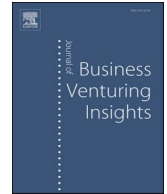




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## Beyond the bubble: Will NFTs and digital proof of ownership empower creative industry entrepreneurs?

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### A B S T R A C T

Non-fungible Tokens (NFTs) are blockchain-enabled cryptographic assets that represent proof-of-ownership for digital objects. The use of NFTs has been pioneered by creative industry entrepreneurs who have sought to generate new revenue streams and modes of stakeholder engagement. Despite rapid growth in popularity, concerns have been raised around the legal ownership of NFT assets and the prevalence of speculation and fraud associated with NFT trading. In this rapid response article, we explore the value of NFTs for creative industry entrepreneurs. First, we examine the novel digital affordances of the technology; second, we analyse NFTs through the prism of the recent Initial Coin Offering (ICO) boom and bust; and finally, we take a longer-term historical perspective to consider how past speculative waves inform the present NFT economy. While we identify some potentially valuable artistic and financial opportunities for creative industry entrepreneurs, we conclude that NFTs should be approached with caution.

### 1. Research context

Non-fungible tokens (NFTs) are the latest in a series of novel, tradeable digital assets based on blockchain technology. NFTs, in simplified terms, are blockchain-enabled cryptographic tokens designed to represent ownership of objects such as art, songs, newspaper articles, and even viral video clips. NFTs are encoded, or 'minted', on to a blockchain (such as Ethereum), which provides a digital certificate of ownership for a specific asset (see [Table 1](#) for a summary of definitional terms). They can be sold or exchanged like other cryptocurrencies (such as Bitcoin) via platforms such as [Opensea.io](#), [mintable.app](#), or [Rarible](#); however, unlike bitcoins, which are fungible assets (one bitcoin is equivalent to any other bitcoin), NFTs are non-fungible, meaning that their perceived value depends on their individual characteristics.

Since early 2021, the market for NFTs has expanded rapidly. Headline-grabbing stories about the sale of digital art ([Kastrenakes, 2021](#)) have led to a speculative boom that has encouraged established artists such as the Mick Jagger and Kings of Leon to experiment with their own charity-focussed NFTs ([Aswad, 2021](#); [Cirisano, 2021](#)). Less well-known artists are benefiting from the technology too, with the musician RAC selling a recent album as an NFT for \$708,000 ([Leising, 2021](#)).

Evaluating the potential of NFTs, particularly as we navigate a new technology searching for 'use cases', is mired in difficulty. Are we observing the faltering early days of a disruptive technology that will redistribute market power? Or are NFTs simply the latest in a chain of blockchain applications, which perhaps have more to do with speculation and capital flow than genuine function?

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## 2. The entrepreneurial potentialities of NFTs: three perspectives

Our rapid response article addresses these questions from the perspective of creative industry entrepreneurs (CIEs). We define creative industry entrepreneurs as both creators (e.g., musicians, artists, designers, photographers) and ventures who operate in the broader ecosystem by supporting the production and distribution of creative goods (e.g., art galleries, recording labels, production companies, publishers, stock image hosts etc).

To understand why NFTs have been enthusiastically adopted by CIEs, it is necessary to understand the structural challenges in the marketplaces where they operate. First, as digital objects such as imagery and music can increasingly be copied and shared at zero marginal cost, capturing value from digital creations has become difficult. For example, the owner of an image used in the ‘Disaster Girl’ internet meme, which has been used by countless millions of internet users, previously had few means of financially benefitting from this creation. At a recent auction however, Zoë Roth, who features in the meme, sold an NFT associated with the original photograph for \$500,000 (BBC News, 2021). Second, where digital goods have been monetised effectively (for example, individual songs), the structural conditions of digital creative industries can often limit value capture by creators in favour of funnelling revenues to more powerful stakeholders e.g. intermediary agents or platforms (Chalmers et al., 2021).

To reflect on these issues, we use this rapid response article to analyse NFTs from three perspectives. First, we explore the potentially novel affordances offered by NFTs as a digital technology. Second, we shed light on the characteristics of NFTs by examining the related phenomenon of initial coin offerings (ICOs). Finally, we employ a historical lens to consider how past speculative booms inform the present NFT economy. Building on these perspectives, we draw conclusions on the potential for NFTs to transform markets for both CIEs and consumers.

### 2.1. The material lens: what are novel digital affordances offered by NFTs?

One way to understand the entrepreneurial potentialities of NFTs is by examining their digital affordances (Autio et al., 2018); that is, the possibilities they might offer to perform new functions or actions, or to perform existing functions or actions differently. Affordances are not deterministic technology features, but potentialities discovered and enacted by goal-driven actors (Markus and Silver, 2008; Zammuto et al., 2007). They therefore allow us to analyse how CIEs might view NFTs as digital technologies enabling new, or different, action possibilities that could be (re-) imagined as new venture ideas (Davidsson et al., 2020; von Briel et al., 2018). But while digital affordances are relational and depend on the goals pursued by entrepreneurial agents, they are also material; that is, vested in structural features of the technology that embodies and enables NFTs. In particular, digital affordances of NFTs rest on structural features of blockchain technology, such as its reliance on a distributed ledger database, smart contracts, autonomous execution, and cryptography (Nofer et al., 2017; Yli-Huumo et al., 2016).

Principally, one could imagine that two kinds of digital affordances are associated with NFTs by CIEs. First, NFTs might be seen as offering *new* action possibilities to agents that were previously deemed unavailable or unactable. For example, NFTs could be construed as affording new forms of **ownability** that confers value for digital assets (by providing a relatively secure record of ownership). Digital assets are fundamentally characterized by infinite expansibility and non-rivalry in use (Faulkner and Runde, 2019; Kallinikos et al., 2013). These qualities are often sought after in digital age strategic competition because infinite expansibility allows ventures to make additional instances of digital assets available almost immediately and at zero costs if needed, whereas non-rivalry in use allows ventures to have multiple actors use the same content both simultaneously and sequentially without affecting each other’s use. This has, however, often created difficulties for CIEs, because enforcing copyright law at scale has been challenging. With NFTs notionally offering new ways of claiming or enacting ownability, potentialities emerge that could be leveraged by CIEs. For example, NFTs’ ability to provide a digital record of ownership might have some use as evidence of property rights.

A second kind of digital affordance of NFTs would describe action possibilities that are seen by entrepreneurial actors as being qualitatively different in-kind or in-degree. One such example is NFT’s way of enacting **verifiability**, that is, the ability to evaluate and validate asset ownership. Verifiability is a key primitive affordance that proffers protection against spoofing, tampering, denial of service, repudiation, or other security attacks (Wang et al., 2021). As such, it offers CIEs qualitatively different (perhaps occasionally better) possibilities for new venture ideas such as those that build upon services for protection, verification, or security assurance of creative outputs, which might be relevant in contexts such as gaming, trading, or collecting rarities.

**Table 1**  
Definition of key NFT-related terms.

Term	Definition
<b>Non-fungible Token (NFT)</b>	Blockchain-enabled cryptographic tokens that represent ownership of unique digital objects (e.g., an image) though typically not the underlying asset.
<b>Initial Coin Offering (ICO)</b>	A fund-raising approach that has some similarities with a conventional Initial Public Offering (IPO). In ICOs cryptographic ‘tokens’ are issued to investors and these (fungible) tokens can subsequently be exchanged by holders. Unlike IPOs, ICOs are not typically pre-authorised by securities regulators.
<b>Securitized Token Offering (STO)</b>	A form of tokenized exchange that is regulated under standard securities regulations.
<b>Blockchain</b>	A decentralized transaction and data management technology with the central idea to provide security, anonymity and data integrity without any third-party organization in control of the transactions.
<b>Gas Fee</b>	The energy cost of ‘minting’ an NFT on to the blockchain.
<b>Metaverse</b>	Immersive three-dimensional virtual worlds in which people interact as avatars with each other and with software agents, using the metaphor of the real world but without its physical limitation (Davis et al., 2009)

Other novel or qualitatively different digital affordances of NFTs might also be discovered. Important here is not whether NFTs truly yield new or different forms of features, but rather, if entrepreneurial actors can use NFTs to discover an action possibility that enables them to conceive of a new venture idea. Such potentialities can be systematically unearthed, either by examining the structural material features of blockchain technologies in which NFT affordances are vested, or by examining the possible usage contexts and goals for which affordances (new or different) might be desirable. Either strategy will identify action possibilities that can then be evaluated in terms of whether they support new venture ideas. These could be economically viable imaginary combinations of product/service offerings; potential markets or users, and means of bringing these offerings into existence (Davidsson, 2015).

## 2.2. What lessons can be learned from the ICO market?

Initial coin offerings (ICOs) are a recent development in entrepreneurial finance whereby ventures raise funding by selling digital tokens to investors (Fisch, 2019). A major difference between NFTs and ICOs is that tokens sold in ICOs are typically fungible, and the ICO sector is more mature and has received ample prior research attention. These points aside, NFTs resemble ICOs in many respects. Both are based on blockchain technology, and both involve the sale of tokens that can be traded in a secondary market after their first issuance, thus creating a speculative aspect. Because of these similarities, we now highlight three particularities of ICOs and derive implications for the emerging NFT sector.

**Dynamism.** The evolution of the ICO landscape is highly dynamic, both in terms of the number of ICOs and the funding raised. After the first ICO occurred in 2013, hardly any ICO activity took place until the end of 2016. ICOs rapidly ascended in 2017, when ~950 ICOs raised approximately ~\$7.5b in funding. Both the number of ICOs (~2600) and the funding raised (~\$12.3b) reached a peak in 2018. From there, the numbers declined to ~830 ICOs raising ~2.0b in 2019, and considerably less in 2020 (Bellavitis et al., 2021). The rapid rise and fall in ICO activity coincides with the development of the overall crypto sector and the prices of Bitcoin and Ethereum, which reached new all-time highs in 2018. The high price of Bitcoin and Ethereum indicated a positive overall sentiment towards the crypto sector, which benefitted ICOs. However, while both Bitcoin and Ethereum bounced back and quickly reached new all-time highs in 2021, the ICO domain did not see a grand resurgence. Currently, it is unclear whether and how ICOs will develop in the future or whether they will vanish entirely.

An explanation for the disinterest in ICOs might be the emergence of NFTs. The number of NFTs issued has rapidly increased in recent years, similar to the rise in ICOs in 2017 and 2018. This increase was likely fuelled by the high valuations of Bitcoin, Ethereum, and other cryptocurrencies (Dowling, 2021). The opposite effect might also apply, in that an increasing interest in NFTs has led to a renewed appraisal of the crypto sector. Disentangling the causalities behind the crypto market dynamics is an intriguing point for future research; one that could also provide insights on the future development of the NFT sector.

**Regulation and fraud.** The ICO sector is notorious for fraudulent activity. Common forms of fraud include exit scams and phishing attacks, and the ex-ante prediction of fraudulent ICOs is difficult (Hornuf et al., 2021). The extent of fraud is related to a lack of regulation, which facilitates fraudulent activities and increases uncertainty for both investors and ventures. Owing to the high investment risk in ICOs, several regulators have banned ICOs (e.g., China) or issued cautionary investor warnings (e.g., USA, Germany) (Bellavitis et al., 2021). In their analysis of ICO regulation, Bellavitis et al. (2021) show that large differences exist across countries, ranging from no regulation at all to very strict regulatory frameworks. Within the countries that have regulatory frameworks for ICOs, some countries are favourable (e.g., Singapore) while others are restrictive (e.g., USA). However, due to the global and digital nature of ICOs, the regulation of ICOs and the mitigation of fraud is difficult, most notably because ventures can rapidly change locations.

Due to their novelty, NFTs presently face a similar lack of regulation. Bellavitis et al. (2021) suggest that countries with existing cryptocurrency regulation were quicker to regulate ICOs. It is likely that countries with regulatory frameworks for cryptocurrency and ICOs will be similarly faster in introducing (or extending) dedicated NFT regulation. It also seems likely that regulatory strictness will vary. While some countries will create favourable environments that try to attract NFTs, other countries might ban NFTs outright. Likewise, the development of the NFT sector will be accompanied by fraudulent activity. While exit scams seem less likely in NFTs because the underlying asset is typically complete and not subject to further developments after the investment, NFTs are still prone to other forms of fraud, such as phishing activity. Reducing fraudulent activity will be a critical challenge that the NFT sector needs to address.

**Development as a funding mechanism.** ICOs markets have rapidly developed, with increasingly specialized types of token offerings emerging, the most prominent of which are security token offerings (STOs). While ICOs typically refer to the sale of utility tokens that confer consumptive rights to investors, STOs describe offerings in which investors acquire tokens that refer to investment products (e.g., equity, cashflow rights) (Lambert et al., 2021). Therefore, STOs are subject to securities regulation. This increases the regulatory burden for the STO venture but can decrease investors' uncertainty. Initial exchange offerings (IEOs) are another recent type of token offerings. IEOs describe token sales conducted via crypto exchanges, such as Binance. As an intermediary, the exchange manages the token offering and facilitates the investment process for investors. However, the introduction of an intermediary undermines the disintermediated nature of ICOs, which was one of their distinguishing features as a funding mechanism.

As of 2022, NFTs are created and sold without much differentiation. Given the development of the ICO sector, a future differentiation of NFTs seems likely. Such differentiation could occur based on the type of underlying asset that is sold (e.g., security or not) or based on which level of regulatory clarity the NFT creator seeks. For example, the development of security NFTs could help to reduce the high degree of uncertainty in NFTs by forcing NFT creators to adhere to certain regulations. Indeed, a discussion on whether some NFTs actually constitute securities investments is already ongoing among practitioners (Ozair, 2021).

### 2.3. A historical lens

Moving from the recent history of ICOs to a longer time horizon, financial history provides three possible lenses through which the phenomenon of NFTs can be viewed. The first of these returns to the theme of fraud. The language used to sell an NFT often implies that it confers some level of property rights on the holder, but legally, this may not actually be the case. In many circumstances, the seller does not actually own the artwork to which the NFT relates (Mendis, 2021), meaning buyers cannot typically exploit the right-holder's underlying asset (e.g. royalties from music recording or art print). This potentially places NFTs within the long history of basic frauds in which a person sells an asset they do not own. A colourful precedent is that of George C. Parker, a con man who used false documents to 'sell' the Brooklyn Bridge at the turn of the century. Parker's documents, like an NFT, purported to confer ownership of something, but had no legal power under then-current regulation.

Another potential form of fraud in NFT markets is the wash trade, whereby two closely linked parties trade an asset for a high price to give the false impression of an active and lucrative market. In its purest form, the buyer and seller are literally the same person, and trade the asset repeatedly for a high price in the hope that an uninformed observer will decide to get involved in the artificial market. Some high profile NFT sales have involved undisclosed links between the buyer and seller, suggesting that they contained elements of a wash trade (Baker, 2021; Castor, 2021). A historical analogue is the use of wash trades to manipulate U.S. railway stock prices in 1908, which led directly to Federal regulation banning the practice (Markham, 2014).

The second possible lens is financial bubbles: a market phenomenon whereby prices rise substantially before crashing, with neither the rise nor fall having an obvious financial explanation. Unlike with fraud, a bubble does not necessarily involve any intention to mislead. Investors may simply be misinformed about the true value of the bubble asset, but others will understand it thoroughly, and invest anyway in the hope of short-term profits. The consequences of financial bubbles vary: some are economically destructive, but others reward innovation and lead to long-term technological benefits. NFTs can only be considered a bubble to the extent to which demand is organic. If investors are being widely misled by misinformation, the phenomenon is more accurately viewed as a vehicle for fraud. If not, then a 'pure' bubble in NFTs should not necessarily be of concern to regulators. NFTs are not currently systemically important, and a crash would be extremely unlikely to have significant economic consequences.

Historically, bubbles linked to a new technology have sometimes resulted in social benefits (Eatwell, 2004). The main reason for this is that a bubble can channel capital towards more innovative sectors of the economy, such as railway companies in the 1840s, bicycle companies in the 1890s, or internet firms in the late 1990s (Quinn and Turner, 2020). This pattern is unlikely to repeat for NFTs however, because in this case, the investment is primarily in the assets themselves rather than an associated business. Rather than financing potentially innovative operations, the capital used to buy NFTs is partly lost to energy costs, partly paid to processors as minting fees (or 'gas fees'), and partly paid to the originators of the art, meme, or object against which it is minted. There is no particular reason to expect such flows to lead to greater innovation.

Of course, capital flows to artists can be seen as a social benefit for other reasons, which relates to the most promising historical precedent for NFTs: patronage, the financing of artists by wealthy individuals in return for cultural prestige. During the Renaissance, substantial art and literature was funded in this way (Lytle and Orgel, 1981). While NFT technology is not strictly necessary for patronage, in practice, many individuals may choose to fund creative outputs through NFTs that they would not choose to fund any other way. The challenge for regulators is therefore threefold. First, to provide legal clarity on what property rights are actually conferred by an NFT. Second, to deter fraud in the sphere. Third, to accomplish these goals in a manner which preserves the underlying novel mechanism for funding creative endeavours.

### 3. Implications for creative industry entrepreneurs

NFT markets currently enjoy remarkable growth; purportedly because the technology appears, at face value, to partially solve a longstanding problem relating to the proof of ownership for digital assets. Yet, as our analysis highlights, it is far from clear if NFTs actually achieve this feat, with many questions remaining around the legal status of the assets, the veracity of boosterish claims made by NFT proponents, and the widespread manipulation and fraud associated with NFT markets. Table 2 summarizes opportunities and threats related to NFT for CIEs. Returning to our focal question: is there value in NFTs for CIEs? We answer with a heavily caveated, yes.

**Short-term implications:** In the near-term, there is clearly some opportunity for CIEs to 'ride the wave' of a bullish and somewhat frontier marketplace. While not yet underpinned by definitive legal foundations, the principles of *ownability* and *verifiability* may notionally see NFTs emerging as a means for creative entrepreneurs to build new revenue streams by monetizing previously non-monetizable outputs. As the musician Brian Eno dryly observes, "NFTs seem to me just a way for artists to get a little piece of the action from global capitalism, our own cute little version of financialization" (Morozov, 2021a).

The affordances proffered by NFTs may additionally help to extend the lifetime value of creative offerings, allowing entrepreneurs to build on notions of exclusivity and community to encourage additional purchase behaviour amongst fan groups (Kaczynski and Kominers, 2021). NFTs also appear to be driving cross-fertilization of funding. For example, we see cases of individuals who would not previously have invested in physical art deciding to enter digital art markets (Small, 2021). These new revenue streams are to be welcomed, particularly in an era when oligopolistic digital platforms have significantly disadvantaged creators and rights-holders (Meier and Manzerolle, 2018), in some cases creating a value-gap that imperils the fundamental creation of art (Negus, 2018). Each NFT can cost around \$32 to mint (though this cost is extremely volatile and platforms such as Opensea.io offer purportedly 'free' services which they have recently had to cap owing to fraudulent usage), so issuing large numbers of them may be prohibitively expensive for less well-known artists. However, when it comes to experimentally minting one or two, the potential benefits are likely to outweigh the risks.

At the same time, based on our analysis of historical financial bubbles and ICO markets, we suggest that NFTs may be similarly

**Table 2**  
Summary of opportunities and threats relating to NFTs for creative industry entrepreneurs (CIEs).

Time Horizon	Opportunity	Illustrative Example(s)	Threat	Illustrative Example(s)
Short-Term	CIEs can ride the current wave and experiment with NFT content at minimal cost (from \$0 to around \$32 per NFT – costs correct as of Feb 2022).	This overview of music industry crypto-innovation from 2021 highlights the varied ways musicians are capitalising, often lucratively, from NFTs: ( <a href="https://nftnow.com/music/top-music-nft-moments-2021/">https://nftnow.com/music/top-music-nft-moments-2021/</a> )	The market is already saturated with NFTs, and most assets never achieve secondary sales.	Limited available data shows most creators are not generating meaningful revenue. ( <a href="https://thatkimparker.medium.com/most-artists-are-not-making-money-off-nfts-and-here-are-some-graphs-to-prove-it-c65718d4a1b8">https://thatkimparker.medium.com/most-artists-are-not-making-money-off-nfts-and-here-are-some-graphs-to-prove-it-c65718d4a1b8</a> )
	CIEs can extend lifetime value of creative offerings and the potential to exploit new affordances such as time-based or ‘dynamic’ NFTs that create ‘living art’ which change based on external stimuli. CIEs can tap into funding streams beyond traditional industry/creative sector sources.	Dynamic time-based NFT projects by Dirty Robot ( <a href="https://dirtyrobot.com/#/">https://dirtyrobot.com/#/</a> ) and Ether Cards ( <a href="https://ether.cards">https://ether.cards</a> ) hint at some novel and artistically innovative applications of NFTs.  The NFT market is dominated by younger ‘investors’ who are often prevented from buying into traditional investment products such as real estate. NFTs offer a new asset class for overlooked investor markets. ( <a href="https://inews.co.uk/opinion/nft-cryptocurrencies-young-people-gamble-old-ways-invest-1383523">https://inews.co.uk/opinion/nft-cryptocurrencies-young-people-gamble-old-ways-invest-1383523</a> ) ( <a href="https://www.colormatics.com/article/nft-audience-insights-whos-buying-nfts-and-why/">https://www.colormatics.com/article/nft-audience-insights-whos-buying-nfts-and-why/</a> )	Creative industry entrepreneurs become dependent on highly volatile revenue streams.  CIEs who successfully exploit NFTs are at high risk of fraud owing to poorly regulated and weakly-enforced markets.	Mooted regulation could disrupt the market abruptly leading to income streams being disrupted. ( <a href="https://www.forbes.com/sites/insider/2021/07/15/digital-art-may-be-next-in-the-secs-crosshairs/?sh=624305232dff">https://www.forbes.com/sites/insider/2021/07/15/digital-art-may-be-next-in-the-secs-crosshairs/?sh=624305232dff</a> )  Artists are having their intellectual property stolen with little recourse owing to the anonymous nature of blockchain. ( <a href="https://www.theguardian.com/global/2022/jan/29/huge-mess-of-theft-artists-sound-alarm-theft-nfts-proliferates">https://www.theguardian.com/global/2022/jan/29/huge-mess-of-theft-artists-sound-alarm-theft-nfts-proliferates</a> )
Long-term	CIEs may notionally be able to use NFTs to create a digital record of ownership for outputs in a way that previously would have been impractical.  NFTs may be precursors of a more effective, ethical, and sustainable set of technologies and therefore engaging with NFTs will position CIEs well for future opportunities.	CIEs may form a new asset class that creates new ecosystems of economic activity that enable further opportunities for value creation. ( <a href="https://hbr.org/2021/11/how-nfts-create-value">https://hbr.org/2021/11/how-nfts-create-value</a> )  NFTs may increase their utility if they can be efficiently securitized to enable small investors to purchase a tangible underlying asset (or fraction of an asset). ( <a href="http://www.pymnts.com/nfts/2022/pymnts-nft-series-tokenizing-assets-is-nfts-next-frontier/">www.pymnts.com/nfts/2022/pymnts-nft-series-tokenizing-assets-is-nfts-next-frontier/</a> )	NFTs, as a form of ownership, have not yet been enshrined in any meaningful form of supporting legislation or regulation. The vast majority of NFTs currently do not, in fact, have a functional application beyond perceived value as a ‘collectable’. Continued usage as a form of speculative investment is likely to undermine the perceived viability of NFTs.  NFTs are essentially exploitative in that they are primarily purchased by naïve and low-income investors who are potentially misinformed about the risks of purchasing NFTs as assets. This will undermine public confidence in NFTs when markets turn.	Leading law firms highlight the uncertainty and risk relating to NFTs ( <a href="https://www.dlapiper.com/en/us/insights/publications/2021/09/non-fungible-tokens-what-are-the-legal-risks/">https://www.dlapiper.com/en/us/insights/publications/2021/09/non-fungible-tokens-what-are-the-legal-risks/</a> )<  Research shows that 75% of NFT purchases are low value transactions made by retail investors, and most new investors have not recouped the costs of their purchases. ( <a href="https://www.ft.com/content/e95f5ac2-0476-41f4-abd4-8a99faa7737d">https://www.ft.com/content/e95f5ac2-0476-41f4-abd4-8a99faa7737d</a> ) The majority of NFT investors are not ‘sophisticated’ and marketplaces could be ‘a hotbed of misinformation and false advertising’ ( <a href="https://uk.practicallaw.thomsonreuters.com/w-030-4989?originationContext=knowHow&amp;transitionType=KnowHowItem&amp;contextData=(sc.DocLink)&amp;firstPage=true">https://uk.practicallaw.thomsonreuters.com/w-030-4989?originationContext=knowHow&amp;transitionType=KnowHowItem&amp;contextData=(sc.DocLink)&amp;firstPage=true</a> )

(continued on next page)

Table 2 (continued)

Time Horizon	Opportunity	Illustrative Example(s)	Threat	Illustrative Example(s)
	Technological, cultural, social and economic trends appear to be converging around the notion of online communities such as Facebook's Metaverse. This suggests that some form of digital ownership mechanism will become important in (notionally) decentralized virtual economies.	<p>There are also more energy efficient platforms that can reduce the environmental impact of NFTs, e.g., Palm.io which is moving towards proof-of-stake.  <a href="https://palm.io">https://palm.io</a></p> <p>Commentators speculate that the 'Metaverse' could become a dominant technology platform in the near future.  <a href="https://www.bloomberg.com/professional/blog/metaverse-may-be-800-billion-market-next-tech-platform/">https://www.bloomberg.com/professional/blog/metaverse-may-be-800-billion-market-next-tech-platform/</a></p>	Some of the problems NFTs and cryptocurrency claim to solve will be solved instead by traditional institutions such as government or collective political action. This will reduce the attractiveness of risky emerging technologies such as NFTs.	High-profile campaigns by groups such as Broken Record have forced political action with respect to creative industries. <a href="https://committees.parliament.uk/work/646/economics-of-music-streaming/">https://committees.parliament.uk/work/646/economics-of-music-streaming/</a> <a href="https://www.newstatesman.com/culture/music-theatre/2021/02/broken-record-music-streaming-spotify-tom-gray">https://www.newstatesman.com/culture/music-theatre/2021/02/broken-record-music-streaming-spotify-tom-gray</a>

ephemeral. While NFTs have the *potential* to support various new forms of digital ownership and creative patronage, sales data suggests that, to date, market activity has been dominated by speculative trading. Much of this activity has been centered on so-called cryptocollectibles, the most popular of which are often generated by standardized algorithms. The vast majority of such items are never sold at all, with average purchase prices typically being driven up by secondary sales of a small number of highly sought after items that are perceived to be exclusive (Howcroft, 2021). If NFT activity is to continue on this pathway, it may represent an opportunity for some creators to participate in a short term ‘gold rush’. Equally evident, however, is that creative industry entrepreneurs should not become overly reliant on revenue that could abruptly disappear if markets crash or if major fraud is exposed.

**Long-term Implications:** We see two possible broad longer-term trajectories for NFTs. The first trajectory draws from lessons about the evolution of digital technology infrastructure in general (Haki et al., 2020; Henfridsson and Bygstad, 2013) to suggest that NFTs, like other digital technologies, will continue to evolve and be superseded by more refined technologies. Importantly, the most likely outcomes of such technological evolution are lock-in and drift, not transformation, of organizing practices (Pentland et al., 2021).

Based on evidence from ICO markets, it also seems likely that the NFT market may cool off at some point. It is then unclear whether investors will continue to invest in NFTs, eventually sparking a new wave of interest, or whether NFTs will face a similar trajectory as ICOs, with investors moving on to next blockchain-based financial vehicle. Certainly, NFTs, in their current form, and with their current levels of institutional support, are not yet fully able to realize core affordances pertaining to legal protection and ownership. As such, the NFT may, at best, simply represent one (soon to be obsolete) step in the early genealogy of blockchain-enabled ownership mechanisms.

Looking forward, we may, for example, see securitized NFTs (similar to the aforementioned trend in STOs) that draw more on smart contract potentialities to create ongoing revenue streams for investors (and perhaps even fans). In such a case, an investor could purchase part of an individual music recording and consequently benefit from an ongoing revenue stream from the asset (through streaming plays, radio plays, licensing etc.) We also see value in other potentialities afforded by NFT technology, particularly the ability to sell digital goods that themselves evolve, or are revealed over time, which would entail something novel that few other creative media forms can do.

Because NFTs build on blockchain infrastructure, it also seems relevant to reflect on related technology developments, such as the so-called ‘Metaverse’ (Davis et al., 2009). The Metaverse, a concept recently championed by Facebook, is emblematic of the emerging Web 3.0 movement, which uses blockchain to underpin a more decentralized internet. This vision is not uncontroversial, with critics such as Francesca Brià (Morozov, 2021b) and others pouring scorn on the notion that meaningful decentralization will (or should) actually happen within the current political and economic context. Venture capitalists and ‘big tech’ are banking on the success of an increasingly virtual world (Baskerville et al., 2020), in which digital assets become primary everyday objects of exchange within self-contained economies. This enclosure of previously non-financialized goods is not necessarily implausible; many video game virtual worlds already support NFT purchases for items such as ‘skins’ and other items. Thus, NFTs may open up possibilities to expand previously established (Berente et al., 2011; Chandra and Leenders, 2012), but currently niche, practices surrounding property ownership, commercial exchange, and advertising in virtual settings (Kamin, 2021) – for better or worse.

We conclude that there are meaningful signals that suggest CIEs would benefit from investing some time developing an understanding of these trends. There is strong potential that significant capital flows will pass through digital, partly decentralized markets that are either currently in their elementary form, or do not yet exist. Indeed, there are some pertinent lessons for creative industry entrepreneurs who dismissed the first wave of digitalization and found themselves in a powerless position as markets rapidly evolved.

The alternative trajectory we foresee is that the technology simply fizzles out. For all the excitement around blockchain, there is a growing disillusion that many use-cases have been revealed as nothing more than technological solutionism. Web 3.0 could well be nothing more than a fad, as people reject the idea of more encompassing digital worlds. CIEs might also find remedies for what they perceive as market failures within the current system, through political or institutional means such as antitrust legislation and an increasing willingness to take on ‘big tech.’ Similarly, if NFT markets prove to be highly volatile and subject to fraud, many investors may question the residual value of the item they are purchasing, which could precipitate a return to more conservative models of ownership and commercialization.

#### Author statement

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#### Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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