightclub medallions for online environments. To critics this is reinventing elite, anti-democratic aspects of the artworld (Rivers Ryan, 2021). When it comes to visual NFTs, gateways are more likely to occur within profile picture (PFP) NFT communities or with brands who deploy tactics of status and exclusivity. Music platforms such as Emanate and Royal.io are designed so that musicians can offer NFT owners exclusive content, early access to future releases, and even studio sessions with the artists.

Communities of affiliation and taste can form around NFT projects even without the technicalities of token gateways. Those who use PFPs on a Twitter account become the collective voice of that community (Punk 6529 in Shin, 2022). Event-based experiences are common for major PFP projects–festivals, gigs and dance parties that might involve elements of cosplay. Local meetups for people who hold an NFT in a collection are common, as well as events where people who wish to learn and discuss NFTs more generally. In these examples, the so-called 'metaverse' is here, but it is happening IRL or in web2.0 platforms like Discord.

A cynical reading is that those who are invested in a collection are motivated to keep the 'community' active to maintain the value of their NFT. Participating in channels, offering new content and events to keep momentum around a project perpetuates the market for potential buyers. Or it may be that the constant need to produce content and sustain an audience is the latest rendition of the social media content industry (such as YouTube stars) who are under pressure to keep the attention of fans to maintain revenue streams (as described in Healy, 2022). For artists who may be making resale royalties on an NFT collection, sustained interest from a community is a good thing; demand will result in revenue each time an NFT changes hands.

Where cultures and subcultures have always created economic value through the selective choices of an 'in' group, that value has generally flowed to others who are able to recognise and leverage it (venues, marketing companies, fashion labels, etc). With NFT communities, creators are also able to set in motion micro-economies that reward artists and those who directly support, promote, and extend on that cultural artefact. These are an evolution of social network markets whereby invention and innovation occur through "the sociocultural processing of uncertainty through harnessing the distributed knowledge of others" (Potts & Hartley, 2015, p. 4).

2.4 Infrastructures for the Metaverse

Ownership and collecting take on a different dimension in the field of games. NFTs enable true possession of game items that a player has earned. As Kieran Warwick of Illuvium points out, gamers have wanted ownership for decades. In games such as *World of Warcraft*, "you've had people that spent hours and hours grinding in a game and that has created a value … The more missions you do the more you earn. You can sell loot and buy weapon or skin … Where that breaks down is you can't sell it to another player or for real world value". The terms of service of most game companies prohibit players from trading (Kim, 2022). Instead, some gamers who want to acquire an item or character in exchange for money decide to meet other gamers face-to-face, which can be arduous and risky. In web3, exchange is made safe through smart contracts.

The ability to own items is not the same as 'play to earn'. Web3 games like *Axie Infinity* and *STEPN* reached a high level of usage as players realised they could make money by selling NFTs that were acquired through the game play. *Axie Infinity's* daily revenue dropped from around USD$17million in August 2021 to $10,000 almost a year later (Eleje, 2022). Analysts have attributed the collapse to the game's inflationary economics (players were incentivised to breed Axies until the entire market was saturated). While some may have been motivated by play, many others were playing for livelihood, meaning they were not spending inside the game but withdrawing value from it. With web3 games, designers need to understand and manage the economy of the game, which means ensuring enough people are willing to stay, play, and pay.

Illuvium

Kieran Warwick is the co-founder of *Illuvium* (Figure 2.2), an Australian web3 AAA game currently in development. When we spoke to him in July 2022, *Illuvium* had 11,000 players in the beta version (2 million people had signed up for it, but they needed to restrict access). The term AAA describes "blockbuster" games with high production values and advanced gameplay. Warwick points out that web3 games are only 3-4 years old, which is the minimum time that it takes to build a AAA game. As there have been no AAA web3 games to date, it is difficult to

know whether their arrival will put pressure on other games to move to web3 technology and enable real ownership of game assets across the games industry.

He told us, “at the end of the day, people are playing to have fun. Web3 offers things that make that better, including ownership, transferring assets, and potentially earning money. However, all this is ancillary to a core aim of a gamer which is to have fun. AAA games have most fun with the largest players”.

Illuvium has implemented various features to ensure sustainability, including deflationary mechanics such as characters becoming obsolete every six months. The game is structured so that there are two modes of play – one being a city-builder game (like *Minecraft*) and the other about capturing Illuvials (like *Pokemon*). These support each other so that those who build generate fuel that they can use for their cities, or which they can sell to those who need resources in the overworld to capture Illuvials. In 2022, *Illuvium* conducted its first successful land sale, where players could buy plots of land that they may rent or sell.

When asked why many gamers are “against” web3 games, Warwick attributed it to the massive interest in web3 games from venture capitalists, which is directing money away from non-web3 games developers: “We are in a unique situation where 1% of gamers understand web3 and 99% listen to their favourite developer who can’t get funding anymore”. He believes this will only change when players get to experience truly fun games where they also get to own and sell their assets in a marketplace that connects to the external economy.

Figure 2.2: In-game still of Illuvium*. Image courtesy of* Illuvium*.*

Web3 virtual worlds such as *Decentraland* and *Voxels* also sell plots of virtual land that can be built out. The extent to which these virtual worlds allow people to move assets between worlds and games, and for ownership and exchange to occur without high fees, will differentiate them from the commercial Metaverse being built by Meta. In April 2022 Meta announced that 47.5% of NFTs sales in its Metaverse will flow back to the company (Shead, 2022).

Exhibitions within web3 virtual domains are becoming common (Valeonti et al., 2021; Weber, 2022). O'Gorman (aka GhostAgent) described his experience with *Voxels*:

> *Once you've logged in through your web3 wallet there are tools in the game. You can build. You can own a part of the world – the metaverse – by buying an NFT, and that defines the area that you can build in. That's your virtual property; you'll have an address … It's a 3D website. Once you're on that you can build on it and you can import voxel models and build immersive experiences in there…It's got a great community because it was early and a lot of artists liked it because of the tools you can build … And then you can put your artwork in there, build a gallery. There's a community of creators within that* (O'Gorman, interview).

Other examples include the Russian State Hermitage Museum's *The Ethereal Aether*, launched in 2021, an entirely digital exhibition in which 38 NFTs were displayed within a digital construction of the museum called the Celestial Hermitage (Castrovilli, 2021). Later this year, in tandem with their physical installation at Art Basel Paris, and in collaboration with dslcollection and V-Art, Ukraine will launch a VR iteration in the metaverse (Chen, 2022c). If augmented reality reaches widespread adoption, it is possible that NFTs could be encountered in much the same way as physical artworks are in offices, public spaces, and homes. For now, the appreciation and consumption of NFTs is largely via web3 interfaces that connect to wallets and display the contents of a wallet.

2.5 Network Scams, Rug Pulls, and Hoaxes

Crypto is a honeypot for scammers due to the value that is stored in digital wallets. The Australian Competition and Consumer Commission (ACCC) reports that between 1 January and 1 May 2022, Australians lost $113 million to crypto currency scams although the actual amount is estimated to be higher as the data is based on reports made to its scam reporting service, Scamwatch (Australian Competition and Consumer Commission, 2022). Many scams related to NFTs involve the same tactics as used in other online contexts, such as phishing scams (where people are sent emails or text messages that are designed to look like legitimate correspondence from a bank, credit card provider or online shopping service and trick them into clicking a link).

Other than these clear instances of theft, NFT buyers have been vulnerable to what are known as 'rug pulls' and 'exit scams', whereby an individual or team launches a project with promises of future benefits and then fails to deliver on that promise, walking away with the funds received and leaving those who purchased the asset with a worthless token. As discussed in Part 5, consumer protection laws are likely to apply if buyers have been, or are likely to be, misled or deceived. However, it can be difficult to discern an intentional rug pull from a project that simply used its initial raise of investment poorly (like any other failed business). Some projects have even achieved meme status for underwhelming delivery such as the web3 game project *Pixelmon*, which raised over USD$70 million, only to release an NFT of character Kevin that was far inferior to what buyers expected from the project (yyctrader, 2022). Kevin was so bad he became a sought-after NFT.

Scholar Lana Swartz (2022) has theorised the 2017 crypto bubble of initial coin offerings as a 'networked scam'. She draws on Herman Melville's 1857 book *The Confidence Man*, in which all characters in the novel are attempting to scam each other. In a network scam, like in Melville's novel, there is no one scammer, but rather an economy in which everyone is a con artist. Swartz theorises that the ICO bubble was "a collaborative effort to bring about a shared future" but where there was "an uneven belief among participants in that future ever coming to pass" (2022, p. 1696). Capitalism itself is a confidence game, but crypto adds beliefs and hopes for the future into the mix, which blurs the lines between what is legitimate and illegitimate. With NFTs, expectations of future value drive speculation in a similar way to other crypto assets. However, if NFTs are a 'networked scam', then at least some of the players – mostly coders – also consider the art world to be the scam.

Mimicus Etheriensis

A mimic is an NFT that can transform to look like any other NFT that conforms to the ERC721 or ERC1511 standards. A developer who goes by the pseudonym of the Guildmaster Fuzzleblot (GF) created the (open source) codebase for the mimic project. At a technical level NFTs have two main areas of functionality. One is around ownership and transferring the NFT. GF explained in an interview that this part of the NFT "is protected, safe and rock solid". The second part is for displaying data – the NFT's name, what it looks like, how it sounds. Generally, only websites would access that, but in the case of mimics, the mimic contract accesses that itself. When a website asks the mimic what it looks like, it asks another NFT 'what do you look like?' and then relays that back to the website.

GF has also built the codebase so that a mimic token holder can perform what is called a 'rite', the result of which is that only that one mimic can access an NFT's data. For instance, if you were to set your mimic to Beeple's famous *The First 5000 Days* NFT and perform the rite, any other mimic doing the same would revert and not show Beeple's work (we don't recommend doing this. See Part 5).

NFT creators can guard against their NFTs being mimicked through a 'message.sender' function. Using this function, your NFT could check to see whether it's a contract or an end user website that's asking for your information and reject contracts (including mimics) from being able to receive it. GF said that you could also set it so that your NFT sends an alternate payload: "You could send them Rick Astley doing a dance as the NFT and that's what the mimic would end up looking like. Whereas if a website asked for your data, you give them the real data. So there are some tricks you can do". However, he's not aware of anyone implementing such code to date.

When asked why he set out to create mimics, GF replied that it is intended to "separate out the wheat from the chaff" by drawing attention to how NFTs work and potentially drawing focus to parts of the standard that could be improved. In his view, many NFTs are "half-hearted or permutations of a concept". At some point people will realise "that's not that useful and it's not even that fun if they are not actually genuinely interesting pieces of art. And I think my hope is that mimics speed up and accelerate that process of people realising that NFTs can be great but not all NFTs are great. Just grabbing things and flipping them – I don't think it's sustainable in the long term" (Guildmaster Fuzzleblot, interview). He added that mimics have a novelty value of their own by making us think about where NFTs derive their value from. In that respect, mimics are themselves art.

Part 2 Summary

The use of blockchain technology by creative practitioners shows that technologies designed for one purpose can be taken up by another group, producing unexpected outcomes. Creative practitioners have taken tools that first appeared in the context of finance and repurposed them to address gaps and problems in the creative economy. This includes questioning the very notion of what it means to own art (what you are paying for); giving those who 'earn' within games power over their assets; providing ready-made governance tools that help artists to work together; and strengthening the connection between musicians and their fans.

3. Who in the Cultural and Creative Industries is Using Web3?

Indigo Holcombe-James

In this Part we detail which types of creative practitioners are using web3 technologies. Drawing on empirical data, alongside a desktop review of research literature and the popular press, we show that creative practitioners who previously struggled to make money from their art are earning income through web3. Moreover, those who are benefiting from these technologies are often from traditionally marginalised practices and backgrounds.

We identify and distinguish between creative practitioners who use blockchain technologies generally, who use blockchain technologies within their creative practice, proxy users who collaborate with others that engage with the technologies on their behalf, and non-users of blockchain technologies.

However, despite the swell of NFT activity seen over 2021, take-up and use of web3 technologies in Australia remains nascent, and empirical data from our survey highlights the polarised response to these technologies amongst creative practitioners.

3.1 Blockchain Users

Who is using blockchain technologies? To answer this question, we distributed a survey inviting contributions from creative practitioners in Australia who were using blockchain technologies (see Appendix for method, questions, and analysis approach).[4] We received 110 eligible responses (Figure 3.1).

[4] A note on the data: The survey received 110 eligible responses. This is a small sample. It should not be considered representative, and findings should be treated with caution. We report the figures here, however, to recognise the efforts made by respondents in completing the survey, and to provide the basis for future inquiry. We also note that more than 70% (71%, n=78) of responses came from non-users of blockchain technologies (discussed further in Part 4 section 4.4). In addition, once in the field, the survey was shared on social media by several industry figures, including academics, who actively encouraged responses from creative practitioners who were opposed to blockchain technologies.

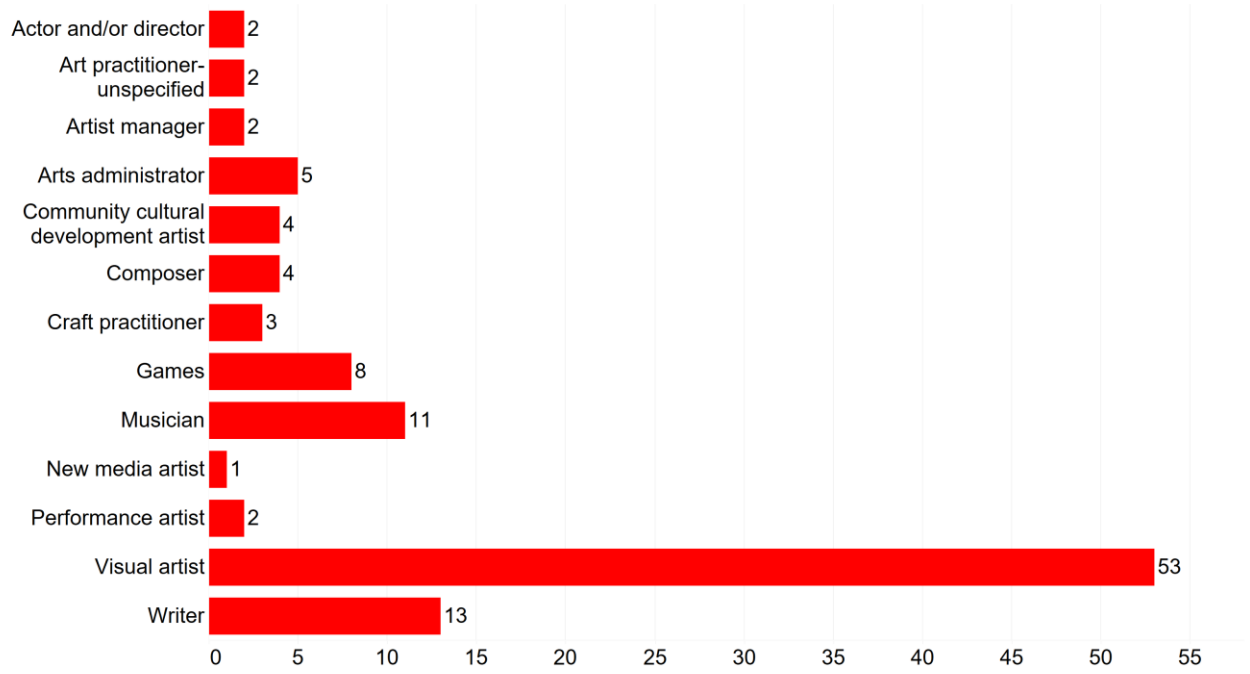

Figure 3.1: All survey participants by art form

Just a quarter (25%, n=28) of the 110 eligible responses are users of blockchain technologies (Figure 3.2). The majority of blockchain users identify as visual artists (46%, n=13), and musicians (14%, n=4). A small number of respondents (4%, n=4) identified as proxy users. They don't use blockchain themselves, but they have previously collaborated with others who have engaged with the technologies on their behalf. As with blockchain users, most proxy users identify as visual artists (50%, n=2).

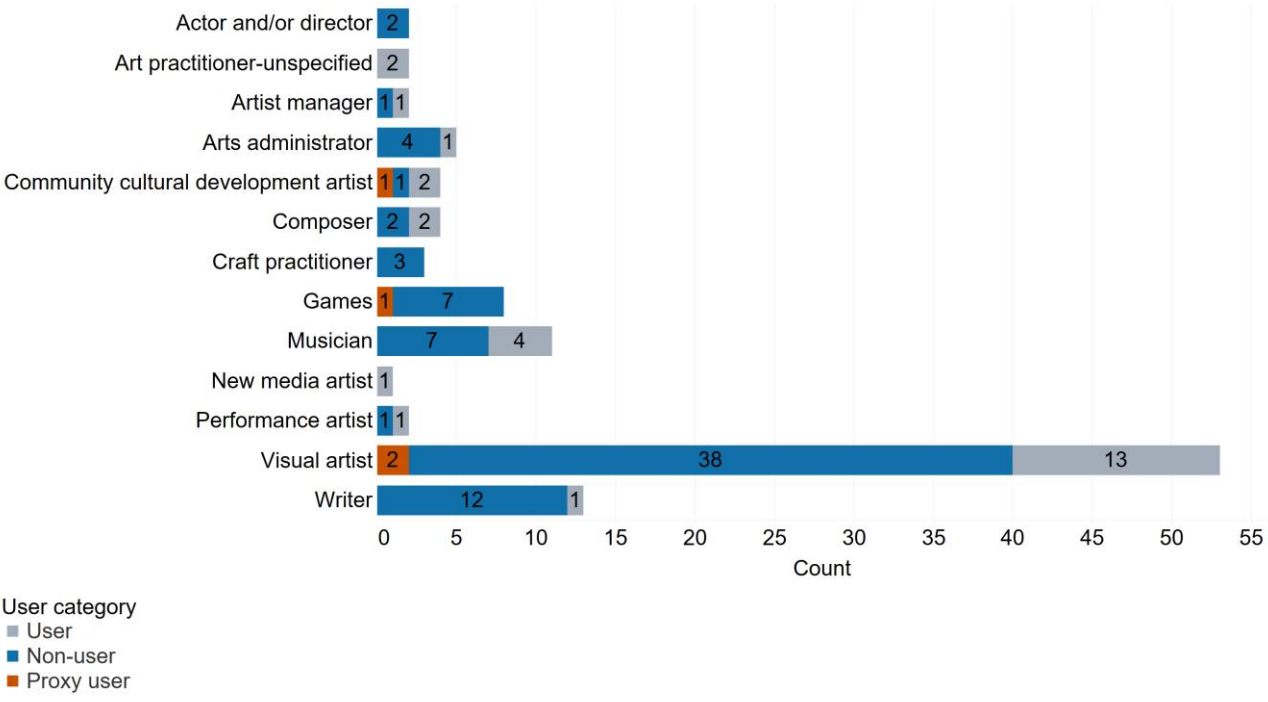

Figure 3.2: All survey participants by blockchain user category

Importantly, not all blockchain users apply these technologies within their creative practice (Figure 3.3). Slightly less than a quarter of the total sample (24%, n=26) use blockchain technologies in their creative practice, with most categorising themselves as visual artists (46%, n=12). Of this cohort, two are proxy users of web3 technologies.

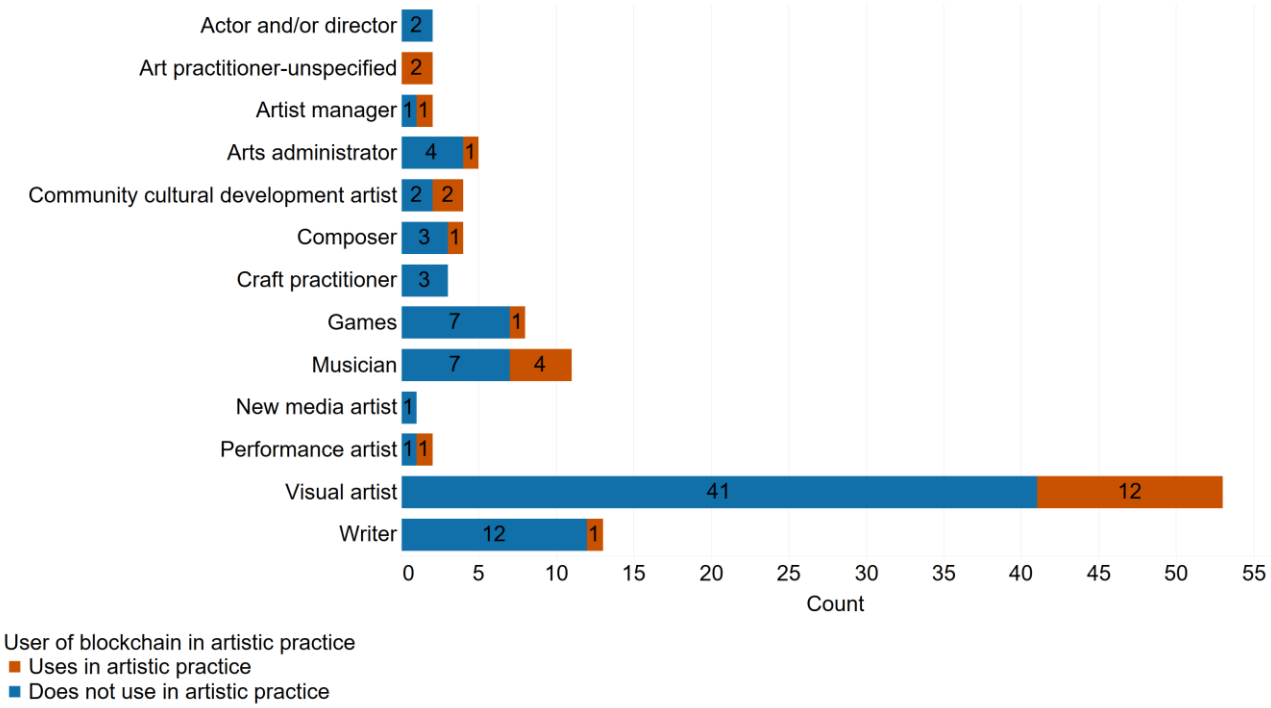

Figure 3.3: Blockchain use within artistic practice by artist category

The majority of those who use blockchain technologies in their creative practice are between 30-39 years of age (n=11, 42%) and 40-49 years of age (27%, n=7) (Figure 3.4).

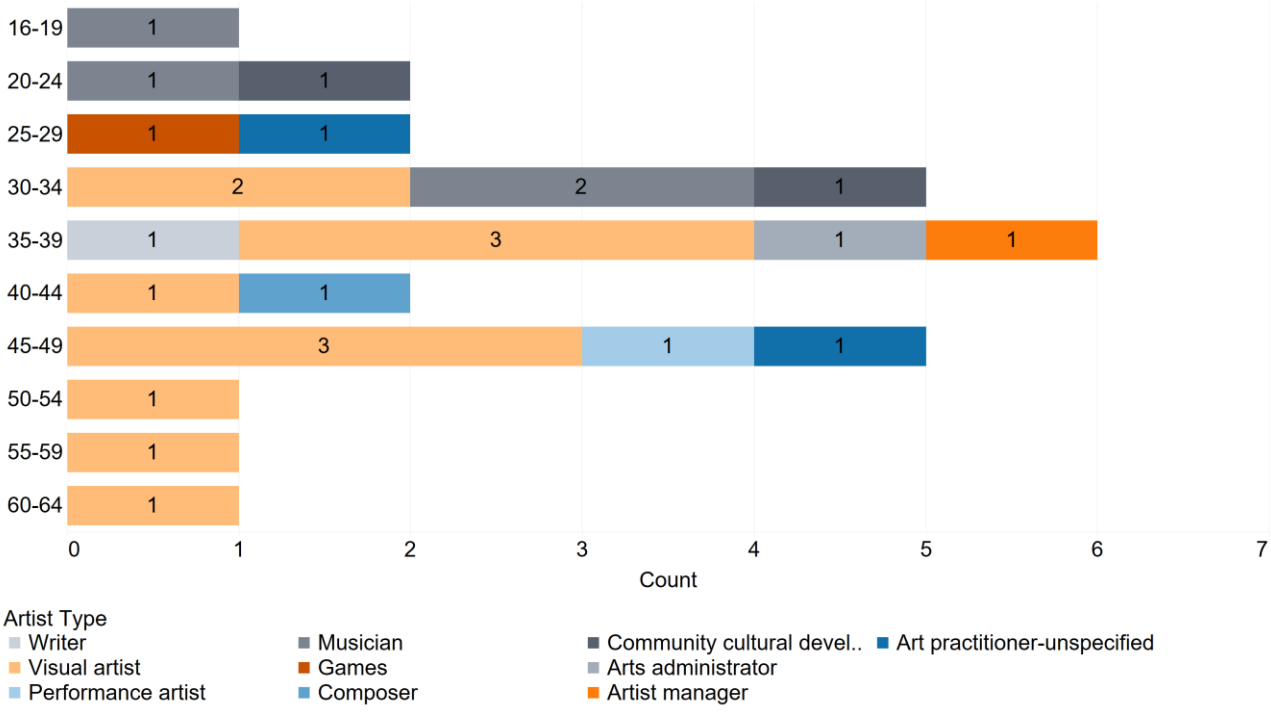

Figure 3.4: Age breakdown of blockchain in creative practice users

Reflecting the widely reported gendered division of web3 use (Gottsegen, 2021; Perrin, 2021; Sharma et al., 2022), more than 60% (62%, n=16) identify as male. 88% (n=23) identify as non-Indigenous, and just under a fifth (19%, n=5) report having a disability, injury or sickness that impacts their life as an artist (Figure 3.5).

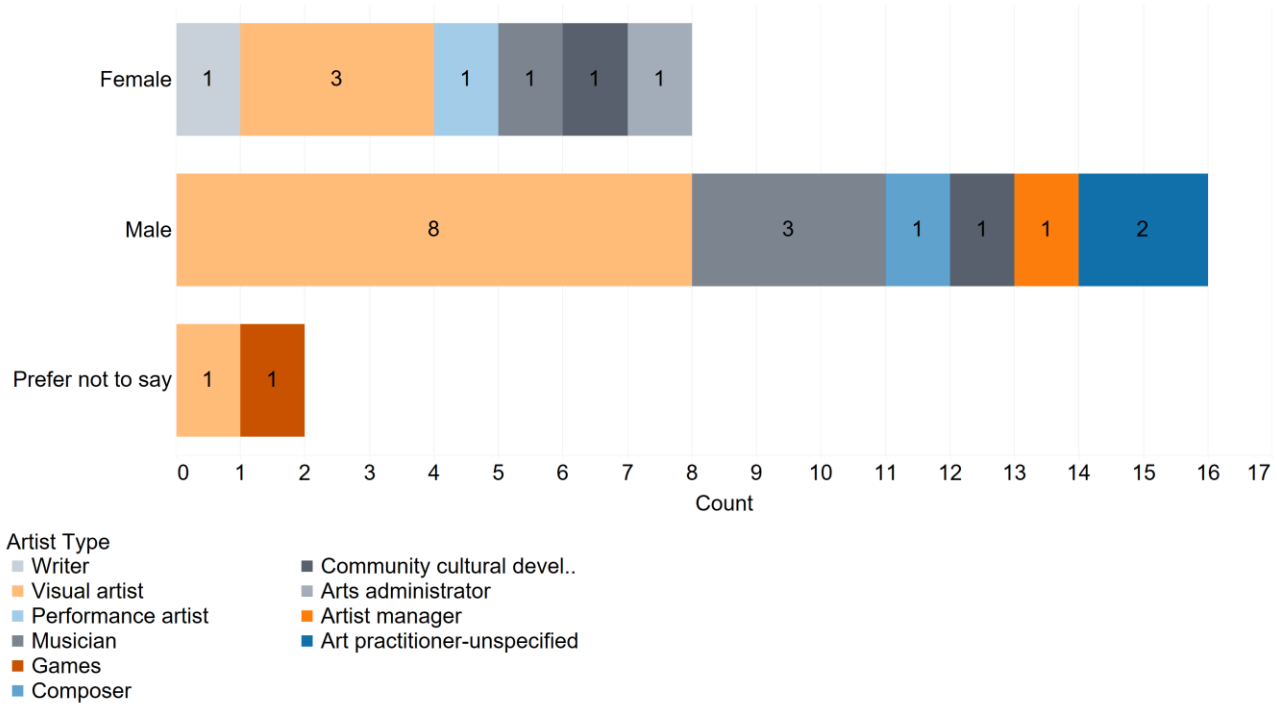

Figure 3.5: Gender breakdown of blockchain in creative practice users

Survey respondents told us they deployed web3 technologies in relation to their creative practice in a variety of ways. The majority (n=24) are engaged with NFT marketplaces (such as OpenSea), and smart contract platforms for audio/visual materials like Audius (n=12). Nine respondents reported creative involvement in blockchain-based/decentralised games, and six are using the technologies to facilitate certification of authenticity for their creations.

Four respondents selected 'other' uses, with specified practices ranging from web3 technologies as "a creative tool, e.g., cryptographics [or] etherscan.io" to create composable NFTs (Visual artist, 50-59 years old, male, capital city), to building "virtual galleries [and] curat[ing] NFT art shows" (Visual artist, 40-49 years old, female, capital city).

When asked why they use blockchain technologies in their creative practice, intellectual property benefits (n=18) and the new ways of artistic creation enabled (n=18) were the most frequently cited reasons. Respondents also cited artistic creation (n=16), engagement with blockchain communities and governance (n=15), and the impact of COVID-19 (e.g., the reduction in previous practice/venues, n=7). Five respondents selected 'other', with specified responses ranging from "curiosity" (Visual artist, 30-39 years of age, male), and "experimentation" (Writer, 30-39 years of age, female), to "new ways to monetise IP and fan-clubs" (Artist manager, 30-39 years of age, male). We return to the financial benefits of web3 technologies for creative practitioners in the following Part.

3.1.1 Proxy users

A small number of survey respondents (4%, n=4) told us that they were proxy users of blockchain technologies, meaning they don't use web3 themselves, but they have previously collaborated with others who have engaged with the technologies on their behalf. A smaller sub-section of this cohort (n=2) has engaged with these technologies via a proxy in relation to their creative practice. These instances of proxy use potentially point towards the barriers to technical proficiencies or

digital skills that onboarding web3 requires (although, as discussed in Part 2 section 2.2, minting NFTs does not require coding know how). These instances of proxy use also point towards the need for educational initiatives to enter this space (see section 3.4.3).

3.2 'Traditional' vs 'Commercial' Practitioners

Much has been made in the popular press of the division in web3 take-up between creative practitioners engaged with 'traditional' art worlds, and those from oft neglected practices like street art or graphic design. Why do we see greater take-up and use of web3 technologies by creative practitioners from practices like street art or graphic design? For journalist Doosie Morris (2021, para. 10), this is at least in part because *"*[t]he ethereal nature of an NFT makes a quick sense to street artists who have long dealt with creating art that could disappear at any moment; where its value lies in the experience and occasionally in the documentation". For these creative practitioners, web3 technologies offer a means for redressing this historic marginalisation. According to Antonio Case, curator of Hobart-based Museum of Art and Philosophy (MAP), Australia's first NFT gallery, this potential to "bridge the gap between traditional and digital artists" (as quoted in Oramas, 2021, para. 2) is what makes web3 technologies important (see also Natalee, 2021).

For creative practitioners like graphic designers, whose work is typically tied to commercial logics and freelance contracts, this is a substantial shift. For journalist Jess Cockerill (2021, para. 12), this shift enables "the promise of economic and creative freedom" (see also Sharma et al., 2022; Volpicelli, 2021). Illustrating this potential, Cockerill (2021, para. 12) quotes Western Sydney-based 3D artist, Serwah Attafuah, who explains:

> I think that releasing more NFTs could be a really good way to move into being an artist as my main thing. I want to get to a place where I can rely less on clients and freelance work, which I feel is suffocating me in a way.

Such stories of economic success and newfound creative freedom were likewise evident in our empirical data. Half (52%, n=13)[5] of those survey respondents who use blockchain in their creative practice report that using web3 technologies has changed their creative practice. When asked to specify how (through an open text field), these responses focussed predominantly on financial benefits:

> *I can make money now.* (Visual artist, 30-39 years old, prefer not to disclose gender)
>
> *I've never had better or more earning potential.* (Visual artist, 40-49 years old, male)
>
> *Increased opportunity to make an income from my digital art.* (Visual artist, 40-49 years old, female)

Irrespective of the amount of income generated, 72% (n=18)[6] of those who use blockchain in their creative practice report that their use of web3 technologies has resulted in revenue. Of those that have not yet generated revenue, 3 (12%) anticipate doing so in the next 12 months.

Similar stories were shared by interview participants.

> *I wouldn't say I'm rich. But I've got more money in the bank than I've ever had in my life, that's for sure.* (anon. interview)
>
> *I'm a new media artist. I particularly focus on virtual and augmented reality. There're limited ways to get financial compensation from those types of art practice. I've been*

[5] One respondent chose not to answer this question, making the total n=25.

[6] One respondent chose not to answer this question, making the total n=25.

> *using blockchain, and specifically NFTs, for the last couple of years to gain creative income.* (Brown, interview)

For at least one survey respondent and one interviewee, their use of blockchain technologies provided them with a "fulltime income" (Visual artist, 50-59 years old, male, capital city), enabling their fulltime dedication to creative endeavours.

> *It's changed my life … there hasn't been a time that I can think of where I really haven't had to have another job, a 'real job' as people call it. … I was working as a commercial artist, that was how you applied your talent … to make a living. So, now people are doing this [using blockchain] instead. There's a lot of people leaving their commercial art jobs to do this.* (anon. interview)

This finding – that web3 offers significant scope for expanding the capacities of practitioners currently bound to commercial logics – is reflected in the academic literature. According to Sharma and colleagues (2022, p. 10), many participants in their study of NFT take-up and use "already had artistic background[s] such as being landscape photographers, film maker[s] and tattoo artists", with web3 technologies enabling creative outputs that were removed from client expectations (Sharma et al., 2022, p. 10; see also Chen, 2022b). Sharma and colleagues (2022, p. 18) also argue that web3 technologies like NFTs "empower many under-resourced artists and creative professionals, such as those who were from developing countries, [and] who were less known".

Although web3 technology's explicit financialisation of creative practice has been criticised, those (often marginalised) creative practitioners benefiting from it have responded strongly. Xu (2022, p. 68), for instance, quotes artist 'Blake' who "is sick of the trope of the 'starving artist' and the idealistic concept of an artist creating purely for the sake of it, devoid of money". As Ian Buswell explained:

> *So, from a distribution standpoint, it's [blockchain] levelling the playing field, it's removing that intermediary that for so long has held creatives back from really sort of, monetising their skills and expertise, really being able to open that up and essentially create a global marketplace for their talent.* (Buswell, interview)

For creative practitioners, web3 technologies offer the possibility of independence from traditional intermediaries (De Filippi et al., 2018; Franceschet et al., 2021; Liddell, 2022; Weber, 2022).

3.3 First Nations Creative Practitioners and NFTs

First Nations creative practitioners are entering the web3 marketplace. A key example is the Mulka NFT project (Buku-Larrŋgay Mulka Centre, n.d.), borne of the Buku-Larrŋgay Mulka Centre, funded by venture capitalist Mark Carnegie (Wilson, 2022), and forming part of the MintNFT fine art collective (MintNFT, n.d.). Produced inhouse and onsite at the Mulka Centre, the Mulka NFT project features works by the late Mr W. Wanambi and Ishmael Marika. Mr W. Wanambi's NFTs are based on detailed scans of his bark paintings that have been used to generate a series of 81 NFTs that effectively operate "like high-tech jigsaw pieces" (Wilson, 2022, para. 3). Ishmael Marika's NFTs are derived from "hand-drawn generative animations based on sacred saltwater songlines" (Wilson, 2022, para. 3; Buku-Larrŋgay Mulka Centre, n.d.). According to the Productivity Commission's (2022) draft report on Aboriginal and Torres Strait Islander Visual Arts and Crafts, as of March 2022, sales of Mulka NFTs totalled slightly less than AUD$9000.

The Mulka NFT project seeks to generate sufficient revenue to acquire the (material) artworks the NFTs are based on. In this way, the project responds to the dynamics of the First Nations art market: due to high purchase prices, artworks are typically acquired by collectors and institutions outside the community of origin (Buku-Larrŋgay Mulka Centre, n.d.; Houlbrook-Walk, 2022). The intention, then, is for the Mulka NFT project to provide a pilot "which can be applied to other contemporary artists so their work can be accessioned back into the community for many generations to enjoy" (Buku-Larrŋgay Mulka Centre, n.d., para. 8). For art historian Jessyca Hutchens (n.d., para. 6), this initiative intervenes "… across the entangled worlds of digital

artworks, art markets, collecting practices, archives and museums to ensure long-term local access".

First Nations creative practitioners are also partnering with emerging web3 platforms. A key example of this is Reko Rennie's collaboration with Culture Vault (discussed further in Part 4). Rennie's first NFT series, TOTEMIC, comprises 36 items based on animated sculptures that explore Indigenous identity and ancestry (OpenSea, n.d.c; Art Almanac, 2022). As we discuss in Part 5, those creative practitioners not willing or able to work directly with web3 technologies themselves increasingly appear to be partnering with intermediaries like Culture Vault who provide technical expertise and access for both artists and audiences (Francis, 2022; Middleton, 2022). As stated by Rennie, "Working with Culture Vault is a great opportunity to explore the endless possibilities within the digital world of the arts" (in Art Almanac, 2022, para. 12).

The automating of resale royalties enabled by NFTs (discussed further in Part 5) also pose significant potential benefit for First Nations creative practitioners. The total value for First Nations artwork sold in the secondary market is considerable. In 2019, this was AUD$6.4 million, increasing to AUD$11.6 million in 2021 (Australian Government Productivity Commission, 2022). Since its introduction in 2010, the Australian Government's Resale Royalty scheme has paid AUD$3 million to First Nations artists (Australian Government Productivity Commission, 2022). In 2019, the Copyright Agency undertook a pilot project exploring use of blockchain technology for administering resale royalties for Indigenous artworks. The trial found that for the technology to work, galleries need to be adept and diligent with metadata (Rennie, 2020).

The Productivity Commission (2022) highlights the risks posed to First Nations creative practitioners regarding the potential exacerbation of plagiarism cases in NFT markets. Given, however, that estimates indicate between 69% and 76% of products currently in the market purporting to be the work of First Nations creative practitioners are inauthentic (Australian Government Productivity Commission, 2022; see also Indigenous Art Code, n.d.), these risks are already prevalent. The provenance capabilities afforded by web3 technologies discussed throughout this report arguably offer a means for mitigating some of these risks (see Part 4 section 4.2).

Vanessa Lee-AhMat is a Yupungathiand Meriam woman who is collaborating with Tim Lea on Walking Between Worlds, a web3 project that is guided by and embeds Indigenous cultural knowledge and protocols (funnelweb3, 2021). Lee-Ahmat is also collaborating with Bibi Barba of the Darumbal – Biri Gubi – Gadigal – Yuin Nations on a pilot project that sets out to establish a First Nations cultural embassy in the metaverse that will be operationalised with and through First Nations ownership and governance (Barba et al., 2022).

3.4 Who Is *Not* Using Blockchain Technologies, and Why?

In this section, we distinguish between *resistance* and *barriers* to use. Resistance to take-up and use is aligned closely with ethical, moral, and environmental concerns. Barriers are related to more general barriers to digital transformation seen within the context of cultural institutions, derived from limited resourcing and expertise.

Who is not using blockchain technologies? To answer this question, our survey also invited contributions from creative practitioners in Australia who were not using blockchain technologies (see Appendix for details)[7] (Figure 3.6). Non-users of blockchain were by far the largest cohort of

[7] As noted above, this survey draws on 110 eligible responses. This is a small sample and should not be considered representative and findings should be treated with caution. Further, as previously explained, we note that once in the field, the survey was shared on social media by several industry figures, including academics, who actively encouraged responses from creative practitioners who were opposed to blockchain technologies, with this possibly providing some insight into the skewed sample.

respondents, comprising 71% (n=78) of the dataset. Reflecting the sample more broadly, the majority identify as visual artists (49%, n=38) and writers (n=12, 15%).

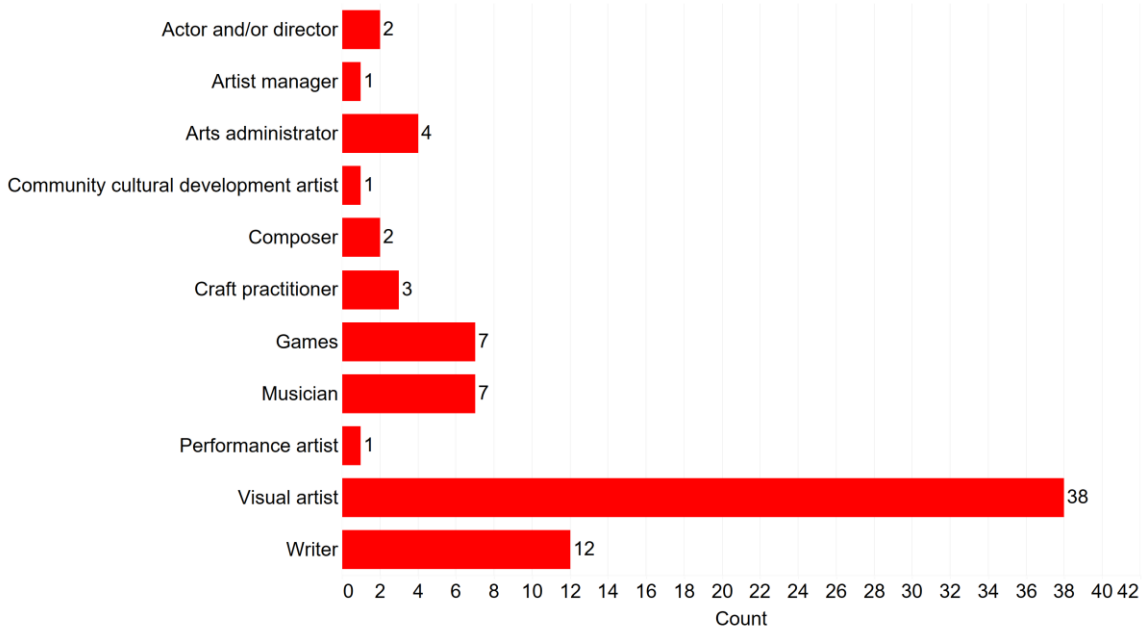

Figure 3.6: Non-blockchain users by artist type

Non-users are comparatively younger than users, with 36% (n=28) between 30-39 years of age and 26% (n=20) between 20-29 years of age. Non-users of blockchain technologies are also more diverse than users: 58% (n=45) identify as female, and 6% (n=5) identify as non-binary; 4% (n=3) identify as Aboriginal; and 29% (n=23) report having a disability, injury, or sickness that impacts their life as an artist (Figure 3.7).

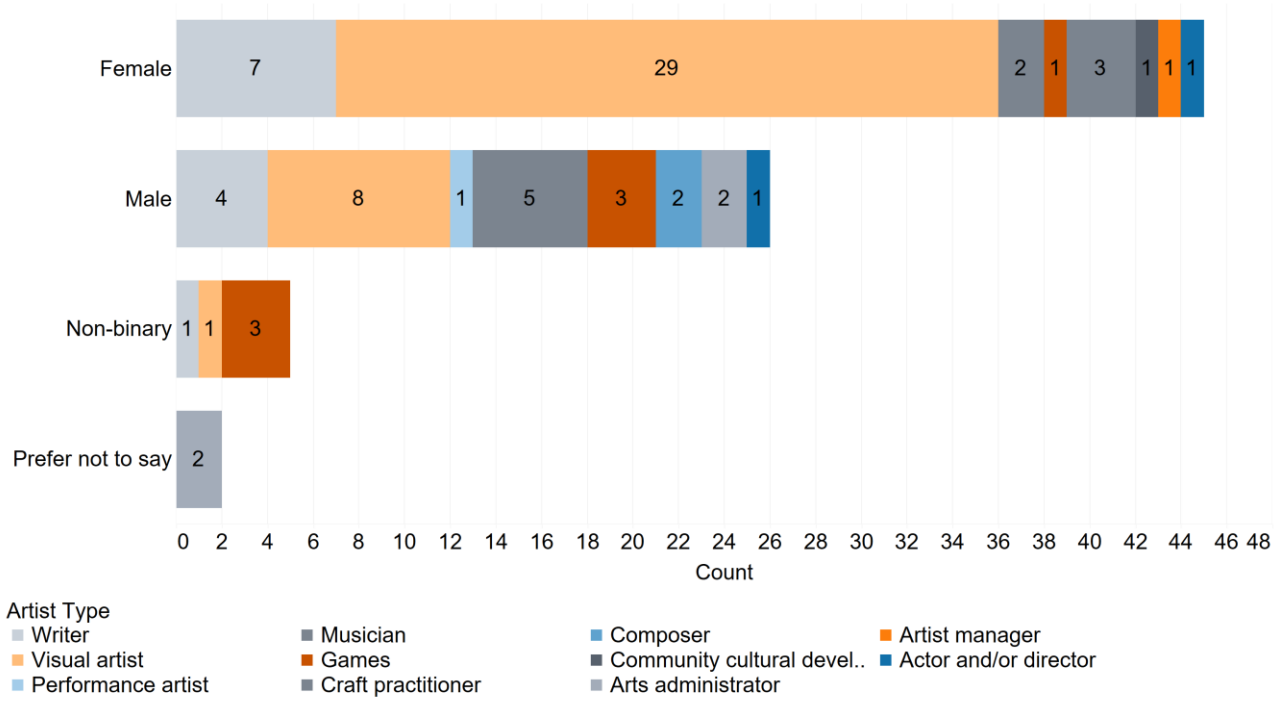

Figure 3.7: Gender breakdown of non-blockchain users

When asked how likely they were to use blockchain technologies in the future, more than half of non-users (51%, n=40) said they “definitely won’t”, and 21% (n=16) “probably won’t”. Interestingly, more than a fifth (22%, n=17) are “unsure” as to whether they will use the technologies in future.

When asked how important they thought blockchain technologies would be for the creative industries in ten years’ time, more than half of non-users (51%, n=40) think they will be “not important”, and just under a fifth (19%, n=15) think they will be just “slightly important”. More than a quarter (26%, n=20) think blockchain technologies will be “moderately important” for the creative industries, despite their disinterest and disengagement.

Finally, when asked whether other creative practitioners within their networks are using blockchain technologies, 79% (n=62) said “no”, perhaps providing further evidence of the currently polarised discourse around these technologies.

3.4.1 Resistance

Resistance to web3 technologies by creative practitioners and cultural institutions typically falls along ethical, moral, and environmental lines, with environmental concerns particularly levelled at the Ethereum blockchain (Valeonti et al., 2021).

Our survey asked non-users to share the primary reason they are not using blockchain technologies in their creative practice. We provided the following options:

- Ethical stance based on environmental impact
- Don’t know how to
- Ideological stance based on economic model
- Can’t see the business case, don’t know why I would want to
- It’s not relevant to my artistic practice
- Can’t afford it
- Other, please specify

The majority (32%, n=25) chose “other”, with 10 of these responses reporting that “all of the above” or a combination of the provided reasons were why they weren’t using the technologies. Some respondents also provided the following comments:

> *Both an ethical stance based on the environmental impact and a fundamental disagreement it's trying to solve any legitimate "problem" that exist[s] for digital or physical art.* (Visual artist, male, 30-39 years old)

> *Multiple options from above: it’s entirely unethical for both economic and environmental reasons, and provides *literally* no actual value to anyone involved.* (Games, male, 30-39 years old)

Survey responses from non-users of blockchain technologies were especially strident in their disavowal of the technologies. When asked what would encourage their use of blockchain apps and platforms in the future, non-users reiterated that this would be unlikely under any circumstance:

> *Absolutely nothing because they are, fundamentally, a scam that has no value whatsoever for artists, and also will never be environmentally sustainable.* (Games, male, 30-39 years old)

> *Blockchain is inherently evil and based on junk libertarian ideology. It has no place in art and I will not only never use anything connected to it but will do everything in my power to discourage its use and discredit those who promote it.* (Composer, male, 30-39 years old)

> *I am morally against the concept of NFT in general and especially when using art as their excuse.* (Visual artist, female, 40-49 years old)

> *Literally nothing. They are a scam, for morally bankrupt cretins to prey on the ill-informed.* (Games, male, 30-39 years old)

We address the environmental considerations of web3 technology take-up and use in the creative and cultural industries in Part 1 section 1.5.

3.4.2 Barriers

The barriers to digital transformation confronting the arts – at the level of both creative practitioners and cultural institutions – are well documented, and increasingly so in the wake of the COVID-19 pandemic (e.g., Goodman, 2022; Holcombe-James, 2022; Massi et al., 2020). As Valeonti and colleagues (2021, p. 8) note:

> …cultural heritage institutions are not usually amongst the earliest adopters of bleeding-edge technologies (which can be attributed to the fact that museums traditionally have limited budgets to experiment with new technologies and only few and well-resourced museums have the privilege of in-house technology teams).

These barriers extend into and influence the take-up and use of web3 technologies. In our research, creative practitioners often spoke about the challenges of learning how to access and use web3 technologies:

> *[to purchase an NFT,] I had to sign up for OpenSea. I needed a wallet, like a crypto wallet. I had Coinbase, and I needed to work out how to get it from Coinbase into my wallet, my MetaMask wallet. I had to learn whether this was all a Russian scam. And everything looks 'not legit', it doesn't look like CommSec, or the Commonwealth Bank app, it looks like… It's got a fucking cat on the wallet. Everything is just like, cute, and weird, and multicoloured, and run by, like, 22-year-old men, predominantly*. (Ian Rogers, interview)

For some practitioners, the process of using web3 as part of their creative practice – e.g., minting an NFT – was not the problem. Rather it was getting into web3 at all that was the challenge:

> *So, what you're talking about is like the NFT part which is just a superficial label, right, of just visuals or a piece of music or whatever, and just making it available. That part is relatively simple for someone to do. But when it comes to all the other stuff like token types, transactions, contracts, wallets, I mean there is so much to learn.* (anon., interview)

For others, these barriers have to date proved insurmountable:

> *I don't even know what to ask for. What is the – I don't know the right phrases? I'm really coming in as a baby … into this area.* (Lynelle Flinders, interview)

According to some, these technical barriers – which we might consider through the lens of digital exclusion or inequality – explain why some 'traditional' artists and creative practitioners are not engaging with web3 technologies. For Michelle Grey, founder of Culture Vault (discussed further in Part 4), web3 "can be a very daunting space" for traditional artists (as quoted in Miller, 2022, para. 12; see also Coslovich, 2022). And, according to Morris (2021, para. 5), "… a number of prominent contemporary fine artists" they had spoken to "admitted to having to put 'learn about NFTs' on their to-do lists". For Grey and others, this gap – between established artists and new technological frontiers – has made space for the 'new' intermediaries that we discuss in Part 4.

For institutions (whose take-up and use of web3 technologies we discuss in Part 4), as Sen (2021, para. 3) notes, adoption of digital technologies and practices by existing intermediaries have "been largely limited to creating digital archives of collections", due in part to sustained focus on physical experiences. While these practices have expanded due to the COVID-19 pandemic and restrictions on physical audiences, the technical proficiencies required for web3 engagement

remain distant for many (Holcombe-James, 2022; Mittendorf & Smith, 2021). Legal considerations are also troublesome and are discussed in Part 5.

The alignment of web3 take-up by the predominantly non-traditional creative practitioners just discussed appears to extend into the practices of intermediaries: "throughout the excitement, Australian artists, collectors and galleries – especially those connected to street and urban contemporary art – have been making their plays" (Morris, 2021, para. 4). Traditional intermediaries, in contrast, have "remain[e]d conservative" (Morris, 2021, para. 4; see also Mittendorf & Smith, 2021). This conservatism is linked by Morris (2021, para. 4) to environmental concerns, failure to grasp the underlying concept of web3, and wariness about "involvement in what they see as a new epoch for art". It is to these dynamics that we turn to in Part 5.

3.4.3 Education

Responding to the barriers just described, intermediaries (discussed further in Part 4) are taking on educational roles, delivering web3-related public programming like lectures and workshops. These initiatives range in orientation, from a consideration of what web3 technologies mean for museums and galleries and how they might engage with them, to how audiences might understand them (e.g., Design Institute of Australia, 2022; Hirshhorn Museum and Sculpture Garden, 2021; Institute of Contemporary Art, Los Angeles, 2021; Los Angeles County Museum of Art, n.d.). These educational practices are intended to 'onboard' both creative practitioners and audiences into web3. According to Seattle NFT Museum founder Peter Hamilton, the educational component is critical:

> I can't emphasise enough how important the educational part of this museum is … we're trying to onboard folks and help them see what the value of NFTs are … pull[ing] back the curtain a little bit on what blockchain is and what its utility is. (in Reuters, 2022, para. 10)

Closer to home, Melbourne-based Oshi Gallery also describes education as key to their role, with the gallery's mission positioned as: "engag[ing] the public, artists and collectors in emerging cultural technologies, immersive experiences and the ever-changing space that is blockchain" (Oshi Gallery, n.d., para. 1). This engagement takes multiple forms, from workshops to talks and information.

These educational roles are also being taken on by exhibitions like *Satellite*, held at Twenty Twenty Six Gallery (discussed further in Part 4 section 4.1). In this example, the exhibition incorporated "a series of panel talks and networking events that invite attendees to think about the future of digital ownership, provenance and the latest trends around NFTs" (Natalee, 2021, para. 7). Going further, the exhibition website includes calls specifically to those who are new to blockchain: "New to NFTs? Please see for our simple step-by-step guide on how to prepare for Satellite and what you need to do to get set up to purchase NFTs" (Twenty Twenty Six Gallery, n.d., para. 3).

Such educational programs were highlighted by interview participants as facilitating their entry into web3:

> *If you actually look at an NFT website, like a project, there's kind of clear instructions on how to do it. … you can go to just about any NFT project now, and in the FAQ section, it'll just say, "If you've never bought an NFT before, here's what to do." And it'll say, get an account, go to Coinbase or Binance or something, get the currency, get a MetaMask wallet or a Rainbow wallet or whatever, put the currency in the wallet, press this button on the website. And in mine it was go to OpenSea and buy it on OpenSea.* (Rogers, interview)

While these educational and engagement practices provide valuable instances of peer learning, they also raise questions regarding who has the authority and expertise to provide sensitive financial, privacy, and security advice.

Part 3 Summary

Australian creative practitioners are using web3 technologies and they are using them to make money. Those with traditionally marginalised practices like street artists and commercial practitioners have been early adopters, finding prestige and buyers through web3. Traditional artists are increasingly getting involved, navigating the fraught field of crypto art investors and speculators.

Despite these uses, attitudes towards web3 technologies remain polarised among creative practitioners. Where some see blockchain technologies as a means for correcting the inequities and exclusions of the contemporary cultural economy, others see these same technologies as degrading cultural value and wasting limited resources. For others, access to web3 requires negotiating barriers of digital inequality. In response, a range of new and old cultural intermediaries are taking up educational practices, raising urgent questions about who holds expertise and authority within this new creative economy.

4. Where Are Web3 Technologies Being Used?

Indigo Holcombe-James

In this Part we look at the take-up and usage of web3 technologies by intermediaries within the creative industries, from public institutions to commercial, traditional, and new spaces. We draw on empirical data, research literature, and investigations from the popular press.

Much discussion around web3 has focussed on the potential for income generation for creative practitioners and intermediaries (e.g., Ciecko, 2021; Liddell, 2022; Valeonti et al., 2021; Whitaker, 2019). This is unsurprising: such discussions come at a critical time, with intermediaries like public cultural institutions in especially dire financial straits following years of governmental neglect compounded by the COVID-19 pandemic's restrictions (Cuseum, 2021; Hardaker, 2022; Kinsella, 2021; Valeonti et al., 2021). While important, the financialisation of existing works is not the most interesting possibility posed by web3 technologies in this context. We see significant potential innovations in provenance, both in terms of tracing and documentation. We give examples of how web3 technology is being integrated with and extending the practices of international and local intermediaries in ways that support such innovation. Importantly, these practices are not new, but rather a translation (and, in some instances, perhaps an extension) of existing practices to a different mode or medium.

4.1 Intermediaries Using Web3 Technologies

While 'traditional' intermediaries – such as museums and galleries – around the world have taken up a range of web3 use cases, from the British Museum to the Russian State Hermitage and the Italian Uffizi Gallery, these practices have to date been relatively constrained in the Australian context.

Recent popular press coverage (e.g., Coslovich, 2022; Xu, 2022) indicates the National Gallery of Victoria (NGV) is Australia's only public cultural institution to have acquired NFT works. To date, the NGV has collected three of Refik Anadol's *Quantum Memories: Noise* series, and two of Damien Hirst's *The Currency* NFTs, "so that it can keep an example of both the NFT and the physical painting" (Coslovich, 2022, para. 38).[8] According to NGV assistant director, curatorial and audience engagement Donna McColm, the gallery plans "to display the physical painting alongside the digital artwork" (in Coslovich, 2022, para. 39). These items have been collected under the institution's responsive collecting policy (Coslovich, 2022), with "works created in response to very current global issues and artistic movements" (McColm in Xu, 2022, p. 66) a priority in the gallery's collection of contemporary art.

The NGV's contemporaries have so far been "reluctant to participate" (Xu, 2022, p. 64). Indeed, according to journalist Gabriella Coslovich (2022), the National Gallery of Australia "has yet to form a position [on NFTs]" (para. 34); the Art Gallery of New South Wales is considering NFT acquisitions in relation to "artistic merit, longevity, sustainability and conservation" (para. 35) concerns, and have yet to take the plunge; and the Australian Centre for the Moving Image, although interested in creative practitioners "exploring NFTs as a sales mechanism" (para. 36) do not currently plan to acquire any. Reporting by journalist Ashleigh Wilson (2022, para. 28) reveals a similar stance taken by new director of Sydney's Museum of Contemporary Art Suzanne Cotter: "I would err on the side of caution".

There appears to be greater interest in the museum sector. Key examples include the South Australian Museum's partnership with Queensland-based Civic Ledger to propose a blockchain-enabled solution for collections digitising as part of the 2019 South Australian Blockchain

[8] In this work, Hirst created 10,000 physical dots and an NFT to go with each. Buyers were given one year to decide if they would keep either the physical dot or the NFT, but they could not choose both. The experiment concluded in July 2022, with 5,149 physicals and 4,851 NFTs (Hirst retained ownership of 1,000 and opted to make them all NFTs).

Innovation Challenge (von Einem, 2019), although this was ultimately unsuccessful. More recently, in early 2022, the National Museum of Australia advertised a new role: "Head, Digital Innovation and Blockchain Project" (National Museum of Australia, n.d.). Located within the museum's Public Engagement Division, the role is intended to develop "the strategic framework for the adoption of blockchain technologies", with this adoption framed around "greater collection access for museum audiences" and developing "authenticated digitised tokens related to the Museum's National Historical Collection" using NFTs (National Museum of Australia, n.d., para. 2).

Greater take-up is evident by commercial intermediaries. At Melbourne's Neon Parc, for example, Kieren Seymour's solo exhibition *Autism, Bitcoin, and the Four Seasons* included sale of NFTs of each exhibited piece (Mills, 2021), as did Dave Court's solo exhibition *HOUSE PARTY* at Adelaide's Praxis Art Space (Cockerill, 2021). Melbourne-based Futures Gallery's presented artworks with corresponding NFTs for the Melbourne Art Fair in February 2022. Group exhibition *Satellite*, held at Sydney gallery Twenty Twenty Six displayed 50 HD screens showcasing NFTs by artists such as Serwah Attafuah, Jonathan Zawada, Greg Cooper, and Wes Cockx (Natalee, 2021; Sier, 2022).

Web3 technologies have also facilitated the development of new intermediaries, from New York's Superchief Gallery, and Seattle's NFT Museum, to Melbourne's Oshi Gallery (discussed further in Part 5 section 5.3). In addition, numerous third-party services are seeking to facilitate distribution and acquisition of web3 art by working directly with creative practitioners and audiences. In contrast to platforms that are open to all to mint and sell NFTs (e.g., Opeansea), intermediaries like Culture Vault "have emerged as a more fine-art view of the NFT" (Xu, 2022, p. 64; Liddell, 2022), providing creative practitioners and audiences with a more curated offering. Going further, Culture Vault (and similar intermediaries, e.g., MintNFT) aim to provide an 'onboarding' service for 'traditional' creative practitioners, responding to the barriers to take-up detailed in section 4.4.2. As co-founder Michelle Grey notes, while some established artists have independently taken up web3 technologies, there remains a cohort that:

> … are NFT-curious but don't really understand the blockchain or any of the concepts … there's nobody there to give you advice on the floor price, the rarity, the scarcity, basically the creative or business strategy associated with creating [NFT] entities. (in Miller, 2022, para. 11)

These 'onboarding' initiatives are also oriented towards audiences, with Culture Vault providing a service through which "first-time NFT buyers and seasoned digital art-collectors can purchase premium NFTs" (Culture Vault, n.d., para. 1). In these ways, such third-party services are perhaps more closely aligned with the role played by art dealers in the traditional market. Web3 thus arguably does not "do away with intermediaries altogether", but rather generates "alternative[s]" (Liddell, 2022, p. 51). A precursor to Culture Vault is Sydney-based DROPLT, which launched in August 2021 and only features work by artists who have gallery representation or a gallery track record (DropIt, n.d.). More recently, Sugar Glider Digital, spearheaded by a public art consultant and curator Emilya Colliver, is focused on commissioning NFTs and bringing them into physical public spaces.

4.2 Web3 Innovations in Provenance

Web3 technologies offer a significant innovation for tracing and documenting provenance. Ascertaining the "authenticity, ownership, and provenance" (Sharma et al., 2022, p. 9; Liddell, 2022; Sen, 2021) of creative works and cultural heritage has long been troublesome. The metadata encoded within NFTs provides a workable response to these challenges, enabling the checking of precisely which wallet holds the NFT "because that information is public on-chain data" (Sharma et al., 2022, p. 9; Nadini et al., 2021), affording insight into "how [NFTs'] value changes as they move" (Liddell, 2022, p. 171) from the creative practitioner's wallet, to a collector's wallet, and perhaps, if eventually acquired, to that of an intermediary like a museum or a gallery. Verisart, for instance, enables users to "apply blockchain to a physical artwork" providing "a museum quality record of ownership for that piece" (Liddell, 2022, p. 224). Another example is the ARCHANGEL

project (Bui et al., 2019, 2020; Green, 2018; University of Surrey, 2019), which, in collaboration with The National Archives, the University of Surrey, and The Open Data Institute, uses a permissioned blockchain to secure the digital archive's documentation.

Such innovation in provenance has the potential to benefit all parties. This is because "[c]rypto art mirrors the value attribution system of the traditional art market, including the social capital afforded by the ownership of a particular artwork" (Nieto-McAvoy & Kidd, forthcoming, 2022, p. n.p.). For creative practitioners, ready access to information about who currently and who has previously owned their work would inform outcomes ranging from marketing (e.g., insight into sales prices would assist creative practitioners to more accurately price future work) to grant applications and documentation of practice. Creative practitioners would benefit from the rectifying of information asymmetries, where institutions typically have greater insights (Samudra, 2022). As one interview participant, a creative practitioner in their 50s, told us:

> *The beauty of the blockchain is obviously that you can see who's buying your work and go have a look in their wallet. Everything's public. You can go and see if you can figure out who they are if they don't have complete anonymity.* (anon., interview)

Intermediaries like museums and galleries would benefit from insight into who created, who has previously owned, and how many copies are available of a specific creative work (Nadini et al., 2021). Take-up and use of web3 technologies in this way would also, theoretically, enable the interoperability of multi-institutional collections records (Franceschet et al., 2021). Collectors would also benefit for similar reasons. In addition, collectors may benefit through the visible accrual of cultural capital enabled by being able to detail precisely when they became an official supporter of a particular practitioner. As Ian Buswell explained in an interview for this research:

> *And again, using code, using the transparency and all of the provenance, that if you do buy something and you do invest, you do have it and you have proof of that.*

Oshi Gallery and Provenance

Oshi Gallery is based in Melbourne. Founded by GT Sewell and partner Jane, Oshi Gallery aims to fill a gap in the scene. As Jane explained in an interview conducted for this research, "until we started this in 2020, there has been no bricks and mortar home for artists or institutions that showcase this work. So that's what we've really decided to do".

The innovation in provenance tracing and documentation facilitated by web3 technologies are a game changer for Jane. As she explained, as a gallerist, she:

> *get[s] calls and emails from people wanting certificates of authenticity years after they purchased an artwork, or, "hey, my house has been burnt down and I need to know how much I paid for this artwork from you, six years ago. It was by this artist, and it kind of looked like this". [When I get those calls I'm thinking] Okay! Now I've got to go back through every paperwork and try and figure out who those people are, what they bought, how much it was, and what's its current value.*

With web3 innovations in provenance, the story can start from the beginning. As Jane told us, provenance could "start with the artist's show with us … it all ties back to that actual information … that is from the ground up provenance".

4.3 Web3 Technologies and Intermediary Practices

The innovations in provenance just described are underpinned by the integration of web3 technologies with the existing practices of intermediaries, from digitising collections (and the utilities that extend from this) to collecting and commissioning. In this section, we briefly discuss these practices, and highlight some critical considerations for each.

4.3.1 Ownership and Income

For those with physical collections, web3 technology use has predominantly oriented around documentation and digitisation, which in turn opens a range of utilities including possibilities around *ownership* of collection items and the generation of revenue. Through minting NFTs of collection items, cultural institutions open the potential for monetising them without having to sell the items themselves (Charr, 2021; Cuseum, 2021.; Kinsella, 2021; Valeonti et al., 2021; Whiddington, 2021). High profile instances of such practices include the Italian Uffizi Gallery (see Artnet News, 2021; Valeonti et al., 2021), the British Museum (see Chayka, 2022; Valeonti, 2022), the National Art Museum of Ukraine (see Cuseum, 2021.; UKRINFORM, 2022), and the State Hermitage Museum of Russia (see Charr, 2021; Valeonti et al., 2021). Manchester's Whitworth Gallery have also explored producing and selling NFTs of existing collection items (Harris, 2021; Sen, 2021; Valeonti et al., 2021). In this instance, according to gallery director Alistair Hudson, raised funds are intended to "redistribute the wealth of [the gallery's] collections in the most democratic way" possible (in Harris, 2021, para. 4).

Surrounding these practices are questions regarding their relationship with the OpenGLAM movement, which argues for open access to and reuse of cultural heritage (e.g., Sanderhoff, 2013, 2014; Tanner, 2016). For Valeonti and colleagues (2021), it is unclear how monetising collections through web3 technologies could not undermine such an approach. Liddell (2021), in contrast, argues that such practices might actually support the OpenGLAM movement, "through blockchain's potential to reconceptualize the notion of ownership over digital museum collections" (p. 231). In any case, for those institutions with publicly accessible collection images, the decision of whether to NFT or not may be taken out of their hands. In 2021, the Global Art Museum (GAM) began minting NFTs from open access collections like the Rjksmuseum's on OpenSea (Ciecko, 2021; Valeonti, 2022; Whiddington, 2021). Although undertaking the project without permission, GAM claimed 10% of proceeds would be returned to the respective institutions (Valeonti et al., 2021). While, technically speaking, GAM was within their rights to use the open access images, when it was revealed the project did not have institutional endorsement, there was significant blowback, eventually resulting in GAM removing the collection, and re-framing the project as a "social experiment" (Valeonti et al., 2021, p. 10). We return to legal considerations around creative works and web3 technologies in Part 6.

4.3.2 Mobility and Collaboration, Restitution and Repatriation

Using web3 technologies to digitise collection items also opens possibilities for *mobility* and *collaboration* without having to undertake the considerable expense and risk associated with physical transportation. The Uffizi Gallery, for instance, has exhibited Leonardo da Vinci's *Portrait of a Musician*, Caravaggio's *Bowl of Fruit*, and Raphael's *Madonna of the Gold Finch*, with NFTs of each sold in varying degrees of scarcity (Beyermarch, 2022). It is worth noting, however, that the Italian government announced in July 2022 that it is halting the creation of NFTs based on Italian masterworks (Escalante-De Mattei 2022).

As Nieto-McAvoy and Kidd (forthcoming, 2022) note, these opportunities for mobility and collaboration raise interesting questions about restitution, repatriation, and who benefits financially from 'ownership' of culturally significant items. Chidi Nwaubani's Looty project, for instance, deploys web3 technologies in an act of what has been described as "digital repatriation" (Looty NFT, n.d., para. 1), "virtual restitution" (Abrams, 2022, para. 1), or "a digital art heist" (Chen, 2022a, para. 3). Effectively, the project digitally renders significant items – such as the Benin Bronzes held by the British Museum – in 3D to then create and sell as NFTs. The initiative aims to generate

financial resourcing for young African artists, with 20% of all sales going towards grants funds. Ultimately, Looty intends to establish a museum in the metaverse in which the reclaimed items can be housed.

While Looty's use of the Benin Bronzes was tacitly approved by the British Museum, another similar project, organised by the Cercle d'Art des Travailleurs de Plantation Congolaise (CATPC), did not receive the same endorsement with significant consequences. The CATPC Project sought to generate an NFT that could be sold in parcels rather than as a whole (a "fractionalised" NFT) of a culturally significant sculpture (the 'Balot'), that the Virginia Museum of Fine Arts (VMFA) had been unwilling to loan to the source community (Human Activities, n.d.b; n.d.a). Following production of the NFTs, the VMFA has declined to loan the (physical) work and claimed the CATPC's use of the Museum's images in creating the NFTs violates their copyright (Boffey, 2022; Brown, 2022; Seymour, 2022; Villa, 2022).

4.3.3 Collecting and Commissioning

Intermediaries like museums and galleries are commissioning and acquisitive institutions are collecting web3 art. The Institute for Contemporary Art Miami, for example, acquired *Priscilla*, one of the CryptoPunks generated by Larva Labs as part of their permanent collection (Cuseum, 2021.; Lu, 2022). CryptoPunks is one of the earliest NFT projects, formed before the ERC standards were developed, and is valued for historical reasons, including establishing the 'pixels' aesthetic since referenced in many collections. The Los Angeles County Museum of Art (LACMAO) launched a digital art fund in 2022 and acquired NFTs of Krista Kim's *Continuum: Los Angeles* and Shantell Martin's *The Question* (Chen 2022). The San José Museum of Art commissioned and has since acquired the video work and associated NFT *Build or Destroy* by Oakland-based artist Rashaad Newsome (Cuseum, 2021; Lu, 2022; San José Museum of Art, 2021). Given the collection guidelines for many institutions are framed around enduring cultural significance (Lu, 2022), these practices of collection and commissioning provide supportive evidence of the significance of this emerging body of work.

4.3.4 Insuring

While this report has detailed several instances of commissioning and acquiring web3 artworks, the processes required to do so can be problematic. The ICA Miami's CryptoPunk, for example, is awaiting "professional appraisers to settle on the work's dollar amount" (Dugan, 2022, para. 2). Traditional artwork appraisals involve comparison against existing similar works. The nascence of creative work using web3 technologies makes this a more difficult undertaking. According to Caroline Taylor of Appraisal Bureau, a service that values NFTs, the process involves "factor[ing] in an average price of the blockchain that an NFT is minted on, as well as the value of similar works, and how it could be used" (in Dugan, 2022, para. 9). This method is further complicated by the market's variability: "because insurers have to determine how much they would have to pay out if a volatile digital currency is lost or destroyed, [Taylor's] method automatically calculates the value on a daily basis" (Dugan, 2022, para. 9).

4.3.5 Storage and Preservation

Storing – and preserving – web3 works presents challenges, including avoiding hacking and scamming (Dugan, 2022) and, eventually, undertaking digital conservation (Lu, 2022; see also Giannachi, 2021). As Tina Rivers Ryan, Assistant Curator of Albright-Knox Art Gallery explains, mitigating against digital deterioration involves:

> maintaining document documentation, iteration reports, interviewing the artist to figure out what their wishes are for long term conservation, the degree to which the technology is integral or is mutable or variable. (in Lu, 2022, para. 7)

Nieto-McAvoy and Kidd (forthcoming, 2022) also note the potential issues around archiving and storage posed by creative practices built on web3 technologies. They suggest the experiences of new media art in cultural institutions offers insight to how this could play out. In Australia, 'The

Archiving Australian Media Arts: Towards a method and national collection' project (Centre for Transformative Media Technologies, n.d.) led by Professor Melanie Swalwell may provide some insight into both the likely issues to come and potential mechanisms for rectifying them.

In addition to digital deterioration, storing and preserving web3 artworks also requires mitigating against human error. German institution ZMK, the Centre for Art and Media permanently lost their two CryptoPunks after a staff member accidentally transferred them to an inaccessible wallet (Valeonti, 2022).

Part 4 Summary

Cultural intermediaries from public institutions to commercial, traditional, and new spaces are engaging with web3, but some are more invested than others. Blockchain technologies like NFTs offer cultural intermediaries a range of opportunities, facilitating innovations in tracing and documenting provenance, enabling ownership of and generating income from cultural works, facilitating (digital) mobility of cultural works and collaboration across and between intermediaries, and offering mechanisms for restitution and repatriation of culturally significant collections. These opportunities do not, however, come without risks. Collecting, storing, and preserving web3 works will require careful consideration.

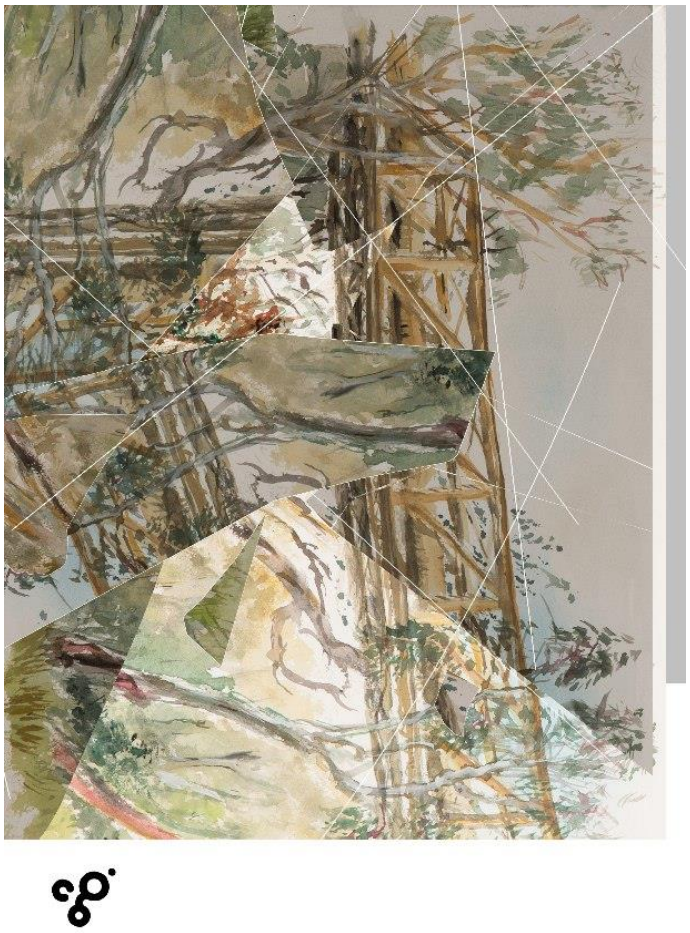

Figure 4.1: A New Destiny *by Ghost Agent on cryptographics.art. Image courtesy of Richie O'Gorman*

5. Legal Considerations

Alana Kushnir & Ellie Rennie

Blockchains and smart contracts should, in theory, reduce the administrative burden on creative practitioners by automating processes. Unfortunately, legal issues do not disappear by selling works as NFTs and it could take many years to achieve legal clarity let alone arrive at easier legal processes. As discussed in the preceding parts of this report, NFTs are assets that can be traded in a peer-to-peer fashion because blockchains enable us to agree on who owns what. While this confers proof of ownership of an NFT token, it does not deal directly with transferring or licensing the *intellectual* property rights in digital assets associated with the NFT (like images or videos), or any *personal* or *real* property associated with the NFT (like physical prints or 3D printed sculptures).

An assumed benefit of NFTs is that they can enable people to purchase a song or artwork and have exploitation rights over that work, including the ability to use it as a profile picture or make merchandise or derivative works from it. Legal experts have argued that, in general, existing laws can apply to NFTs and digital and physical assets that are transferred using NFTs. For example, intellectual property laws give exclusive rights to the owner of the intellectual property and make it unlawful to use those rights without their permission. NFT buyers therefore need to ascertain what licence rights they are purchasing from the owner, if any. NFT creators who want to give NFT owners permission to use their work need to take affirmative steps to make it clear what owners can and can't do. Unless these considerations are explicitly addressed, none of this is obvious from the metadata associated with an NFT token.

Like all property, copyright can be transferred from the owner to another person or legal entity. However, scholars at Cornell University and IC3 have written that transfer of copyright is not likely to be established through a smart contract under US law, as a transfer of ownership of the copyrights needs to be in writing and signed by both parties to be legally enforceable (Grimmelmann et al., 2022). The same applies under Australian copyright law. Moreover, transfer of copyright – otherwise known as an assignment – can open a new suite of problems related to downstream transfers (see Grimmelmann et al., 2022).

It is worth noting that there are many other ways in which the law can intersect with NFTs. NFT tokens themselves have been recognised as digital assets – specifically, as personal property – in UK and Singapore courts, however we have yet to see a similar test case here in Australia. Further complicating these considerations is the fact the legal implications of personal or real property transferred via an NFT (such as prints or 3D printed sculptures) have yet to be fully considered. For example, whether the material component (like the print) can be split from the NFT and sold separately remains an open question. Questions also remain around whether NFTs can be considered a security, and therefore trigger existing financial regulations when they are minted and sold. We are also starting to see NFTs used as procedural tools in legal processes (e.g., Shumba, 2022).

These questions are open and multiplying and covering all of them is beyond the scope of this report. Instead, we aim to provide a snapshot of current legal concerns and questions that creative practitioners and intermediaries may want to consider as they engage with web3 technologies. We focus on intellectual property, resale royalties, and consumer protection, as these are the immediate concerns of most artists. However, NFTs and other tokens do come into contact with securities law and tax law, which creators and buyers may need to investigate.

5.1 What is Intellectual Property?

Intellectual property (IP) refers to "creations of the mind" (WIPO, n.d., para. 1), including literary and artistic works, as well as designs, names, and symbols used in commerce. Intellectual property laws exist to incentivise creations of the mind. Without these laws, anyone could copy a creation of the mind and exploit it for commercial gain, to the detriment of the author (or creator). This would effectively de-incentivise the making of creations of the mind.

The distinct areas of IP law that NFT creators and buyers need to be mindful of include copyright, designs, trade marks, and patents.[9]

Copyright provides authors and IP owners (of any creative work, not just literary works) with economic rights over the expression of their work (it can't just be an idea). These rights mean the authors/IP owners can prohibit or authorise the reproduction, adaptation, performance, recording, translation, and broadcasting of a work. In addition, authors have moral rights that protect the integrity of their work and provide the author with rights over attribution, including anonymity and pseudonymity. In Australia, the *Copyright Act 1968* (Cth) stipulates the laws relating to copyright. Under the *Copyright Act*, original works receive copyright protection at the point of creation, making it unlawful to use another's copyright protected work without the author/owner's permission, regardless of whether a copyright attribution is present. Unless copyright has been assigned (transferred) or licensed (given permission to use), it resides with the author/s. Employment or work for hire are two instances where the copyright owner and author may not be the same. For example, employers hold copyright of works created by employees and freelance contracts may have specific IP clauses which determine that the copyright of works is held by the client, rather than the creator.

Design rights protect the overall visual appearance of a product. This visual appearance can be made up of multiple visual features (e.g., shapes, colours, configuration, patterns, ornamentation). The design right applies to a product that "has physical and tangible form, is manufactured or handmade, [and] is produced on a commercial scale" (IP Australia, 2020a, para. 2). Design rights are particularly important when it comes to fashion NFTs.

Enterprises that wish to distinguish their goods or services from those of other companies may apply for a **trade mark**. Unlike copyright, trade mark signs generally need to be registered to be enforceable (although other areas of law can be used to support trade mark-related claims, like passing off and misleading and deceptive conduct). Importantly, a trade mark can be applied to "a letter, number, word, phrase, sound, smell, shape, logo, picture, movement, aspect of packaging, or a combination of these" (IP Australia, 2019, para. 1).

Patents provide a means to protect the IP of an invention. The patent application includes technical information about the invention and patents are kept on a register. To register a patent, the "invention must be new, useful and inventive or innovative" (IP Australia, 2020b, para. 1). It is important to note that a patent may not be granted if the invention has been demonstrated, sold, or discussed in public before the patent application was lodged (IP Australia, 2020b). Confidentiality agreements can be used to support conversations regarding the invention with employees or business partners prior to lodging the patent application.

The Coalition of Automated Legal Applications (COALA) is an international group of legal practitioners, legal scholars, artists, and technologists working on blockchain-related legal issues. COALA is currently developing NFT legal standards aimed at addressing the legal uncertainties that surround NFTs, including how to associate licensing terms into a token, and how to enable people to verify that they have authorisation to use a work. COALA's work includes technical experimentation to create an immutable link between an NFT and licence terms that can be adopted by any platform.

If this effort achieves its goal, it is entirely possible that web3 – including NFTs – will make legal administration easier for creators and NFT owners in the future when current uncertainties have been resolved. For now, artists should approach intellectual property as a matter of risk assessment, including seeking legal counsel where necessary. A useful starting point is the "Can't Be Evil" NFT licences released by A16Z in August 2022. The licences aim to fulfil three objectives: "(1) to help NFT creators protect (or release) their intellectual property (IP) rights; (2) to grant NFT holders a baseline of rights that are irrevocable, enforceable, and easy to understand; and (3) to

[9] There are other subsets of IP for more specific applications, e.g., plant breeders' rights.

help creators, holders, and their communities unleash the creative and economic potential of their projects with a clear understanding of the IP framework in which they can work" (Jennings & Dixon, 2022, para. 4).

In the next section we provide a brief look at some of the intellectual property issues artists are facing in relation to NFTs, giving examples where possible. We have organised these according to common motivations for undertaking NFT projects and focused on IP. The final section looks specifically at resale royalties, meaning the ability to receive a share of sales that occur after the initial sale.

5.2 Intellectual Property and NFTs

5.2.1 An Artist or Estate Chooses to Sell a Collector's Item

The creators of an NFT project should be mindful that buyers may have incorrect assumptions about what they are entitled to do with the artwork associated with their NFT token. One now infamous example where buyers misunderstood the intellectual property attributes of an NFT was Spice DAO's purchase of the script bible of Alejandro Jodorowsky's 1970s film version of the sci-fi novel *Dune*, which never made it to production. The DAO assumed the transfer in ownership of the NFT was also a transfer of associated copyright and intended to produce an animated version. Only after they had made the purchase did SpiceDAO realise the copyright owner was author Frank Herbert's estate, which had licensed the exclusive film rights to the producers of the 2021 film production of *Dune*. In addition, as Caroline Foley points out, the DAO would also have needed copyright from Jodorowsky to use the intellectual property in such an adaptation (Foley, 2022).

Spice DAO's experience is a cautionary tale, which legal commentators use to encourage buyers to check any rights associated with the NFT. But it is not always obvious where a buyer should look. Marketplaces like OpenSea state in their terms of service that NFTs may be subject to terms between buyers and sellers and to check third party links to creator's website for such 'purchase terms'. OpenSea (2021) makes it clear that it is not party to such terms, but that it will take down content in accordance with the US Digital Millennium Copyright Act (DMCA), which provides a procedure for reporting copyright infringements. Given, however, that users are habituated to ignoring terms of service during everyday online activities, and with terms of service subject to change, there remain doubts as to how binding such terms might be.

For a buyer, if the rights are not specified by the creator (on their website, for instance), then it is safest to assume that the author of the work retains copyright de facto until IP expires (Department of Infrastructure, Transport, Regional Development, Communications and the Arts, 2019). As is the case if you buy a physical print of an artwork, the owner of the NFT may display the work but cannot make further copies to sell or produce merchandise based on the NFT (such as selling a line of t-shirts with the work screen-printed on it). For instance, NBA TopShots (2022, sec. 4) state that purchasers of its NFTs acquire a "non-exclusive, nontransferable, royalty-free license to use, copy, and display the Art" for personal, non-profit purposes or to display on marketplaces and other apps if ownership is cryptographically proven.

5.2.2 A Musician Wants to Release a Music NFT

In 2021, American rapper Jay-Z sued his former collaborator Damon Dash for attempting to sell an NFT of Jay-Z's debut album *Reasonable Doubt*. Jay-Z and Dash each own one-third of the record label that owns the copyright to the album and Jay-Z claimed that Dash was attempting to sell the copyright of the album through the sale of the NFT, which he had no right to do. Dash countered that he was attempting to sell his share in the record label (see more Guest Work Agency, 2021).

There are often multiple rights-holders in a single song, such as band members, song writers, and record label producers. As the *Reasonable Doubt* NFT example illustrates, artists or bands who are signed to a label often hand over the master rights of their songs, including rights to future

works. If an artist or band wants to release an NFT they need to carefully look at who they need permission from – obtaining licenses where necessary – to mint the NFT. Profits from the NFT may need to be split between rights holders. It's possible some existing label contracts do not extend to artworks that a musical artist intends to release as digital art NFTs, and some artists have rights that fall outside the label contract, such as over merchandise, that might give them scope to issue NFTs independently of the label. Artists who are unsigned and have complete control over their works will have fewer hurdles, while those who are considering signing to a label may want to include specific wording about whether the minting and selling of NFTs falls within the scope of their contract.

5.2.3 A Company Behind an NFT Project Wants to Build its Brand by Allowing Token Holders to Use the Image in Their Own Commercial Enterprises

One of the most famous NFT projects*, Bored Apes Yacht Club* (*BAYC*), seeks to harness the enterprising efforts of its community by encouraging members to earn income by using the image of a '*Bored Ape*' they own for commercial purposes. Yuga Labs, the creators of *BAYC*, grants owners "unlimited, worldwide license to use, copy, and display the purchased Art for the purpose of creating derivative works based upon the Art ('Commercial Use')", including the ability to create merchandise products displaying copies of the art as long as it is done in a way where there can be cryptographic proof of ownership "to ensure that only the actual owner can display the Art" (*Bored Ape Yacht Club*, n.d., para. 3). Bored Ape Wear, for instance, produces street wear that displays *Bored Apes* owned by the *BAYC* founders. A quick search on Etsy retrieves floor rug designs featuring Bored Apes, although there's no way to establish whether the sellers on Etsy own the NFTs of the apes printed on the rugs (bringing new meaning to the term 'rug pull').

NFT projects that wish to permit commercial use of the associated image can give permission to the owner of the NFT by way of a licence to use it for a profit-making enterprise such as merchandise. In the case of *BAYC*, Yuga Labs states it is granting an unlimited worldwide licence to use, copy, display and create derivative works, not that it is transferring copyright to the owner.

CryptoKitties, the first project to use the ERC721 standard, issued owners of *CryptoKitties* the "NFT Licence", (CryptoKitties, n.d.) which allows, among other things, the owner of a '*CryptoKitty'* to profit from merchandise that uses the image of their *Kitty* up to USD$100,000. The licence states the owner can even get a tattoo of the *Kitty*, although it doesn't say whether the owner would need to remove it if they sold the *Kitty*.

If an artist wishes their NFT work to be available for others to use, then another licensing option is to adopt a Creative Commons licence standard. Creative Commons is an organisation that has produced six copyright licence standards to choose from that allow certain usage rights to the public. These 'legal tools' encourage reuse or remixing and make it easier to discover works on the web. However, a Creative Commons licence is a public licence that applies to anyone, meaning anyone can copy and use the artwork under the conditions of the Creative Commons licence attached to it regardless of whether they own the NFT. Creative Common licences are therefore insufficient for projects that wish to grant a bespoke licence to the current owner of the NFT.

There is also the question of how to 'attach' the licence terms to the NFT. Given the limited space for the metadata associated with an NFT, licence terms tend to either be covered by NFT platforms in their general website terms or can sometimes be seen in the description that accompanies an NFT listing (e.g., the Krista Kim example referred to by Guest Work Agency, 2021).

5.2.4 A Well-Known Brand Asks an Artist to Collaborate with Them and Create an NFT

There are growing examples of artists collaborating with well-known brands in creating NFTs (Batycka, 2022; Digital Nation Staff, 2022). In cases where an artist is hired by a brand to create an NFT, there will likely be a contract between the artist and the brand's company that has been initiated by the brand. The artist may negotiate to retain copyright over the work they create and

share in the sale or resale profits rather than earn a set fee, particularly if the artist's reputation is helping to sell the NFT.

Big brands are likely to own trade marks (as discussed above), which protect their brand under trade mark legislation. For example, Hermes has claimed that artist Mason Rothschild produced the equivalent of fake Birkin bags for the metaverse by releasing NFTs featuring the bag without their permission (Guest Work Agency, 2022). This example raises questions over whether the NFT's value is derived from association with the brand and whether companies with trade marks will need to start enforcing their rights when it comes to NFTs.

5.2.5 An Illustrator Is Employed by a Games Lab That Is Creating NFTs As In-Game Purchases

A game involves multiple layers of copyright protection. The illustrator and/or animator may be the owner of copyright in the moving image (the 'cinematograph film'), the sound producer in the 'sound recording', and the writer over any text-based elements (the 'literary work'). The game engine software may also be treated as a 'literary work' under copyright law, and it could also be protected by a patent. Typically, if the artist, animator, sound producer, or writer is employed by a games lab then the intellectual property will belong to their employer. Where they are sub-contracted to the games' lab for a specific project, the contract between an artist (sound producer or writer) and a games lab will likely specify how the copyright in various layers of the game will be carved up, much like a film production. It is also possible that the game engine software licence that is granted to the games lab to create the game will also have terms relating to required credit lines for the game engine provider and even royalty payment requirements based on the number of games sold.

While in-game purchases such as buying avatars and skins well predate NFTs, game developers are considering whether to back their in-game purchases with NFT technology (see section 5.2.3). However, like other types of other NFTs linked to copyright-protected subject matter (e.g., artworks or music), the degree of exploitation the gamer has ultimately depends on the scope of the licence granted by the owner of the intellectual property in the in-game asset. This is likely to be the game developer. In other words, the intellectual property in the in-game asset is likely to still be owned by the game developer, with the gamer given a licence to use that intellectual property in certain specific ways, unless the terms of the game provide otherwise. We have yet to see a game which assigns or transfers intellectual property in in-game assets to purchasers (*Illuvium*, discussed in Part 2 section 2.4, does not).

If an NFT project founder were to commission an artist to produce a visual image or animation, they would need to negotiate with the artist prior to commencing to establish intellectual property arrangements. Typically, this would involve a written contract that would specify who owns what IP (particularly if it is based on an existing storyboard, script bible, etc.). The majority of NFT platforms and standards to date assume there is a single author of a work, which can complicate matters where such collaborations occur (see Kushnir, 2021 for a detailed discussion).

5.2.6 An Artist Is Selling an NFT as a Digital Certificate to Accompany a Physical Sculpture or Painting

If the artist is selling a digital image of an artwork separate to the physical artwork itself (see *Lost Tablets* in Part 2 section 2.1), then this is similar to selling a print of an artwork, or an editioned photograph.

In cases where the NFT functions as a digital receipt of the purchase of a physical artwork, questions around whether the NFT can prove the physical artwork is authentic may arise. While the record of the purchase transaction on the blockchain is shared and immutable, there is still a technological challenge to linking the NFT and the physical artwork in a way that can be proven. For example, a physical painting may contain a label on the back which includes the token ID, but someone could remove the label and replace it with a false token ID.

Richie O'Gorman (aka GhostAgent) described his early attempt at physical NFT artworks:

> *I started doing a project, I call it Skeuomorphic provenance loop. I wanted to make an NFT you give to someone. I was surrounded by ceramicists so I started making these ceramic containers and I would put the private key in there. Obviously, there's a flaw in that whole concept because someone knows the key. Me, who put it in there. Then I went down the rabbit hole of Shamir's secret sharing and Multi-sig.* (O'Gorman, interview)

There are many companies that have been working on developing the technology to link physical assets – including but not limited to artworks – to NFTs (e.g., Forctis, n.d.; Verisart, n.d.). Technologies currently being suggested include barcodes and QR codes, RFID and NFC tags or chips, holograms, DNA tags, security inks, and (diamond) dust identity. Companies like Mattereum issue an Asset Passport that comes with certifier-backed warranties and provides the possibility for dispute resolution. Companies like Kong, in turn, are focused on hardware components, creating microchips that contain a private key (called HaLo and SiLo tags), which provide strong guarantees of authenticity and enable a physical object's history to be reliably factored into its value. These innovations are critical considerations in relation to the opportunities for enhanced provenance provided by web3 technologies, as discussed in Part 4 section 4.3.

As discussed in Part 3 section 3.3 of this report, NFTs also offer potential for tracing provenance and resale royalties (discussed further below) in the context of First Nations artworks (Copyright Agency, 2019; Rennie, 2020).

5.2.7 A DAO Wants to Commission an Artist to Create Artworks for an NFT Project

If undertaking an NFT project, a DAO needs to consider who is liable for any potential legal action that may arise in the future, including intellectual property or consumer protection disputes related to any NFT collection that it issues to its members or sells for income. An artwork can only give rise to intellectual property rights where the author of that work is a person. A person, in this instance, could be a natural person, or an incorporated entity, like a private company (in Australia, a Pty Ltd), a public company limited by shares or guarantee (in Australia, an Ltd), or a statutory incorporation (such as RMIT University). What this means for DAOs is that intellectual property can be owned jointly by individual members of the DAO, but not by the DAO itself. In other words, the DAO itself cannot enter into legally binding contracts, and cannot enforce what it buys and sells in a court of law, including intellectual property. It also means each member is responsible for the actions of the others (being jointly and severally liable). Furthermore, joint ownership or a licence to an artwork requires all members to consent to its use. In practice, this can be time consuming and unwieldly, leading to all sorts of problems, such as it not being clear who has the right to do what with that artwork, especially if this is not addressed before the artwork is created.

Some DAOs are registered in jurisdictions where specific laws have been adopted that allow limited liability for DAOs, such as Malta and the State of Wyoming in the US (Wright, 2021). However, both the Malta and State of Wyoming DAO models are different and have received criticism for being complicated and only capturing certain types of DAO structures. At the time of writing, Australia has no legal framework for DAOs, which means DAOs are not recognised as legal entities that can enter into legally binding contracts. This means a DAO could not legally enforce a licence it may have been granted for use of an artwork for the DAO, nor could it legally enforce an assignment (i.e. the sale or transfer) of the copyright in an artwork. One indication this may be changing is the 2021 Senate Select Committee on Australia as a Technology and Financial Centre, which stated COALA's DAO model law "could be used as a starting point for developing a law in Australia" (Commonwealth of Australia, 2021, p. 78).

5.2.8 An Artist Creates a Generative NFT Project Where the 'Image' Is Created and the NFT Is Minted at the Time of Purchase

Further uncertainty surrounds generative artwork NFTs that are created in whole or in part by software (Graves, 2022), as copyright protection does not necessarily extend to works created by non-human entities (Guadamuz, 2017).

A judge in Australia ruled in 2021 that an artificial intelligence (AI) system could be an inventor for the purposes of the Australian *Patents Act 1990* (Cth). The case found that, under patent law, there is no requirement for a human author as there is for copyright and moral rights (Caligiuri & Tobin, 2021). This ruling, however, has since been overruled. The current Australian approach is consistent with the United Kingdom and the United States (Guest Work Agency, 2022).

It is also worth noting that a number of projects listed on artblocks.io, a generative NFT platform, have chosen Creative Commons licenses. It is as yet unclear how such licenses would be construed.

5.2.9 An Artist 'Outs' a Copycat NFT Using their Twitter Account

Artists are increasingly finding that their digital artworks or images of their artworks have been minted as NFTs and/or listed for sale on NFT platforms without their permission. (An example of these dynamics in the context of cultural intermediaries like museums with open access collection is discussed above in Part 3 section 3.3.1.1).

The 'calling out' approach on social media, particularly Instagram and Twitter, continues to be a cheap but risky avenue that is frequently being used by artists to address NFT copycat situations.

To help combat this issue, digital art platform DeviantArt (Team, 2021) has created a free copy-detecting AI to help alert artists to the minting of their work as NFTs.

5.2.10 A Museum Wants to Collect NFT Art

As discussed in Part 4 section 4.1, while there is evidence of 'traditional' cultural intermediaries like museums acquiring NFTs overseas, these practices remain nascent in Australia, with the National Gallery of Victoria an important exception to this rule. These practices are guided by collection policies, which may not yet facilitate the purchasing of NFTs. It is worth noting that the NGV's acquisition of NFTs have reportedly been under their responsive collecting policy (Coslovich, 2022).

5.2.11 A Museum Wants to Mint and Sell NFTs

As discussed in Part 4 section 3.3.1, several museums and galleries are minting and selling NFTs of works in their collection as a means of fundraising and merchandising. These practices raise questions regarding the rights to mint and sell NFTs of works they may have in their collection but not own copyright over. Minting and selling NFTs in this way would require permission from the copyright owner (e.g., the artist).

Museums currently undertaking such initiatives are typically doing so through third-party platforms or marketplaces, rather than building their own NFT platform or selling directly through the museum's website or online shop. For example, the British Museum is using LaCollection (see Chayka, 2022; Valeonti, 2022).

5.2.12 A Gallery Wants to Exhibit an NFT Collection

We have seen some galleries holding exhibitions (whether in physical galleries or in the metaverse) of NFT collections from a single collection, where it is the collector who is supplying the NFT for display, rather than the creator.

In Australia, copyright includes the exclusive right to reproduce and to communicate to the public (electronically by means of uploading to a website, for example), but it does not include an

exclusive right to display. So, in theory, the display of a physical artwork in a gallery does not infringe the copyright of the artist if it is displayed without permission from the artist. However, displaying the NFT artwork image on a screen in a gallery technically involves a *reproduction* of that work on the screen, so there remains a question regarding whether the copyright owner's rights (e.g., the artist's rights) have been infringed by having the NFT reproduced on a screen in a gallery without their permission. It therefore remains unclear whether an NFT collector has the right to provide a gallery with permission to display their NFT collection, or whether the NFT collector can hold their own exhibition with displays that reproduce the NFT artwork.

A potential innovation in this space is the new 'rentable' Ethereum NFT standard (S, 2022), however this would not provide a solution for the display and exhibition of existing NFTs that do not use this standard.

5.2.13 Indigenous Cultural and Intellectual Property Issues Raised by NFTs

The Indigenous cultural and intellectual property issues which NFTs may raise are yet to be examined in detail. Indigenous cultural and intellectual property (ICIP) is based on Indigenous peoples' right to self-determination. According to Terri Janke (1997), ICIP rights are Indigenous peoples' rights to their heritage and culture.

In April 2022, a discussion paper, *First Nations' Culture in the Metaverse*, written by Bibi Barba, Dr Vanessa Lee-Ah Mat, Angelina Gomez, and Joni Pirovich, was released. The paper noted the need to advocate for international protection of ICIP embedded within cultural content in the metaverse:

> There should be recognition and respect for the principle that only First Nations people as protectors of their land, waters and air, of spiritual and sacred objects, can share their stories, or give others permission for a specific use (ensuring transparency and no exploitation in use) to share their stories, through words, song, dance and art. (Barba et. al., 2022, p. 11)

We believe the area of ICIP issues and NFTs requires attention, consultation and action by metaverse developers and their communities.

5.3 NFTs that Enable the Producer to Share in the Profits of Secondary Sales

One of the most common reasons NFTs have been championed as changing the status quo for creators is because of their ability to distribute royalties to the creator(s) when the NFT is resold. This is particularly accurate for creators based in jurisdictions which do not have legislation in place for an artist's resale royalty, like the US, Canada, New Zealand, Japan, Switzerland, and Greater China. For creators based in jurisdictions which do have a legislated resale royalty requirement, like Australia, the UK, and the European Union, this reason for championing NFTs may not be as pressing.

To date, little analysis has been undertaken to determine whether the resale of NFTs falls within the remit of existing resale royalties legislation or falls outside of it by virtue of their novel form and methods of sale. This section specifically considers how the resale of NFTs by Australian creators interacts with the existing Federal resale royalties legislation, the *Resale Royalty Right for Visual Artists Act 2009* (Cth). It also considers the automated royalties payment process which *some* NFTs adopt by virtue of smart contract technology, and how this operates in practice *vis a vis* the

Copyright Agency,[10] whose role is to administer payments due to Australian artists and artists' estates under the *Resale Royalty Right for Visual Artists Ac*t.

5.3.1 Background to Resale Royalties

Resale royalty or *droit de suite* laws were first brought into effect in France more than 100 years ago. Since then, over 75 countries have followed suit, propelled by their endorsement in Article 14ter of the *Berne Convention for the Protection of Literary and Artistic Works* in 1948,[11] and the European Parliament's directive 2001/84/EC in 2001.

Notwithstanding this widespread adoption, the components and mechanics of each of the legislative schemes vary. For example, a royalty rate of 5% of the total resale price is required in Australia, whereas in Brazil the royalty rate is set at 5% of any gain in value. In EU countries, the royalty rate varies depending on the sale price of the work. Each jurisdiction also has different thresholds for the minimum sale price, which triggers the payment of a resale royalty and maintains different obligations in terms of who is liable for the payment – the seller, the buyer, or the sales agent (see van Haaften-Schick & Whitaker, 2022).

In jurisdictions which have not legislated for a resale royalty scheme, creators are left to implement a resale royalty requirement by way of private contract.[12] These jurisdictions include the US, Canada, New Zealand, Japan, Switzerland, and Greater China. Although they are a mere handful in comparison to the number of jurisdictions that currently have a legislative scheme in place, the US accounts for the bulk of global art sales at 43%, followed by Greater China at 20% (McAndrew, 2022).

There have been numerous attempts to legislate for resale royalties in the US in particular. Such attempts have been primarily criticised on the basis of its conflict with the US Constitution and the US *Copyright Act 1976*, and more generally on the basis of economic principles i.e., that in having to allocate a percentage of an artwork's resale value to the creator, collectors will be less incentivised to resell artworks and the art market will suffer as a result (for a concise history of US attempts to legislate for artist's resale royalties, see Tarsis, 2022). The resulting gap that has been left open by the US legislature has had a direct influence on the development of alternative resale royalty distribution strategies when it comes to NFTs.

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[10] The Copyright Agency is an independent not-for-profit organisation that has been appointed by the Federal Government to act as Australia's collecting society for all written works, imagery, and survey plans. The Copyright Agency also collects and pay royalties to creators and advocate for their rights.

[11] Article 14ter (Berne Convention for the Protection of Literary and Artistic Works (as Amended on September 28, 1979), 1979) provides:

> (1) The author, or after his death the persons or institutions authorized by national legislation, shall, with respect to original works of art and original manuscripts of writers and composers, enjoy the inalienable right to an interest in any sale of the work subsequent to the first transfer by the author of the work.
>
> (2) The protection provided by the preceding paragraph may be claimed in a country of the Union only if legislation in the country to which the author belongs so permits, and to the extent permitted by the country where this protection is claimed.
>
> (3) The procedure for collection and the amounts shall be matters for determination by national legislation.

[12] A key historical precedent for the inclusion of an artist's resale royalty in a contract is the *Artist Reserved Rights Transfer and Sale Agreement*, a template contract form drafted by lawyer Bob Projansky together with art curator and dealer Seth Siegelaub in 1971. This contract includes a term that an artist can claim 15% of the increase of the value of a work when it is resold at auction or privately. Although the contract was rarely used by artists in practice, it is still considered "a watershed experiment in artists' legal and economic rights" (van Haaften-Schick & Whitaker, 2022, p. 5).

5.3.2 The Origins of NFT Resale Royalties

The distribution of resale royalties to creators has not always been a defining component of NFTs. When one of the early iterations of an NFT was created by artist Kevin McCoy and developer Anil Dash in Rhizome's Seven by Seven hackathon in New York in 2014, the premise behind the duo's prototype was how to give artists creating digital artworks the ability to assert ownership over the 'original' artwork, and "to offer artists a way to support and protect their creations" using the potential of then-nascent blockchain technology (Dash, 2021, para. 2).[13] The defining component of their so-called 'monetised graphics' was the blockchain-backed verification of the digital artwork. However, the potential for blockchain technology to go a step further in supporting artists by distributing resale royalties was not considered.

In November 2017, the Ethereum-based project *CryptoKitties* – which allows players to purchase, breed and sell virtual cats – was launched. The smart contract which deployed each *CryptoKitty* NFT was an early precursor of what was soon to become the ERC721 standard. Soon after, in December 2017, the NFT marketplace OpenSea was launched in direct response to the movement forming around the game. Envisioned as an 'eBay for NFTs', the marketplace supported NFTs which were based on this same early precursor to the ERC721 standard. In 2018 a number of other NFT marketplaces were founded, including SuperRare in Newark, Delaware and Nifty Gateway in San Francisco, whose first minting contracts were also based on precursors to the ERC721 standard.[14]

The ERC721 standard is a template-style smart contract which "provides basic functionality to track and transfer NFTs" (Ethereum, 2018, para. 2). It was first proposed by William Entriken, Dieter Shirley, Jacob Evans, and Nastassia Sachs in January 2018. In the summary of the standard, the authors explain that "[i]n general, all houses are distinct and no two kittens are alike. NFTs are *distinguishable* and you must track the ownership of each one separately" (Ethereum, 2018, para. 3). In other words, the motivation for developing the standard was in the tracking of NFTs. Resale royalties are not mentioned in the ERC721 standard.

For NFT platforms which deploy the ERC721 standard (or the ERC1155 standard for that matter) 'out of the box', the distribution of royalties is administered by the platform itself, not by the smart contract. To that end, cross-marketplace royalty enforcement has primarily been the result of inter-company agreements, such as that between OpenSea and Foundation (OpenSea, n.d.b). The royalty distribution process to date has been *centralised*, dependent entirely on the processes of the platform itself. As James Morgan (2021, para. 4), a co-founder of NFT platform and marketplace KnownOrigin, observed in July 2021:

> The vast majority of royalty implementations are different and do not conform to a standard, this leads to centralisation of tokens and royalty payouts, typically only applied when resale happens on the originating platform. This can also create an undesirable reliance on post-sale settlements in a non-obvious or obscure way. Not fulfilling one of the original and best value propositions for NFTs.

The administration of royalties at the platform level previously enabled OpenSea to withhold the payment of resale royalties for a number of weeks. Some have noted that the high costs of Ethereum gas fees have been part of the problem. As Christian Heidorn (n.d., para. 50) observes, "[t]his makes sense when you're paying out $100 in OpenSea royalties and paying $200 in gas to do so". In other words, delaying payments in order to payout in bulk allows OpenSea to save on

[13] We note that what was the first NFT is still debated. Some point to earlier iterations of text domain names minted in 2011 on the Namecoin blockchain, which was originally forked from bitcoin software.

[14] On the SuperRare website (Lauren, n.d., para. 3), they note that their very first smart contract, the V1, was not the ERC721 standard. "SuperRare's first minting contracts, dubbed 'V1 contracts', were utilized from April 2018 to September 2019, up until the ERC721 NFT token standard was adopted".

gas fees. But some reported that OpenSea withheld resale royalties longer than necessary. As Rami Al-Sabeq (2021, para. 5) stated:

> An artist by the name of Lance Ren was in a Clubhouse room discussing this particular issue when Jen Stein pinged the CEO of OpenSea into the room, Devin Finzer. He reportedly faced the group of angry users, and offered them his apologies in regards to the situation. According to Lance, Devin mentioned two reasons for the lack of forthcoming royalty payments: high gas fees and old architecture that has not scaled yet.

These issues raise the question of how *automated* the distribution of resale royalties for existing Ethereum-based NFTs really are. Indeed, built-in royalty standards in smart contracts are a surprisingly recent development.

5.3.3 A New Chapter for NFT Resale Royalties

A token standard for resale royalties built into the smart contract for NFTs was first introduced in September 2020. EIP 2981, created by Zach Burks, James Morgan, Blaine Malone, and James Seibel, was developed on the basis that:

> [w]ithout an agreed royalty payment standard, the NFT ecosystem will lack an effective means to collect royalties across all marketplaces and artists and other creators will not receive ongoing funding. This will hamper the growth and adoption of NFTs and demotivate NFT creators from minting new and innovative tokens. (Burks et al., 2020, para. 7)

EIP 2981 was designed to extend existing Ethereum smart contract standards, like ERC 721 and ERC 1155, to be compatible with token level royalty handling. To date, of the mainstream platforms, Rarible, NiftyGateway, Mintable, and Opensea are now compatible with EIP 2981. However, even the standard itself notes that it is “a minimal, gas-efficient building block for further innovation in NFT royalty payments” (Burks et al. 2020, para. 2). This is because the standard only provides for the signalling of the royalty amount and the creator to whom the royalty should be paid. The deployment of the standard itself does not *automate* the payment of the resale royalty to the creator.

In March 2022, a proposal for “a standard for onchain Royalty Bearing NFTs” (highlander, n.d.) EIP 4910, was published. Created by John Wolpert, EIP 4910 is an extension of the ERC 721 standard that enables “the collection and distribution of royalties to BOTH creators and affiliates securely, immediately and irrevocably on-chain. EIP-4910 eliminates the risk of centralized platforms failing to pay royalties from secondary sales correctly or on time” (TreeTrunk, n.d.). With the implementation of this new standard, the distribution of resale royalties is not entirely dependent on the lifespan of an NFT platform: “[i]f the platform that a creator is using to manage their NFTs disappears, their funds stay safely on the blockchain” (Harris, 2022, para. 15). From 8 November 2022, new collections launched on Open Sea will be able to set onchain enforcement of resale royalties using a tool that blocks marketplaces that don’t support creator fees.

5.3.4 Australian Resale Royalty Legislation

Australia’s resale royalty legislation, the *Resale Royalty Right for Visual Artists Act 2009* (Cth), was first introduced in 2010. Since its inception, 2300 artists and artist’s estates have received one or more resale royalties from more than 25,000 sales (Copyright Agency, 2022). The scheme has been lauded for its impact in remote and regional locations, and its benefits to Aboriginal and Torres Strait Islander artists and communities (Copyright Agency, 2022).

In December 2019, a post-implementation review was published that surveyed the first three years of the *Resale Royalty Right for Visual Artists Act*’s operation – *The Post-Implementation Review – Resale Royalty Right for Visual Artists Act 2009 and the Resale Royalty Scheme* (Department of Infrastructure, Transport, Regional Development, Communications and the Arts, 2019). One of the

review's key findings was that stakeholder views were polarised, and that the legislation "is generally considered positively by artists and visual arts peak organisations and negatively by art market professionals and art investors, with some exceptions in all stakeholder groups" (Department of Infrastructure, Transport, Regional Development, Communications and the Arts, 2019, p. 9). However, with a five-year lag in releasing the report's findings, its usefulness is limited (Fairley, 2020), and contains no mention of how blockchain technology may be affecting the application of the *Resale Royalty Right for Visual Artists Act* or the resale royalties administration scheme.

The *Resale Royalty Right for Visual Artists Act* establishes a right "to receive a resale royalty on the commercial resale of an artwork" (Department of Infrastructure, Transport, Regional Development, Communications and the Arts, 2019, sec. 6). The amount of that resale royalty is set at "5% of the sale price" (sec. 18). An "artwork" is defined as "an original work of visual art" and includes a non-exhaustive list of types of works of visual art, including "digital artworks" and "multimedia artworks" (sec. 7). The right is granted to artists who are living and to beneficiaries of artists who are no longer living (up to 70 years) where the artist satisfies the "residency test" at the time of the resale. Under the legislation, the "residency test" is broad, in that it not only captures Australian citizens and permanent residents of Australia, but it also captures "a national or citizen of a country prescribed as a reciprocating country" (sec. 14). To that end, the Copyright Agency (2015) is in the process of establishing reciprocal arrangements in France, Germany, and the UK.

The resale right is only triggered under the *Resale Royalty Right for Visual Artists Act* if the sale price of the artwork is above the threshold of $1000, or "if the sale price is paid in a foreign currency, the amount worked out using the exchange rate applicable at the time of the commercial resale that is equivalent to $1,000" (sec. 10). Section 20 provides that the seller and the seller's agent or art market professional are "jointly and severally liable". The section further provides that if there is no agent for the seller, the buyer's agent acting as art market professional is liable, and if there are no agents for either seller or buyer, then the buyers are liable.

Under the *Resale Royalty Right for Visual Artists Act*, the Copyright Agency "must use its best endeavours to collect the resale royalty payable under this Act, and, if necessary, enforce any resale royalty right held under this Act, on the commercial resale of the artwork on behalf of the holder or holders of the resale royalty right" (sec. 23). The collection scheme administered by the Copyright Agency requires the seller and the seller's agent to report all resales to the Copyright Agency, unless the price paid for the artwork is less than the threshold of $1000, or the sale is a private sale between individuals, where no art market professional is involved (Copyright Agency, 2015). The Copyright Agency takes an administrative fee of 15% of the royalty collected, which supports administration of the scheme on behalf of rights holders and beneficiaries.

Currently it is unclear whether the resale of NFTs created by Australian artists triggers the application of the resale royalty right under the *Resale Royalty Right for Visual Artists Act*, and whether the resale of NFTs must be reported to the Copyright Agency under the scheme. This is partly the result of the terminology used in the legislation, which has been drafted with more traditional forms of marketplaces for art in mind, like auction houses and galleries. In particular, it is not clear whether the definitions of "commercial resale" and "art market professional" accommodate the resale of NFTs. Section 8 of the *Resale Royalty Right for Visual Artists Act* defines the commercial resale of an artwork as follows:

> (1) There is a commercial resale of an artwork if:
>
> > (a) ownership of the artwork is transferred from one person to another for monetary consideration; and
> >
> > (b) the transfer is not the first transfer of ownership of the artwork; and
> >
> > (c) the transfer is not otherwise one of an excluded class.

> (2) The transfer of ownership of an artwork from one individual to another in circumstances that do not involve an art market professional acting in that capacity, is an excluded class of transfer.
>
> (3) Art market professional means:
>
> (a) an auctioneer; or
>
> (b) the owner or operator of an art gallery; or
>
> (c) the owner or operator of a museum; or
>
> (d) an art dealer; or
>
> (e) a person otherwise involved in the business of dealing in artworks.

To date, Australian courts have not had the opportunity to consider the application of *the Resale Royalty Right for Visual Artists Act* in general, let alone Section 8.[15] However, the Revised Explanatory Memorandum for the Royalty Right for Visual Artists Bill (2009 (Cth), p. 5) does provide that "the definition of a commercial resale is limited to transfers of ownership for *monetary* consideration to assist with ease of administration". This could potentially be interpreted to mean that transfers of ownership for consideration in the form of cryptocurrency should be excluded.

The definition of "art market professional" also poses a challenge to the application of NFT resales under the *Resale Royalty Right for Visual Artists Act*. As Birgit Clark and Courtenay Whitford (2021, p. 62) have suggested, "NFTs sold via online crypto market-places are unlikely to benefit from the Australian resale royalties regime unless sold by a gallery, museum, auctioneer or person otherwise in the business of art dealing". Notwithstanding their point of view, the Revised Explanatory Memorandum does suggest a somewhat wider interpretation of an "art market professional":

> The term 'person otherwise in the business of dealing in artworks' covers commercial operators whose primary business is not dealing in artworks *but who engage in the business of selling artwork on a fairly regular basis* [emphasis added], such as a café-owner who regularly displays art for sale on the café walls, or a specialist antique dealer who regularly deals in a mix of artworks and furniture. However, it does not capture businesses that only sell artworks on a very occasional or intermittent basis because of the increased difficulty in monitoring and administering the scheme if such sales were included, and the unreasonable additional regulatory burden this would place on such operators. (Revised Explanatory Memorandum, Resale Royal Right for Visual Artists Bill 2008 (Cth), p. 6)

It could well be said that in the present day, NFT platforms and marketplaces *are* in the business of selling digital artworks on a regular basis. As such, where an NFT is resold via an online marketplace, it is arguable that a commercial resale of an artwork has taken place for the purposes of the Act.

As for the question of whether the resale of NFTs must be reported to the Copyright Agency, or indeed, are captured in the Copyright Agency's Notice of Resale, no public guidance has been provided by the Copyright Agency to date. A review of the publicly available Notice of Resale records does not identify any NFT sales (Copyright Agency, n.d.).

[15] The Act has been referred to in one reported case to date, *Australian Competition and Consumer Commission v Birubi Art Pty Ltd* (in liq) (No 3) [2019] FCA 996 at [39]. In addition, section 6 of the recently introduced *Resale Royalty Right for Visual Artists Regulations 2021* (Cth) provides that a transfer of ownership of an artwork for less than $1,000 is an excluded class of transfer such that reporting of the transfer to the Copyright Agency is not required.

5.3.5 Copyright Agency and Desart

Notwithstanding the above-mentioned uncertainties with respect to the *Resale Royalty Right for Visual Artists Act* and the scheme, the Copyright Agency has made attempts to trial blockchain technology in Australia in other ways. In 2018, with support from the Federal Government and in collaboration with Desart, the peak body for central Australian Aboriginal art centres, the Copyright Agency launched a pilot blockchain designed to assist with the tracking of physical artworks originating from three remote central Australian Aboriginal art centres. The pilot was initiated in response to what then-CEO of the Copyright Agency Adam Suckling described as "the serious problem of art and craft merchandise being passed off as authentically Aboriginal and Torres Strait Islander" (Copyright Agency, 2018, para. 5). Reflecting back on the project last year, the Copyright Agency (2021, paras. 5-6) explained:

> We worked with select art centres and art market professionals involved in primary and secondary sales. We considered the operating environment and needs of all parties from the creation of the work through to the sales process. With an eye on what worked well and what could be improved, we reviewed blockchain and a variety of technologies that track supply chains. To test and build our understanding of blockchain, we developed an application on the Ethereum blockchain.
>
> Having completed our research and built a test visual arts blockchain, we found that blockchain technology is well developed and functioning effectively for digital uses like Bitcoin. In visual arts rights management, it can offer automation and efficiency; however, this needs more development in ensuring data integrity for physical works onto the blockchain. There are some very effective methods for uniquely tagging physical works, but more needs to be done on the associated business practices to ensure accuracy.

The Copyright Agency (2021, para. 7) also expressed their commitment to engaging with "all visual arts blockchain organisations" as part of their role in managing the resale royalty scheme.

5.3.6 Resale Entitlements for Australian NFT Artists

So where do these uncertainties around the interaction of the *Resale Royalty Right for Visual Artists Act* and the resale royalty scheme leave Australian artists who are creators of NFTs? While our research shows that Australian artists have been paid royalties for NFTs by NFT platforms and marketplaces, none of the artists interviewed had any interaction with the Copyright Agency or the scheme to date. Nor is it clear whether Australian-owned NFT platforms and marketplaces have contemplated their reporting obligations, let alone liabilities, under the legislation.

5.4 NFTs and Consumer Law

Consumers and businesses may also have protection in relation to the buying and selling of NFTs under consumer protection law. The *Competition and Consumer Act 2010* (Cth) contains a broad provision that provides that "a person must not, in trade or commerce, engage in conduct that is misleading or deceptive or is likely to mislead or deceive" (sec. 18.1). This provision is commonly relied on where an instance of 'ripping off' has allegedly occurred.

A similar provision under US consumer law was relied on by the purchaser of a *Rare Pepe* NFT to file a legal claim against creator Matt Furie and his companies, including a DAO and the limited liability company that operates the DAO. According to case documents (United States District Court for the Central District of California Western Division, n.d.), "the *Pepe* NFT was touted in the advertisement as 'a piece of blockchain history, originally minted in 2016'. The advertisement explained that 500 of this *Pepe* NFT were 'issued', 400 were 'burned' (i.e., destroyed), '99 will remain in the PegzDAO', and only 'ONE is being auctioned here'". Relying on these representations, the purchaser placed a winning bid. 46 of the 99 remaining *Pepe* NFTs were then released, which the purchaser argued significantly devalued their *Pepe* NFT. This case

demonstrates that creators of NFT projects need to be careful not to change their approach after a sale, particularly if it disadvantages NFT owners.

Part 5 Summary

The law has always played catch up with technology. In this sense, the legal complexities of NFTs are not new. Just as web2.0 required law-making to deal with new problems in piracy, privacy, the right to be forgotten, intermediary (platform) liability, and online harm, so web3 is raising a new set of challenges and opportunities. These include questions about who has authorship when an artwork is created by a non-human entity (e.g., AI and generative art), how or whether licences can be transferred along with a token, and whether a DAO can own intellectual property. Some of the legal grey areas outlined above will only be resolved through the courts and legislature over time, and some may require amendments to existing laws before any certainty can be achieved. In the meantime, the onus is on creators and buyers to assess the risks and seek legal advice where necessary.

Conclusion

In 2019, researchers at the RMIT Blockchain Innovation Hub published a provocation paper for the Australia Council, Australian Film Television and Radio School, and Screen Australia on the opportunities and challenges of blockchain for Australia's cultural sector. The report (Rennie, Potts & Pochesneva, 2019) identified the potential for more transparent and lower cost transactions, easier contracting and recontracting, fewer overheads, and less reliance on intermediaries. At that time, industry incumbents had failed to embrace an open and accessible 'internet of value', suggesting the need for a coordinated approach.

Since then, we have seen massive and rapid digital transformation within the cultural sector in response to the COVID-19 pandemic. The digital-only moment pushed many artists to independently explore new business models, including through blockchain-based platforms. For this follow-up report, we delved into how artists and cultural institutions are using web3, including NFTs and DAOs. To do this we designed and conducted a survey, asking creatives what they are using the technology for – or why they are not using it – followed by in-depth interviews with 20 creatives and technologists. For our analysis of cultural institutions, we relied on secondary sources, focusing on the major issues that arise for established entities when trying to accommodate new practices and forms. Recognising that there are many legal uncertainties surrounding DAOs and NFTs, we brought in lawyer Alana Kushnir to guide us through some of the questions that creative practitioners, and those who support them, are asking.

The major finding of this report is that adoption of blockchain by creative practitioners in Australia is uneven, and that views about the technology are polarised. Opposition to the technology takes many forms: resistance to the idea that art's value can be determined through financial markets; concern around the environmental impact of blockchain infrastructures; and insistence that art that can be copied cannot be owned. As we have discussed in this report, many creative practitioners are choosing to look beyond these narrow views and to find new opportunities through the technology. We summarise the 2022 state-of-play as follows:

The New Art of Ownership

We show that first and foremost, artists and musicians are using non-fungible tokens (NFTs) to manufacture ownership without restricting who can appreciate a work in digital form (Myers in Droitcour, 2022, p. np). In web2.0, access to digital works was managed through digital rights management (encryption). In web3, the artist or musician creates a software-enabled certificate of a work in the form of an NFT (in some cases the NFT also includes the instructions for generating the work). By making the NFT the commodity and controlling how many are produced, a market for even the most ephemeral of artworks can occur if demand exists. In this way, a market for digital works is being realised by separating online consumption of the art from the thing that is owned.

Rewarding the Value Creators

In a creative economy, value is the result of people discovering new works and sharing them so that groups – subcultures – form around those works (Potts & Hartley, 2015). With web3, value flows in tokenised form and is transparent, traceable, and commencing this process from the source. The token shows when an item is purchased, giving status if not direct reward to those who discover and support an artist early. In addition, some artists and musicians are using web3 to reward those who see value in a work and who choose to create derivative works from it.

A Cooperative Economy

The ability to assign and transfer value in digital form without the need for trusted intermediaries means that people and organisations can also coordinate more easily on their own terms. Decentralised Autonomous Organisations (DAOs) provide tools for decision-making, tracing and rewarding contributions to group works in a global, digital context. Artists and musicians are using

DAOs to reshape how the business of creativity is run, resulting in artist-centric music labels and art collectives.

Warp Speed Art Markets

The traceability of tokens means that investors also have new tools to hand, bringing unprecedented speed, automation and volatility to art markets and transferring characteristics familiar to one market to other markets (for instance, elite investment in fine arts is now occurring in music).

For the critic, NFTs are merely a means to "extract private property from freely available information" (Joselit, 2021, p. 4), which wipes out the material experience of art. One art critic stated: "I personally have spent most of this year feeling like someone who wished on the monkey's paw: I always wanted digital artists to prosper and digital art to make headlines, but *not like this*" (Rivers Ryan, 2021, p. np).

Web3 is reopening concerns around the commodification of art, recalling Benjamin's (1969) concern that the aura of an artwork is diminished through reproduction. To others, such critiques shut down the agency that comes through web3. New media artist Rhea Myers asserts:

There's no techno-determinist like a critic of techno-determinism … Those of us who work in the crypto space are acutely aware of the limitations and risks, as well as the opportunities and potentials. And this is true of each successive technology (Myers in conversation with Wark in Droitcour, 2022, p. np).

The Keys to the Web3 Kingdom

The short history of web3 shows early adoption by experimental artists working at the intersection with technology and street artists, as well as those who made income from freelance fee-for-service art practice. The manufacturing of ownership through NFTs has boosted art markets for creative works that are digital. Traditional artists are now getting involved. However, some remain reticent, possibly due to a perceived disconnect between their traditional buyers and the cryptocurrency community.

The traceability of tokens also offers new possibilities for galleries, museums, and other cultural institutions. These entities have always played a role in ensuring the provenance and preservation of artistic and cultural works. Web3 makes that role easier. For instance, galleries that assist artists to mint NFTs can play an important role in relaying provenance. The status of that gallery may also be elevated if a work is acquired by other institutions in the future.

The 2019 report called for a coordinated approach to blockchain to ensure that Australian creative practitioners experience the benefits. Our conclusion in this report is that coordination is now happening from the bottom up by way of new governance tools and technical standards. The flow of value through the cultural economy is becoming explicit through web3 and those who choose to see it have much to gain. However, web3 is not replacing the established cultural economy (or not yet). If the last three years have shown anything, it's not that creative practitioners need web3, but that web3 needs creative practitioners if it is to emerge culturally innovative and socially responsive.

Appendix: Glossary and Research Methods

Glossary

Blockchains	A blockchain is a record of digital activity that is shared amongst many people who verify that what happened did, in fact, happen. For this reason, they have been described as an infrastructure for achieving "common knowledge" (Micali in Fridman, 2021, 2:36). A common blockchain application is to use a token as a currency. Traditionally, if I wanted to transfer a sum of money to you, a centralised entity such as a bank would verify that I first had enough money to transfer to you and that, having sent you the money, I have less money to spend or send to someone else. In blockchain, there is no centralised entity holding a master list of transactions to check balances against. Instead, there are many transaction lists (known as ledgers) on each node of the network that check against each other. Once a majority of nodes agree that I have enough tokens to send to you and that I will have less tokens to use after the transaction, the transaction itself is written to the blockchain. This process enables decentralised transactions to occur in a secure way.
Composable systems	A composable system refers to a system's modularity and its ability to be remixed or recomposed into different software based on the components that are used.
Decentralised autonomous organisation (DAO)	In Aaron Wright's (2021, p. 155) description, a DAO consist of a "network of hard to change rules that establish the standards and procedures of anyone interacting with, or taking part in, a DAO" (see also Hassan and di Filippi, 2021). Another way to understand a DAO is to imagine a community arts organisation or a local club. Members of those groups typically pay a membership fee that gives them certain rights such as voting on decisions that the group will make. These groups likely have a mix of paid professional positions and volunteer positions to operate the group. They would also have formal policies and processes that inform how they operate. Now imagine that those policies and procedures are codified to such an extent that any way you contribute is automatically recognised, integrated, and able to be used by other participants in the group. Your membership and voting rights are denoted by the DAO tokens that you hold and your rewards are based on your contributions to the group. Rather than going through a central committee to set the group's direction, anyone can contribute and bring about that change with the governing rules of the DAO moderating that change.

Distributed technologies	Distributed technologies refer to web-based resources that are shared by more than one service. The web itself is a distributed technology; that is, it is a network of networks that uses resources from multiple locations to deliver a web experience. The rise of platforms like Meta, Google, and, at an infrastructure level, Amazon Web Services, have had a centralising effect on the web in that a large amount of web traffic moves through services that they control.
Ledger	A ledger is a record of actions. Typically, a ledger is financial in nature and records when money is earned, when it is spent, and what the balance of the two is. Blockchains are often described as ledgers since they record the flow of tokens in a similar way.
Metaverse	The term 'metaverse' was first coined by the science fiction novelist, Neal Stephenson, in his 1992 novel *Snow Crash*. Stephenson describes a near future in which people can access a shared virtual reality to interact with one another. More recently, Meta (formerly Facebook) has further popularised the term with its ambition to create a new way for people to interact with each other online. It is most simply imagined as a type of immersive virtual reality accessed through a headset.
Mint (verb)	To mint something is to make new. Physical coins are 'minted' in a mint ready for circulation in a country. Similarly, digital tokens are minted digitally. Minting uses the language of a real world process to describe the digital process of tokenisation (see token). To mint an NFT is to create a new token that represents a unique thing, such as an artwork.
Non-fungible tokens (NFTs)	Something that is fungible is interchangeable with something else that is the same. For example, money is fungible because if I hold a five dollar note and swap it for a five dollar not that you hold, I still hold five dollars. Similarly, if I swap it for five one dollar coins, I still hold five dollars. An item that is non-fungible can't be substituted with something else without changing what it is. For example, two paintings of the same subject by the same painter are two distinct paintings even if there is an effort to make them appear to be the same. A token is a thing that represents something else. A shopping voucher is a token. In computer programming, information can be turned into a token to privately use across multiple applications. Digital files can be copied infinitely. This makes them fungible since one file can be exchanged for another file – the content of the file does not matter. Non-fungible tokens are a digital representation of a unique thing that cannot be substituted. Their uniqueness is defined by when they were 'minted,' that is, created, and added to the blockchain record. While the associated content can be viewed and shared in the same way as another digital file, the record itself is what proves it authentic. If I were to give

	you an NFT, then the transfer would be recorded on the blockchain, and I would no longer have it.
Node	A node is one point in a network. In blockchain, a node is a device that runs the software necessary to participate in the network of a given blockchain protocol. The software that a node runs validates transactions and secures a network. Nodes are typically rewarded with tokens to create incentives to continually operate, which in turn strengthens the network.
Proof-of-stake	Proof-of-stake is a consensus mechanism, that is, a method for getting agreement between the various nodes of a network. Those who run nodes and stake tokens are called validators. To become a validator, you need to deposit cryptocurrency to a specific smart contract, which is locked there until the node operator chooses to withdraw their validators from the network or through penalty. Validators are randomly selected by the software to propose new blocks and are rewarded for doing so honestly. A validator's deposit gets taken away if they behave maliciously or fail to maintain their node. Instead of spending computational effort like in proof-of-work mechanisms, proof-of-stake validators put their collateral on the line.
Proof-of-work	Proof-of-work is a consensus mechanism – using software and economic incentives to ensure that nodes can come to agreement about the state of the ledger. Fundamental to the proof-of-work SHA256 algorithm used by Bitcoin is the requirement that the nodes carry out hard computational work to earn the right to mine a new block (a set of transactions to be added to the ledger). When a new block is successfully mined, the miners are rewarded with newly minted bitcoin and transaction fees. The work required to mine a new block makes it extremely difficult and costly for an actor to try to manipulate or control the network unilaterally. However, miners in the Bitcoin network use large amounts of electricity and require bespoke hardware to be competitive, which can have environmental consequences.
Smart contract	Smart contracts are software programs that run a specific instruction when predetermined conditions have been met. In this way, they are "a contract-like arrangement expressed in code" (Sills, 2019, para. 1). For example, an NFT may include a smart contract that automatically pays an artist 10% of its sale price each time that it is sold, regardless of who is selling it or where it is being sold. Strictly speaking, a smart contract is not a contract at all; rather, it automatically applies the logic that has already been negotiated. In our example, the artist could have set the royalty to any amount.

Token and token standard	A token is a thing that represents something else. For example, a shopping voucher is a token. In computer programming, information can be turned into a token to privately use across multiple applications. The process of turning information into a token is called 'tokenisation'. The tokenisation of information also happens in blockchain. For example, to use blockchain to track the provenance of an artwork, the artwork first needs to be tokenised. That is, it's established that a token represents the artwork. The person who holds that token in their wallet is deemed to be the owner of that piece of art and the blockchain records when that token was transferred to the owner's wallet. Change of ownership is reflected in the transfer of the token that represents the artwork from one wallet to another. Minting an NFT is another way of describing the tokenisation of something. The 'something' can be digital (such as an animation) or can represent something physical. When a standard is applied to a token, it means that it functions in an expected and agreed way. They can be recognised and used by different applications on the same blockchain and increasingly, across chains. This is similar to how electronic goods need particular plugs to be compatible with the wall socket of a given country. The use of standards achieves what blockchain developers call 'composability', meaning that different components are compatible and can be easily used with other applications and smart contracts.
Token gateway	A token gateway is a mechanism that allows a person to connect their digital wallet to a service. Access to the service or website is granted based on the presence of a specific token. An example of this is community members holding an NFT that grants each of them access to a private chat channel in an online forum.
Uniform resource identifier (URI)	A uniform resource identifier is a sequence of numbers and letters that identify both the location of things used by various web technologies and what they are. These things can be anything from people, objects, places, concepts, and web pages. URIs are different from universal resource locators (URLs) in that URLs only provide the location.
Wallet	A wallet is a piece of software (such as Metamask) or a piece of hardware and software (such as a Ledger hardware wallet) that holds tokens and provides an interface that allows people to send tokens. Some wallets also display NFTs and provide an interface for staking and governance.

Web2.0	Web2.0 is also known as the social web. It signalled a conceptual shift away from the idea of broadcast to something that was more participatory. The World Wide Web experience of the 1990s was largely one-directional. While there were tools to create webpages (e.g., GeoCities) and mechanisms for basic interaction ('signing' guestbooks), people consumed more than they created. Websites were 'published' and were often one-off investments. This shifted in the early 2000s with the idea of 'social' media. Websites were built around interactions between people and the idea that using the web was both creative and consumptive took hold. To facilitate this process, platforms that simplified how people used the web began to emerge. These platforms would act as a centralising force on the web itself. Criticism of web2.0 is that it is meaningless jargon and that the idea of personal publishing (blogs), collaborative writing (wikis), and interactions in between is just people to people – which is what the web was in the first place (Laningham, 2006).
Web3	Many view web3 as different from web3.0 in that emphasis is on the decentralisation (in opposition to the centralising effect of platforms), control over one's data and how it is used, and provability of ownership (with digital wallets and tokens). Where a web2.0 platform might facilitate a transaction between two people (and take a commission for doing so), web3 enables the potential for a direct and unmediated transaction, at least in theory. The reality is murkier (as if other versioned web names were clearer) and many of technologies that support a 'semantic web' are also used by blockchain protocols. Distinguishing between the two may be a moot point. Criticism of web3 as a label is similar to that of web2.0 in that it has come to represent a number of vested interests, namely venture capitalists, who have invested heavily in the space.
Web3.0	Web3.0 is known as the 'semantic web', a term first coined by Tim Berners Lee (inventor of the World Wide Web) in 1999. The idea of the semantic web is that semantic information can be encoded with data so that it is readable by a machine. In other words, a machine can understand the properties of a given subject, its core concepts, and its relationships with other areas of knowledge. By encoding this type of information, a computer can have context and enable reuse across applications. This type of description is known as the Resource Description Framework and is one part of a set of standards set out by the World Wide Web Consortium (W3C).

Methods

Desk research involving:

- updated research on the use of blockchain technology in the cultural and creative industries;
- clarification on the technical requirements of the blockchain economy, including an estimation of the environmental costs of blockchain use in the cultural and creative industries; and,
- the limitations that digital exclusion places on cultural sector uptake of blockchain technologies.

Empirical field work:

- Survey of and semi-structured interviews with creative practitioners who are currently engaging with blockchain technologies to gain insight into innovations, uses, and business models.

In addition, Ellie Rennie is undertaking ethnographic case studies in which she engages with groups working with blockchain technologies (in the creative industries and beyond). The sections on *Envoke* and *Lost Tablets* involved participatory observation, in which Rennie has participated in meetings and followed the progress of these projects over many months. She has also experimented with other NFT projects mentioned in this report to learn how they work.

Survey Method

To answer the question 'who is using blockchain technologies in their creative practice?', we distributed a survey inviting creative practitioners to tell us about their take-up and use of blockchain technologies. We encouraged responses from both users and non-users: we were especially interested in getting a sense of the barriers to take-up confronted by creative practitioners. Given the polarising discourse around the technologies, we were also interested in understanding resistance to this take-up. The full questionnaire is included below.

Survey Data and Analysis Approach

The survey received 215 responses. After filtering out incomplete and ineligible responses, 110 survey responses were eligible for inclusion in our analysis.

Survey respondents were asked to categorise their creative occupation (Table 1), using Throsby and Petetskaya's (2017) Principal Artist Occupation (PAO) categories.

Table 1: Throsby and Petetskaya's (2017) PAO categories
Category
Writer
Visual artist
Craft practitioner
Actor and director
Dancer and choreographer
Musician
Composer
Community cultural development artist

While Throsby and Petetskaya's PAOs are underpinned by a series of detailed sub-categories, to reduce survey length and the burden on our participants we asked participants to categorise their practice within the primary categories. To these, we added three additional occupations: graphic designer, animator, and other, with a text box for respondents to further specify (Table 2).

For Throsby and Petetskaya (2017), graphic artists and animators are captured within the visual artists category.

Table 2: Throsby and Petetskaya (2017)'s PAO Visual artist sub-categories

Category	Sub-categories
Visual artist	Painter (including drawing)
	Muralist
	Sculptor
	Printmaker
	Photographer
	Video/film maker
	Performance artist
	Illustrator
	Cartoonist/Animator
	Calligrapher
	Graphic artist
	Installation artist
	Set designer/Costume designer
	Visual artist – new/digital media
	Light artist
	Collage artist
	Visual artist – public art
	Visual artist – mixed media
	Other visual artist
	Other art forms

We separated graphic designers and animators out as we had observed that this was where innovations in the NFT space were particularly emerging, and we wanted to ensure that respondents from these disciplines had a clear category to select from. We weren't convinced that these practitioners would necessarily describe themselves as visual artists, and given the survey was being delivered entirely online with no possibility for further explanation, we wanted to provide a clear category for such practitioners to select. To re-align the resulting data with Throsby and Petetskaya's (2017) categories, graphic designers and animators have been re-coded as visual artists.

We added an 'other' option for much the same reason. From our own observations, popular press coverage, and academic literature, take-up of web3 technologies by creative practitioners is heavily weighted towards not the 'traditional' arts sector but from those such as graphic design, practitioners in which have previously worked in full time service roles and are now exploiting these skills as part of an individualised creative practice. We wanted to ensure that the survey was open to these creative practitioners.

This 'other' category resulted in a variety of responses, some of which we have been able to re-categorise within Throsby and Petetskaya's (2017) PAOs (e.g., a participant categorising their practice as a 'weaver' was re-categorised as a craft practitioner). Others, however, were so numerous in their provision (e.g., games) that they prompted further consideration. While some of the 'other' categories associated with games could perhaps be re-categorised within Throsby's framework (e.g., a respondent who described their practices as 'games designer' could arguably be categorised within 'visual arts', and 'narrative development for games' could be categorised within 'writing'), their linking characteristic of 'games' has driven our decision to establish a standalone category. This decision is in keeping with the data and our observations of the web3 environment. As discussed elsewhere in this report, web3 offers a range of possibilities for games development, but it is also where we've seen much of the polarising discourse.

The 'other' category also elicited responses from artist managers and arts administrators. These categories have likewise been retained. The final categories and number of responses received within each are presented in Table 3.

Table 3: Number of responses by category

Categories	**n=**	**%**
Actor and/or director	2	2%
Art practitioner – unspecified	2	2%
Artist manager	2	2%
Arts administrator	5	5%
Community cultural development artist	4	4%
Composer	4	4%
Craft practitioner	3	3%
Games	8	7%
Musician	11	10%
New media artist	1	1%
Performance artist	2	2%
Visual artist	53	48%
Writer	13	12%
Total	**110**	**100%**

As detailed in the body of this report, we then further categorised survey respondents into users of blockchain technologies (25%, n=28), non-users (71%, n=78), and proxy users (4%, n=4) meaning those who report use of blockchain technologies, but that this was done in collaboration with someone else and on their behalf.

Importantly, not all users of blockchain are using it in their creative practice. 24% of survey respondents (n=26) report using blockchain technologies in their creative practice, with the majority categorising themselves as visual artists (n=12). Of this cohort, 2 are proxy users (working with others to do so on their behalf).

Table 4: Categories of respondents as percentage of sample

Categories	**n=**	**% of total sample (n=110)**	**% of total creative practice user sample (n=26)**
Actor and/or director	0	0%	0%
Art practitioner – unspecified	2	2%	8%
Artist manager	2	2%	8%
Arts administrator	0	0%	0%
Community cultural development artist	2	2%	8%
Composer	1	1%	4%
Craft practitioner	0	0%	0%
Games	1	1%	4%
Musician	4	4%	15%
New media artist	0	0%	0%
Performance artist	1	1%	4%
Visual artist	12	11%	46%
Writer	1	1%	4%
Total	**26**	**24%**	**100%**

Survey Questions

What kind of artist would you describe yourself as? Please select all that apply.

- Writer
- Visual
- Craft practitioner
- Actor and/or director
- Dancer and/or choreographer
- Musician
- Composer
- Community cultural development artist
- Graphic designer
- Animator
- Other (please specify)

Which artistic role do you consider your principal or main activity?

- Visual artist
- Craft practitioner
- Actor and/or director
- Dancer and/or choreographer
- Musician
- Composer
- Community cultural development artist
- Graphic designer
- Animator
- Other (please specify)

Which country do you live in?

- Australia
- Other

Which Australian state do you live in?

- Australian Capital Territory
- New South Wales
- Northern Territory
- Queensland
- South Australia
- Tasmania
- Victoria
- Western Australia

Which category best describes where you live?

- Capital city
- Regional city or town
- Rural
- Remote
- Very remote

Where were you born?

- Australia
- New Zealand
- Other Oceania
- UK and Ireland
- Continental Europe
- North Asia
- South East Asia
- South Asia
- Middle East, North Africa
- Central and West Africa
- North America
- Central America, Caribbean

- South America
- Other

Was the first language you learnt English or another language?

- English
- Another language

How old are you?

- 16-19
- 20-24
- 25-29
- 30-34
- 35-39
- 40-44
- 45-49
- 50-54
- 55-59
- 60-64
- 65-69
- 70-74
- 75-79
- 80-84
- 85-89
- 90+

What gender do you identify as?

- Male
- Female
- Non-binary
- Not listed, please specify
- Prefer not to say

Do you identify as Aboriginal and/or Torres Strait Islander?

- Aboriginal
- Torres Strait Islander
- Aboriginal and Torres Strait Islander
- No
- Prefer not to say

Do you have a disability, injury or sickness that impacts your life as an artist?

- Yes
- No

What is your **gross** annual income before tax? Your best guess is fine.

- $1-999 p/a
- $1,000-9,999 p/a
- $10,000-19,999 p/a
- $20,000-29,999 p/a
- $30,000-39,999 p/a
- $40,000-49,000 p/a
- $50,000-59,000 p/a
- $60,000-69,000 p/a
- $70,000-79,000 p/a
- $80,000-89,000 p/a
- $90,000-99,000 p/a
- $100,000-109,999 p/a
- $110,000-119,999 p/a
- $120,000-129,999 p/a
- $130,000-$139,999 p/a
- $140,000-$149,999 p/a
- $150,000-$159,999 p/a
- $160,000-169,999 p/a

- $170,000-179,999 p/a
- $180,000-$189,999 p/a
- $190,000 p/a or above

What percentage of your annual income is derived from the following categories? Your best guess is fine.

- Your creative work as an artist?
- Your work in other occupations connected with the arts, such as teaching art and arts administration?
- Other work/income, not connected with the arts?

Have you ever used a blockchain application or platform, or been involved with blockchain activities? Use can include owning cryptocurrency or NFTs.

- Yes
- No
- Not myself, but I have collaborated with others on a blockchain project

What level of blockchain user do you consider yourself to be?

- Beginner
- Intermediate
- Advanced

Which of the following blockchain activities have you participated in? Please select all that apply.

- Staking
- Mining
- Voting on improvement proposals (governance)
- Proposing improvements
- Owning tokens
- Discussing a blockchain project on a social platform such as Discord, reddit, telegram etc
- Participated in bootstrapping event or ICO
- Contributing token to liquidity pools
- I am an employee, board member or founder of a blockchain project
- Identity security
- None of the above

Have you ever used any blockchain apps or platforms in your artistic practice? Use may involve your own engagement with blockchain applications or platforms, or collaboration with others. Please select all that apply.

- NFT marketplaces (such as OpenSea)
- Smart contract platforms for audio/visual (such as Audius)
- Creative involvement in blockchain-based/decentralised games
- Certification of authenticity for my creations
- Other, please specify
- None of the above

Which of the following have you used blockchain apps or platforms for in your artistic practice? Please select all that apply.

- Merchandise
- Ticketing
- Direct sales
- Collaboration
- Publishing
- Authentication
- Other, please specify
- None of the above

Are other artists in your network using blockchain apps and platforms?

- Yes
- No

Why aren't you using blockchain apps and platforms? In this question, we are interested in your individual use, not your collaborations.

- Ethical stance based on environmental impact
- Don't know how to
- Ideological stance based on economic model
- Can't see the business case, don't know why I would want to
- It's not relevant to my artistic practice
- Can't afford it
- Other, please specify

How likely are you to use blockchain applications and/or platforms in the future? In this question, we are interested in your individual use, not your collaborations.

- Definitely won't
- Probably won't
- Unsure
- Probably will
- Definitely will

What would encourage you to use blockchain apps and platforms in the future? In this question, we are interested in your individual use, not your collaborations.

- If they were environmentally sustainable
- If they were easier to use
- If there was wider take-up in sector
- If I could access training, expertise
- Other, please specify

Has using blockchain changed your artistic practice?

- Yes, please specify
- No

Why are you using blockchain apps or platforms? Please select all that apply.

- COVID-19 related reduction in previous practice/venues
- Intellectual Property benefits, such as greater control over rights
- Engagement with blockchain communities and governance
- Artistic collaborations
- New way of artistic creation
- Other, please specify

Have you made revenue through your use of blockchain apps and platforms?

- Yes
- No

Earlier you told us that [X%] of your income is from your creative work as an artist. Of this, what percentage is derived from your use of blockchain apps and platforms? Your best guess is fine.

- Percentage of artistic income from blockchain platforms?
- Percentage of remaining artistic income?

When do you anticipate making revenue through your use of blockchain apps and platforms?

- In next 12 months
- 1-2 years
- 2-3 years
- 3-4 years
- 4-5 years
- More than 5 years
- Never

What would help Australian artists grow their use of blockchain apps or platforms? Please rank the following in order of most (1) to least (6) important.

- More information
- Training (e.g., courses)
- Funding programs to support innovative use (e.g., collaboration with coders)
- Growing audience engagement (e.g., increasing the market)
- Community of practice events
- Greater institutional support (e.g., curated NFT galleries)

Thinking ten years into the future, how important do you think blockchain apps or platforms will be for the creative industries?

- Not important
- Slightly important
- Moderately important
- Important
- Very important

Semi-Structured Interview Data and Analysis Approach

We interviewed 18 people for this report. Some of those who we interviewed were recruited via the survey (respondents were given the opportunity to register their interest in participating in an interview) and others were approached by the research team directly. The interviews were coded according to themes for the purposes of analysis.

Semi-Structured Interview Questions

Please tell us anything you want us to know about your age, gender, or where you live. This is optional. You may decide how you wish to be represented.

Have you ever used blockchain technology broadly, and, whether you have used it in your artistic practice?

How and why are you using blockchain platforms or apps? (Prompts: Which apps? Which blockchains? Who are you collaborating with?)

How did you first hear about blockchain? (Prompts: From other artists? Reading press? Crypto Twitter?)

Have you found it difficult to learn to use blockchain technologies?

How did you teach yourself or learn to use blockchain? Would something have helped you to learn faster?

What do you find most exciting about using blockchain?

Is there somebody active in the space whom you admire, and/or view as very successful?

Are there particular contexts or uses of blockchain you view as the most important? Are any not so important?

What do you think of as your primary motivator for using blockchain? (Prompts: financial, ethical, environmental)

Is there a specific problem in your sector of practice that you think blockchain is solving or best suited to solve? (Does it involve bypassing intermediaries?)

Do you have thoughts on the concept of the ‘metaverse’?

Have you lost money through fraud or dishonest scams while using these technologies? If so, please tell us about what happened, how it was resolved, and any advice or resources that would have helped.

Have you heard of anyone impersonating other artists in the space, or dodgy characters founding companies?

What marketplaces have you used?

Are you represented by an institution, such as an art gallery? Did the institution get you involved with blockchain? Have you seen an impact on your practice or income since this shift?

Many blockchain technologies promise disintermediation and to put more control in the hands of the creator. Please comment on how you feel about this. (Prompts: Is this work you wish to delegate to collaborators or a hired team? Are you excited about having more control over work some view as outside of the ‘creative process’?)

Tell us how you think blockchain apps and technologies will impact the sector over the next five to 10 years. What’s going to change, what’s going to stay the same?

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