Developments in Web3 for the Creative Industries

A Research Report for the Australia Council for the Arts

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Appendix: Glossary and Research Methods

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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 to grant 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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