

# DECRYPTING THE MEDIUM

## A REPORT ON THE NON-FUNGIBLE TOKEN (NFT) MARKET



## ACKNOWLEDGEMENTS

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### OCAD UNIVERSITY

OCAD University (OCAD U) is Canada's oldest and largest art, design and digital media university. Famous for its innovation, creativity and design-thinking expertise, it attracts 4,700 undergraduate and graduate students, annually, enrolled across 18 undergraduate and 7 graduate programs. OCAD U's more than 600 faculty and staff members, and 25,000 plus alumni are among Canada's leading thinkers, artists and designers. Both a post-secondary education entity and major culture and community sector player, OCAD U is a respected institution and is uniquely positioned to convene diverse experts on a range of issues, best addressed through a design-thinking, innovation-driven and inclusive lens. OCAD U fosters both niche research and graduate programs in critical areas that can support policy work priorities.

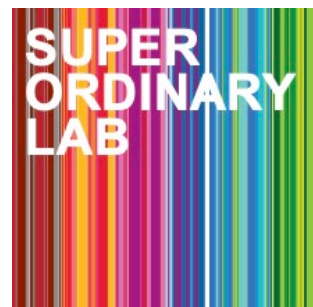
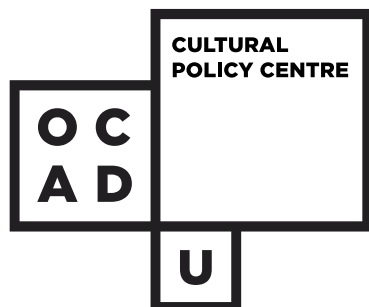
Both the research and report were led collaboratively by the Cultural Policy Centre at OCAD University and Super Ordinary Laboratory.

### Cultural Policy Centre at OCAD University (CPC)

The Cultural Policy Centre is Canada's first national cultural policy centre working to expand the arts and culture sector's capacity in policy research, program development and advocacy. Convening academics, industry experts and not for profits from across Canada, the Cultural Policy Centre at OCAD University will provide crucial direction and support for Canada's arts and culture sector as we adapt to and thrive in the ever-changing environment that characterizes the twenty-first century.

### The Super Ordinary Laboratory

Super Ordinary Lab at OCAD University looks at emerging technologies to understand their social significance and tracks broad-based trends for the purposes of meaningful innovation in technologies, ethnographic methods and cultures of production as well as potential users of these technologies.



## REPORT CITATION

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## Executive Summary

### Report Purpose and Goals

Non-fungible tokens (NFTs) are digital files that have stirred up considerable interest from investors, artists and governments, globally, especially following the \$69 million dollar sale of an NFT artwork made by American-artist Beeple, in 2021. The underlying technology of NFTs—more specifically cryptocurrency applications—challenge not only how art markets operate but how both the government and the sector provide support and protect creatives.

In January of 2022, Canadian Heritage engaged the Cultural Policy Centre at OCAD University to lead strategic foresight research with Super Ordinary Laboratory and present their aggregated findings in a March 2022 report. The primary research objective explored how the NFT market intersects with the Canadian cultural sector. The research was conducted within the context of the Government of Canada’s ongoing commitment to maintaining effective copyright legislation that promotes creativity and innovation, investment and remuneration, while also supporting access to diverse content creation and circulation.

The guiding research questions, which envelope the scope of this report, included:

- How does the NFT art market work?
- How do artists, sellers and buyers access the market?
- Is the market an extension of an existing art market or something new?
- Do artists see NFTs as a new form of artistic creation, a new medium, or a new method to monetize existing artistic practices?
- What are the hurdles and advantages for Canadian artists entering the NFT market?
- Have other countries regulated in this space and how?
- What does the Government of Canada and Canadian Heritage need to consider as they strive to continue to support and protect creatives?

### Approach and Methodology

To respond to Canadian Heritage’s research questions, the research relied primarily on strategic foresight methodology including a horizon scan, and an expert panel workshop that included scenario planning.

First, a literature review or sector scan helped to understand the emergence of the NFT technology and provide case study examples of the technology’s application. Various types of literature and writings on NFTS were analyzed and synthesized through a future forward horizon scan. The horizon scan detailed the driving forces of change (also referred to as drivers of change) and categorized them through an excel dashboard for ongoing tracking. A panel of seven experts participated in a three-hour workshop in March 2022. The workshop was used acquire perspectives on both the current and future NFT market in context to the Canadian cultural sector and industries. The research team set-up two divergent 2030 future forecasting scenarios to present to the expert panel and to guide a deeper cultural sector understanding of the NFT technology and what informs its evolution or demise. The future scenario planning helps to highlight policy opportunities today and guide government policy and the cultural sector to a more favorable outcome.

Both observational and content analysis informed data analysis. Karlsen (2014, p. 9) suggests that “paying attention to others’ ideas, to the eluding of similar ideas from various participants, [...] helps individuals focus their attention on new ideas.” Yet, paying attention is also central to analysis. Key themes were structured and grouped, from there some ideas were subsumed or deleted or merged to manage redundancy. The research team then reviewed the data, and based on the research scope, presented what they thought were the key themes and considerations related to the research questions.

### Key Findings

This research highlighted that the NFT market is rapidly evolving, and that understanding NFTs, and their overall ecosystem will require ongoing research and study. The following four key findings were highlighted:

#### **NFTs change how the art market works**

The decentralization of blockchain technology breaks down traditional closed market barriers. Artists that create NFTs or participate in the NFT market no longer need to rely on agents, auction houses, galleries, and museums to represent their art practice and generate sales. Artists can represent their own work to a global market directly building relationships with collectors rather than relying on gallery representation or an agent. There is also the added potential for artists to receive royalties and ongoing payments when the NFT is traded.

#### **Blockchain and smart contracts support more equitable copyright legislation and protect creators**

Because NFTs allow for authenticating through the blockchain, the creator or maker will always be credited and can be given a form of payment with every subsequent purchase of the artwork. The smart contract can also be used to retroactively credit artists to support either their resale rights or to decolonize heritage and artworks held in museum and gallery collections.

There is additional potential of artists ability to oversee how their minted NFTs are accounted for in recording contracts and business plans. Furthermore, NFTs allow artists to keep track of who owns the art, and this could potentially support them in simplifying their tracking of royalty payments, especially for works of art that are distributed more broadly than one-off creations. However, fraud and regulation are still blockchain concerns.

#### **NFTs create new marketplaces for artists to present their work**

With the arrival of the metaverse, artists can now create and sell both in physical and virtual marketplaces – or a blend of both – to increase their revenue channels and marketing opportunities. Grant programs need to evolve to allow artists to broaden their exhibition opportunities and advance their practices.

#### **NFTs both create barriers and reduce barriers**

The platform poses digital inequity barriers and the NFT market can be unattainable or unavailable to artists who lack financial capital or other resources. For example, in order to mint an NFT, reliable Internet access is necessary as is top of the line equipment. Financial barriers could also pose challenges for artists as to get an NFT on the blockchain there are upfront costs of a couple of hundred dollars. Other barriers include knowledge of how to mint, which is a tedious process posing a significant

investment of time to avoid risks. The above digital and NFT literacy considerations are important when thinking about retroactively crediting artists to increase their resale rights, as some artists may be older and have reduced digital capacity. All artists interested in the NFT market would benefit from learning about the associated risks through the distribution of a manual, before participating in the NFT market. Without the above resources, chances of accessing and being successful as an artist in the NFT market are reduced.

### **NFTs have the potential to increase diversity and inclusion in the Canadian art market**

The NFT art market poses an opportunity to rethink and reduce the inequities posed by the traditional art market. Like, digital and social media, which has increased the voice of artists marginalized by geography, art discipline, race, gender affinity or sexual preference, NFTs allow equity-identifying artists and artists marginalized by location a platform to monetize their work and to survive and advance as an artist. By regulating parts of the underlying NFT technology, Canadian artists are positioned better to securely and equitably advance and thrive.

#### Next Steps

As the Government of Canada moves forward in its consideration of regulating parts of the NFT market, the following opportunities should be discussed:

- Expansion of artist funding and grant programs to support NFTs and experimentation in the artistic metaverse milieu
- Center creator protections and assurances when regulating aspects of the NFT blockchain, marketplace platforms or cryptocurrency as safety is paramount for the success of NFT artists
- Broaden educational opportunities and access points for all artists to enter the NFT market with particular attention to IBPOC artists
- Explore smart contracts and blockchain as prototypes for how Canada can better protect and advance artists into the future, including their resale rights
- Evolve collection management copyright legislation to support decolonization practices that retroactively credit the original owner of the work using NFT technology
- Prioritize protecting creative remuneration and safety when regulating parts of NFTs technology and marketplace platforms
- Reduction of the environmental impact and cost of mining NFTs, especially as Canada works toward net zero in 2050

In addition, ongoing research will be critical to track drivers of change, ongoing associative drivers and new market pathways that will guide policy decision-making. Monitoring the media and industry resources for developments regularly will be central as will tracking legislation from countries around the world.

Future discussion will require collaboration and cross-departmental engagement as many of the highlighted issues embedded withing NFTs, that arose during this research, involve Government of Canada departments that inform policy beyond the creative sector and Canadian Heritage. These departments may include Environment, Finance, and Innovation, Science and Economic Development, among others.

As the global economy recovers and re-emerges from the COVID-19 pandemic, the ever-changing new normal will require ongoing adaptation to survive in new conditions. Foresight methods are a useful way to explore these changes and should be employed to support ongoing Canadian Heritage and Government of Canada policy making.

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# 1 RESEARCH DESIGN AND SCOPE

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## 1.1 Overview

*In this section, the OCAD University research team presents the projects assignment objectives for understanding NFTs in the Canadian creative sector. The assignment objectives are followed by the methodological approach and steps taken to achieve that mandate. In addition, key terms outlining the underlying technology of the NFT market are introduced to guide and support improved context and NFT literacy across the report.*

## 1.2 Purpose and Research Questions

Non-fungible tokens (NFTs) are digital files that have recently stirred up considerable interest from investors, artists and governments, globally. In 2021, an NFT artwork, minted by Beeple, sold for \$69 million through the Christie's auction house raising questions as it pertains to both the art market as well as government regulation. The underlying technology of NFTs, more specifically cryptocurrency applications, challenge how art markets operate and as a result challenge how government and the sector provide support and protect creatives.

The COVID-19 pandemic in 2020 drove the traded volume of NFTs to \$250 million. This report demystifies the popular imagination who mistakenly believe that NFTs emerged during the COVID-19 pandemic. The report further explores how NFTs may continue to gain momentum as the global economy re-emerges from the COVID-19 pandemic – detailing impacts for art and artists and their implications for policy considerations.

In January of 2022, Canadian Heritage engaged the Cultural Policy Centre at OCAD University to lead strategic foresight research with Super Ordinary Laboratory and present their aggregated findings in a March 2022 report. The research findings enclosed in this report were collected between January 2022 and March 2022. The primary research objective explored how the NFT market intersects with the Canadian cultural sector. The research was conducted within the context of the Government of Canada's ongoing commitment to maintaining effective copyright legislation that promotes creativity and innovation, investment and remuneration, while also supporting access to diverse content creation and circulation.

The guiding research questions, which envelope the scope of this report, included:

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- Have other countries regulated in this space and how?
- What does the Government of Canada and Canadian Heritage need to consider as they strive to continue to support and protect creatives?

### 1.3 Scope and Limitations

Time is a critical theme that frames not only the research duration and scope, but a rapidly evolving NFT market. First, NFTs emerged from two different shifts (artistic and economic), highlighting a particular difficulty containing and regulating NFT technology. Also, contextualizing the future of NFTs poses some uncertainty because drivers and trends in the space are evolving and emerging. For example, the recent invasion of Ukraine by the Russian government further spurred this space forward. Cryptocurrencies are being used to transfer funds by several parties. More specifically, NFT cryptocurrency technology was leveraged by the Ukrainian government to generate military funds (BBC, 2022).

The above example is provided to highlight how rapidly NFT use evolves, and that NFT technology and markets require ongoing tracking and monitoring to more fully comprehend and identify regulatory opportunities. However, by using strategic foresight methods, this report holds still the NFT market momentarily to identify trajectories and assess opportunities future-forward. The report also highlights how the underlying technology that supports an NFT, including the blockchain and cryptocurrency, also have the potential of better supporting creatives and are worthy of policy reflection and consideration. The current context of NFTs is dense, multi-layered and presents evolving questions and considerations that are difficult to answer in this reports' cursory research. As the NFT market and technology is rapidly evolving, this report offers a moment-in-time snapshot and "begs the question" for both the report and for policy considerations: how might we intervene meaningfully in this rapidly evolving technology and market, if at all?

### 1.4 Approach and Methodology

To respond to Canadian Heritage's research questions, the enclosed report relied primarily on a methodology that involved strategic foresight. As a methodology, strategic foresight supports policy making (Greenblott, O'Farrell, Olson, & Burchard, 2019). Strategic foresight is understood as a "planning tool to develop the critical thinking, planning, and management competencies for considering the impact of long-term uncertainties on near-term decision making" (Greenblott, O'Farrell, Olson, & Burchard, 2019). Yet, foresight also provides a range of tools that consider future risks and opportunities in a structured manner, in a contained moment in time.

While this report provides more nuanced detail on the discrepancies tracking and tracing the linear NFT market evolution, this section of the report provides a methodological framework, that bridges the Cultural Policy Centre and Super Ordinary Laboratory process, for situating the NFT market research. This process guides much of this reports' outline and final considerations.

This section of the report will provide an overview of the relevance of using foresight methods to track emerging technologies to guide policy making decisions. Next, a discussion of foresight tools, including horizon scanning and expert workshop with scenario modelling, will be offered to identify considerations and opportunities.

#### 1.4.1 Literature Review

The research began with a literature review to understand the emergence of the NFT technology and case study examples of the technology's application. Various types of literature and writings on NFTS were analyzed and synthesized through a future forward horizon scan that detailed the driving forces of

change (also referred to as Drivers of Change) and categorized them through an excel dashboard for ongoing tracking.

### **1.4.2 Strategic Foresight Methods**

Strategic Foresight methods are useful for identifying future policy opportunities and implications (Greenblott, O'Farrell, Olson, & Burchard, 2019). Foresight initially developed as a research approach in the 1960s to track emerging technologies: “foresight activities have been employed to make better long-term decisions, support innovation activities and strategic planning by identifying alternative trajectories for emerging technology trends and creating future scenarios” (Heger & Rohrbeck, 2012). As a methodology, it has been used to understand cyberterrorism in the United States (Greenblott, O'Farrell, Olson, & Burchard, 2019).

Researchers and policy makers leverage strategic foresight because it can look at trends (defined as behaviour repeated over time) and drivers (the reason why this behaviour is happening) and assess their current impact and future implications on an individual or an organization with the understanding that different timelines (called horizon lines) might imply different results or approaches. In this way, strategic foresight “facilitates a systems approach to problem solving and may help an agency better prepare for future threats or take early advantage of emerging opportunities” (Greenblott, O'Farrell, Olson, & Burchard, 2019, p. 246). The systems approach is particularly relevant to NFT technology as tokens exist in tandem with underlying technology including cryptocurrency, decentralized applications (DApps) including finance, and the blockchain. These underlying technologies are regulated in some jurisdictions and experience a variety of other external influences that determine their role in the NFT market.

For the purposes of this research, OCAD U began with the horizon scan. This is central to effective foresight data collection as the horizon scan initiates the positioning of scenario modeling. The research team set up two 2030 future forecasting scenarios to understand NFT technology and what informs its evolution or demise. These scenarios were introduced to an expert panel at a full-day workshop in March 2022. Scenario analysis is one of the most popular forms of strategic foresight (Conway, 2008), (Heger & Rohrbeck, 2012), (Greenblott, O'Farrell, Olson, & Burchard, 2019). From the debate and discussion about what the future of NFTs would look like in 2030, data was identified that had the potential of informing policy making decisions and support the best outcome for the Canadian cultural sector. The latter was determined by ranking and content analysis (Karsen, 2014).

#### **1.4.2.1 Horizon Scan**

Scanning the horizon for drivers of change produces new knowledge but horizon scanning also serves in developing scenario models, which would reveal and position future ideas and recommendations for discussion. This dual function of horizon scanning is critical to the foresight process (Greenblott, O'Farrell, Olson, & Burchard, 2019) and towards understanding a range of implications that would inform emerging technology. A horizon scan is a systems process for gathering and analyzing information on trends and emerging or potential developments. Because horizons can change with emerging tech, foresighters’ advocate for annual horizon scanning to stay in the know of important developments (Greenblott, O'Farrell, Olson, & Burchard, 2019). Researchers who use foresight methods ground the horizon scan through sense-making frameworks, which looks to shifts in the contextual

landscape, from, for example social, technological, economic, environmental and political categories (Conway, 2008), (Greenblott, O'Farrell, Olson, & Burchard, 2019).

Horizon scanning relies on a multitude of scanning sources including media, specialist magazines, journals and newsletters, think tank reports, internet searches, participation in meetings and conferences, and interviews with experts. Within the horizon scan, both underlying and associated (co-evolving) catalysts were identified.

#### 1.4.2.2 Expert Workshop

The expert panel is a foresight method that uses a highly structured meeting to gather information from relevant domain experts on a given issue (Popper, 2008). The goals for the NFT expert panel, included:

- Acquire expert overview of NFT usage in Canada's art and culture sectors
- Gain expert views on the future of NFTs and cultural and economic impact on Canadian artists, content makers, broadcasters, curators, collectors and Crypto Art sales.
- Convene a workshop of participants from a range of cultural industries to identify the key considerations needed to frame future Government of Canada policy discussions.

To understand the evolution of the NFT market and its impact on and future opportunities for the Canadian cultural sector, OCAD U convened an expert panel for a three-hour workshop. In total, seven diverse Canadian industry experts participated in a virtual workshop on March 6, 2022. An additional two Canadian Heritage officers were in attendance. The expert panel (also referred to as research participants) were provided an opportunity to share with Canadian Heritage their own personal and professional work in, and insights on the NFT marketplace space as well as their current views and future thoughts on this nascent, yet highly popularized digital technology.

The workshop was facilitated by OCAD U and followed a structure to illicit the production of data and knowledge. Facilitation is central to drawing out expert foresight, ensuring collaborative discussion and ensuring the domain experts are drawing out "collective sharing of insights, and mutual stimulation of ideas" (Karlsen, 2014). In foresight, debating and collaborative discussion is a prerequisite for the expert group to draw to the surface new knowledge and ideas (Karlsen, 2014).

Because the NFT market is competitive, the research team acknowledged that sharing domain expertise on a nascent technology could be deemed risky to cultural industry experts. As a result, the workshop followed the Chatham House Rule (Chatham House, 2021); whereby participants can use the information received in the workshop, but neither the identity nor the affiliation of the speaker(s), nor that of any other participant may be revealed.

The workshop was intentionally designed to present the drivers to generate a discussion on both the current context of NFTs and to fuel modelling for NFTs in 2030. By providing an overview and establishing a shared NFT knowledge, participants were able to dive into a rich industry conversation and exploration.

The workshop was hosted virtually on Zoom's videoconferencing platform. The workshop used the Miro board platform as a facilitation aid. The Miro board, an online white board, was used as a collaborative working space for participants to post sticky notes, to hold ideas and to facilitate discussion. The Miro

board included project goals and workshop agenda, participant bios, a workshop gallery for participants to share links to their NFT work. The Miro board also facilitated knowledge exchange on identified NFT drivers; these drivers were identified in the preliminary horizon scan. Miro board not only visualized knowledge and thoughts but leveraged design-thinking that facilitated the mapping of drivers and identifying the interdependencies of industry players in the NFT market.

#### 1.4.2.2.1 Scenario Modelling

From the current context, panel experts were divided into a scenario planning activity that situated them in two different future contexts: one where the NFT market soared and thrived, and the other group focused on a tech reversal or stagnated NFT art market. Both scenarios were situated in 2030.

Scenario modelling thus aims to get the desired research output in a short period of time. NFT workshop participants were separated into two breakout rooms to explore two different future scenarios. The first group explored the world of NFTs should it thrive: what if the use of NFTs became current practice and their popularity “soared”? The second breakout group explored the world as if there were a “reversal” of fortune: What if NFTs did not live up to the hype and weren’t widely adopted?

While “forward-looking time frames” in foresight scenario planning often use scenarios that are twenty to forty years ahead, particularly when guiding government policy making, the enclosed research took a more conservative future modelling projection because the NFT technology and market are evolving rapidly. It was important that time be a major consideration in the scenario modelling to ensure an ability to identify and situate realistic policy considerations and opportunities.

Participants were divided into two breakout rooms where they were invited to share their views. The workshop was recorded to support data collection, management and analysis.

#### 1.4.3 Data Analysis

The foresight methodology discussed above followed a process that led to data analysis. The workshop was analyzed to support the writing of this report. The Miro boards were archived, and screenshots were taken and filed for inclusion in this report.

Both observational and content analysis informed data analysis. Karlsen (2014, p. 9) suggests that “paying attention to others’ ideas, to the eluding of similar ideas from various participants, [...] helps individuals focus their attention on new ideas.” Yet, paying attention is also central to analysis. Key themes were structured and grouped, from there some ideas were subsumed or deleted or merged to manage redundancy. The research team then reviewed the data, and based on the research scope, presented what they thought were the key themes and considerations related to the research questions.

This report adopts the *Chatham House Rule* (2021) by anonymizing the data and not connecting statements to the experts’ name. The preliminary insights gathered from the literature review, horizon scan and workshop inform the key considerations that may guide Canadian Heritage decision-making on NFT regulation and policy development.

## 1.5 Key Terms

This section distills key concepts to support literacy of both NFT technology as well as the report. The concepts highlighted are in fact underlying drivers that are catalyzing the NFT industry and market. These drivers are referred to throughout the report.

The diagram below (figure 1) highlights that NFTs are embedded among and dependent with other technology. The diagram depicts how minting (creating) and selling an NFT are connected to underlying technologies. A guided NFT minting process is provided in the appendix to build additional literacy and convey the involved multi-layered minting process.

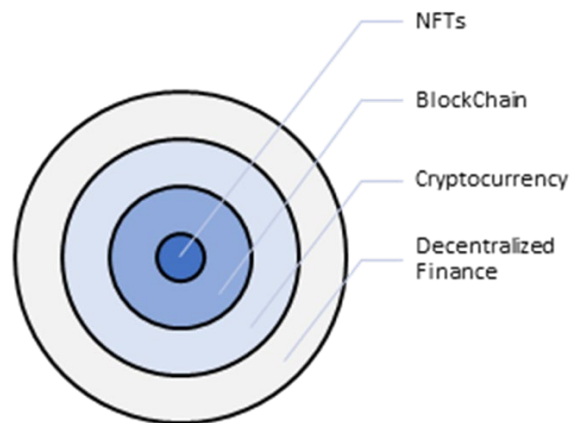


Figure 1: Circle Diagram of Underlying NFT Technology (Stein, 2022)

### 1.5.1 NFTs

NFTs stand for non-fungible tokens. Non-fungible means a unique asset, while a token refers to a digital certificate stored on a blockchain. NFTs are essentially digital abstractions that represent assets that are unique or one-of-a-kind. More specifically, NFTs refer to digital assets that are tracked on the blockchain such as Ethereum or other smart contract platforms.

### 1.5.2 Blockchain

Blockchain is the open ledger that keeps track of all the transactions or blocks. When an NFT is “minted”, which means produced and created, the digital files get converted to the blockchain. This allows the maker (NFT artist or creator) to list their work, as the original creator. This latter point is relevant for understanding the smart contract, which is referred to throughout this report, as a key regulatory consideration.

### 1.5.3 Cryptocurrency

Cryptocurrency is the token that represents the value assigned to the NFT on which it is bought or sold. The most popular cryptocurrency for buying and selling NFTs is currently Ethereum.

### 1.5.4 Decentralized Finance and Applications

Decentralized finance (DeFi) refers to the ecosystem that facilitates the market mechanics of the crypto economy. The ecosystem allows for platforms such as decentralized applications (DApps) to facilitate how someone even interacts with an NFT. For example, Metamask is an app that allows for users to interact with their crypto wallets easily thereby facilitating the ease of which they can purchase, trade or sell an NFT.

DApps use smart contracts on a Blockchain. DApps are digital applications or programs that exist and run on a blockchain or peer-to-peer (P2P) network of computers instead of a single computer. DApps are located outside the purview and control of a single authority. DApps are not only commonly used for NFTs, but also for decentralized finance, gaming and crowdfunding.

## 2 NFT EMERGENCE AND INDUSTRY

### 2.1 Overview

*This section provides a brief overview of the emerging NFT market including timeline, industry drivers and their implications, the market value, division and regulation.*

*A quick snapshot situates NFTs as a digital asset that can be owned, issued, and traded using cryptocurrencies. Cryptocurrencies are understood to be more efficient and borderless than traditional payment formats. The NFTs are unique digital files that allow people to buy and sell verified, traceable ownership of digital items including drawings, songs, and video games.*

*An NFT can either be one-of-a-kind, akin to a real-world painting, or can be a copy of many, like trading cards. NFTs also could represent physical assets and be used as collateral to obtain financial loans. NFTs are part of the blockchain and allow for complete ownership of digital artwork or other digital assets. However, the artist can still retain both copyright and production rights. This allows artists and creators to also benefit from the secondary sale of the NFT asset.*

### 2.2 Timeline

NFTs are a rapidly evolving industry market and the timeline reviewed in this section highlights challenges to track and follow central drivers as they are divergent.

Together, the following three events are significant in the evolution of NFTs: first, the beginning of “net art” in 1994; second, the 2008 global economic downturn, which set the stage for decentralized finance and cryptocurrencies; and lastly, the advent of the bitcoin in 2009, which set the stage for future growth. This section will review the above catalysts as well as other significant dates that propel the NFT technology and market forward.

Aesthetically, there’s an interesting correlation between net art and the uses of an NFT as a tradeable miniature media artwork. Net art is defined as “art that uses the Internet as a medium, which took root in 1994 (Johnson, 2021). Johnson (2021) further suggests that net art wasn’t successful because “early digital artists who have been pioneers in the field, could not find buyers or art institutions interested in this form of art. Artist and early digital art innovator Mark Amerika, working within Net Art had



envisioned a system of digital currency that would help “net artists” sell this new form of technological art (Johnson, 2021). Given the scope of the research, this is a particularly relevant nod that shows a couple of important considerations. First, that it took twenty years between the emergence of net art to lead to a \$41 billion valued market that requires underlying technologies and drivers to exist, namely cryptocurrency. The hope of many early net artists, and the world they imagined when creating their art was realized once the technological breakthroughs of blockchain helped NFTs thrive, opening a new era of tech driven art.

Locked into a cryptocurrency system, NFTs as a new (net art) media asset may be understood as a key date for the establishment of this alternative financial exchange system, as well. Laura Shin (2022), in her book *The Cryptopians*, chronicles the current “cryptocurrency craze” and traces this history back to 1994. The first two-months of the 2008 global economic downturn were also a significant point in the timeline because while “bitcoin” was understood as a term at the time, bitcoin burst forward as an “actually tradeable” alternative economic system that year. The following two events are noted as added fuel to the emergence of bitcoin: first, when the Lehman Brothers filed for bankruptcy in September and when in October, S&P 500 reported losses worse than the Depression era of the 1930s (Shin, 2022). Also in October, Satoshi Nakamoto (2008) published “Bitcoin Peer-to-Peer Electronic Cash System” a ground-breaking publication on how to use the Internet to exchange funds and bypass banks. The 2008 article was updated in 2013.

What has thus far been suggested is that NFTs was spurred by Internet art. This is not only interesting because industry sources primarily point to bitcoin as leading NFTs emergence, but it also provides some “backcasting” insight that suggests that for net art to exist and thrive in the 1990s cryptocurrency was necessary. Understanding net art better may then offer insights today for supporting NFT policy decision-making.

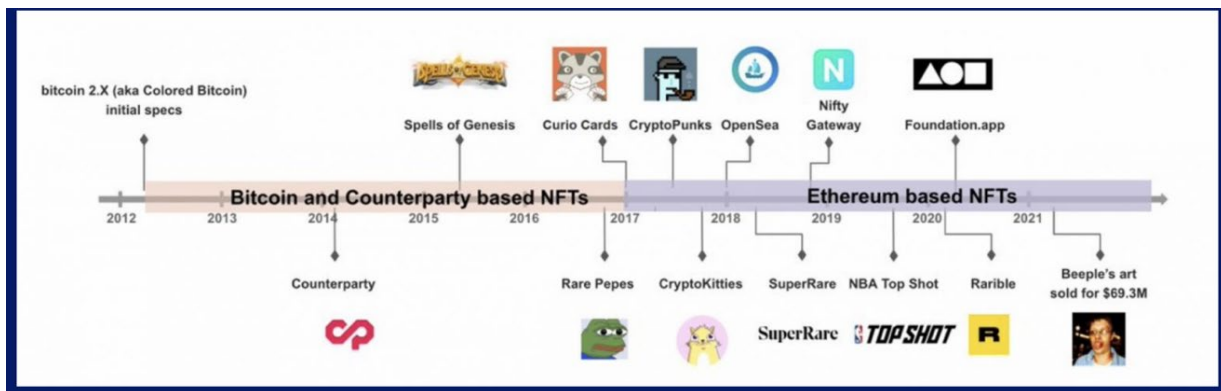


Figure 2: NFT Timeline Image (NFT Ventures, 2021)

Sources drawn primarily from the Internet including NFT websites and media monitoring sites, like figure 2 above, suggest that Bitcoin was the primary catalyst for which NFTs emerged. Shortly, after the first Bitcoin was mined in 2009 and artist Dan Kaminsky released ASCII artwork in 2011, figure 2 highlights that NFTs emerged in 2012. In the same year, “Coloured Coins” (coins that came to represent digital value of goods, especially digital goods) was considered the first major trigger to initiate the NFT genre and movement. In 2015, “Counterparty” came into virtual existence; Counterparty is a peer-to-peer (P2P) platform on the bitcoin blockchain to trade memes and digital cards. What’s being highlighted in

figure 2, is that various events and technology are spurring on the NFT market and therefore its evolution will be dependent on others creating infrastructure and or apps to metabolize through until the next event or technology happens.

The next big catalyst for crypto was in 2013 when Vitalek Buterin coined the term “cryptocurrency 2.0” (Shin, 2022). In 2017, cryptocurrency 2.0 became a firestorm of activity (Shin, 2022). Here, is arguably, the beginning of the “Hype Cycle’s Peak phase” (see figure 3 below).

As noted in figure 2 above, 2017 coincides the emergence of the Ethereum blockchain. Likewise, in 2017, “Cryptokitties” was launched as a blockchain game on Ethereum. Essentially, Cryptokitties allows virtual players to collect, breed, trade and sell virtual cats. In 2017, OpenSea launched the first “decentralized exchange and marketplace” for digital collectibles. The Covid-19 pandemic in 2020 drove the traded volume of NFTs to \$250 million. In part, this was informed by the Nifty Gateway creation of the first virtual marketplace that accepted “Fiat” as digital currency. In March 2021, American artist Beeple sold the highest bidding NFT for \$69 million US dollars.

### 2.2.1 Hype Cycle

It is unclear what direction the NFT technology and market are going. Gartner (2021), whom publish the *Gartner Hype Cycle Chart* - a credible source that provides a yearly overview of the maturity, adoption, and social application of 25 emerging technologies - suggest “that NFTs will have the biggest impact on business and society over the next ten years” (NFT Culture, 2021). As of March 2021, the NFT market was positioned at the peak of the relevancy curve, which in the Hype Cycle is called the “Peak of Inflated Expectations.” The peak of inflated expectations is said to reflect when the mass media celebrates early technology success stories. This part of the Hype Cycle also includes when companies begin their internal assessment of whether they should adopt the technology and enter the emerging market (NFT Culture, 2021). As the NFT market increases in value, market speculation among various companies has become an increased activity.

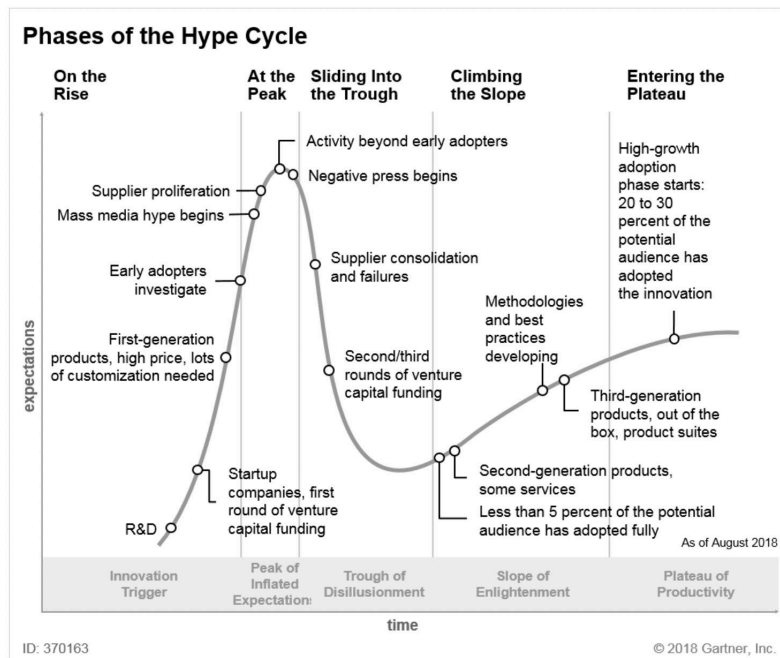


Figure 3: Gartner's Hype Cycle (NFT Culture, 2021)

Many believe that the NFT technology is poised to enter the next phase in the cycle, which is the “Trough of Disillusionment.” This cycle refers to when the technology fails to live up to expectations. Below, for example, 3D artist Peter Tarka (NFT Culture, 2021) points to four indicators that would identify the disillusionment phase in the hype cycle:

- First the collapse of Crypto prices. For example, bitcoin would be valued at less than \$10,000 and Ethereum valued at less than \$500
- Another sign is when NFT Exchanges consolidate or close, and when incidents of artists abandoning NFTs becomes visible through highly publicized channels. This latter point precludes artists using NFT as a form of contrarian art.
- Another sign would be the decreased or non-adoption of NFTs by “big players”; this may include professional sport leagues, mainstream musical adoptions, and more
- The final indicator would be the collapse of “Blue Chip” NFT art prices including works produced by CryptoPunks, Beeple Works, Picasso’s Bull and more (Tarka, 2021) (NFT Culture, 2021)

Since the beginning of the pandemic and subsequent lockdowns, NFTs have soared in popularity in Canada, and abroad (Emergen Research, 2022; Emergen Research, 2022). In 2021, the global market for NFTs had an estimated value of \$41 billion in 2021 (Daily, 2022). In 2021, the NFT market capitalization was around \$30 billion dollars. According to a *Coindesk* report—compiled from different analysts—the NFT market could reach a market cap of \$80 billion dollars in 2025 (Canny, 2022). The Ethereum blockchain remains the most popular chain on which NFTs are traded. However, there are many blockchains that are competing for the NFT market share, such as the Solano and Cardano blockchains.

### 2.3 Underlying Drivers and their Implications

In order to understand the NFT marketplace, there needs to be an in-depth understanding of the foundational technology upon which the NFT market has been built. These key terms were first introduced in the introduction section to provide preliminary definition to frequently used report concepts. This section, however, will contextualize more of the embeddedness and implications of these underlying technologies. By understanding the stable foundational technology, regulators can identify and track key drivers that are fuelling NFT industry growth or destruction, accessibility or inaccessibility, democratization and commercial competitiveness.

This starts with first understanding the difference between a token and non-fungible token. Tokens are essentially pieces of code that live on the peer-to-peer blockchain. Unlike traditional money, tokens are “digitally native, programmable, and secured by one’s crypto wallet and private key” (Rivera, 2021). Tokens are fundamental to the operation of a digital native economy or “Crypto Economy.” Figure 4 below illustrates the differences between a traditional and crypto economy. For example, the traditional economy relies on the exchange of physical goods, whereas the goods exchanged within the Crypto Economy are primarily NFTs (digital goods) (Rivera, 2021). This context is relevant as it distinguishes digital goods from physical goods and the trade and flow of goods through separate financial systems, as illustrated in Figure 4, below.

**Traditional Economy vs. Crypto Economy**

Component	Traditional Economy	Crypto Economy
Economic agents	Households / individuals, corporations, governments, and central banks	Core developers, miners/validators, investors, third party developers, entrepreneurs, consumers, DAOs
Money	Fiat (e.g., USD, Euro, Yen)	Fungible/ERC20 tokens (e.g., ETH, DAI, USDC)
Productive assets	Factories, machines, and software	Smart contracts
Goods	Food, clothing, cars, TV, parks, coal	NFTs
Exchange Mechanisms	E-commerce, retail stores, stock market	Decentralized exchanges, auctions, and order books run by smart contracts
Institutions	Government, Central Bank, corporations	DAOs

*Figure 4: Difference between traditional and crypto economy (Rivera, 2021)*

As figure 4 above illustrates, the Crypto Economy operates based on digital tokens. There are two types of essential tokens: Tokens that are either fungible or non-fungible. A fungible token is one that has stored value; can be used to exchange goods; and used by Crypto communities to make collective decisions. Cryptocurrencies such as Bitcoin and Ethereum are types of fungible tokens. They can be used to exchange goods such as NFTs due to the value that is stored in them.

A non-fungible token is used to represent ownership of a unique item, such as art, a collectible, or even virtual real estate. This token also represents the ownership of the actual token. NFTs can only have one

owner at a time, and they are secured to the blockchain. Amongst the most popular chains are Ethereum, Solano and tezos.

The underlying technology can be thought of as the building blocks that provide the foundation, which create and sustain an environment that allows for NFTs to be created, minted, traded, and sold. Below is a simple explanation before we dive deeper into each of the tech pieces.

In general, a **blockchain** is a digital ledger that is duplicated and distributed across all participants' devices in a network. The technology has tremendous implications for supply chains, finance, ownership, royalty tracking and more due to its transparency and security. Before there was the blockchain, there was the bitcoin. The blockchain was the realization that the technology that underpins the bitcoin could be separated from the currency, and it could be used for interorganizational cooperation (Gupta, 2017). "The Bitcoin" whitepaper written by the infamous and illusive Satoshi Nakamoto (2008), imagined and called for a new system of electronic payments: "What is needed is an electronic payment system based on *cryptographic proof* instead of trust, allowing any two willing parties to transact directly with each other without the need for a trusted third party" (Nakamoto, 2008; Nakamoto, 2008). We can think of this "cryptographic proof" as what has come to be known as the blockchain.

For the blockchain to be the "cryptographic proof", blockchain networks need to be driven by systems of aligned incentives. A well-functioning public blockchain requires many stakeholders, essentially a community of users. The chain needs to have users, node operators, developers and miners who play roles in a mutually beneficial network ecosystem. This makes the blockchain truly decentralized (meaning it does not need to have one central authority). The blockchain, depending on the chain it is, is maintained by a "miners" or "validators." These parties produce blocks jointly via the "consensus mechanism."

A consensus mechanism is an algorithm that participants in a blockchain network use to reach an agreement on the state of the blockchain ledger, including the order of transactions. Popular consensus algorithms include Proof-of-Work (PoW), Proof-of-Stake (PoS), and Delegated Proof-of-Stake (DPoS) (Gemini , n.d.).

Two of the most popular blockchains—the Bitcoin chain and the Ethereum chain—currently work on the proof-of-work (PoW) basis. Ethereum is said to be switching over the next few years to proof-of-stake (PoS), because PoS is said to lower the ecological cost (Kaplan, 2021). Ethereum, which has been the most popular chain and currency for NFTs, faces tight competition from chains that have adapted the PoS model such as Solano. According to the co-founder of Solano Anthony Yakovenko: "Solana incorporates an innovative Proof-of-History (PoH) timing mechanism that is implemented prior to, and facilitates, its PoS protocol structure" (Yakovenko, 2021). The next paragraph details the difference in the blockchain protocols.

Under Proof-of-Work (PoW), a distributed network of miners around the world race to solve increasingly difficult cryptographic problems in order to create a new block on the blockchain containing the new transactions. Solving these problems requires a lot of energy. When a block is entered into the blockchain, the transactions in it officially become part of the record. Miners who successfully create a block are rewarded with freshly minted tokens and all the transaction fees within the block ((Jr) (Ethereum, n.d.).

Under PoS, participants (validators) deposit a certain number of native coins as stake into the network of validator nodes. If a node is chosen to validate the next block, they'll check that all the transactions within the block are valid. If everything checks out, the node signs off on the block, and adds it to the blockchain. As a reward, the node receives the fees associated with the transactions inside the block and freshly minted tokens. If a validator approves fraudulent transactions, they'll lose a part of their stake. If the validator's stake is higher than what they receive from transaction fees, they can be trusted to correctly do their job (Jr) (Ethereum, n.d.).

**Cryptocurrency** is the virtual currency distributed through the blockchain. These are contrasted to "fiat currency:" legal tender, which is distributed through governments, and distributed through centralized financial institutions and systems. Cryptography is the process of securing the integrity of the currency and mining refers to computer processing to audit the transactions associated. A cryptocurrency is a form of digital asset based on a network that is distributed across many computers. This decentralized structure allows them to exist outside the control of governments and central authorities.

Cryptocurrencies are the fungible parts, meaning they provide value to NFTs. Each cryptocurrency has its own blockchain. This means that the currency listed on the artwork will dictate the blockchain ledger the artwork is a part of. Ethereum is one of the most popular cryptocurrencies for NFTs but due to its Proof-of-Work (PoW) has a deep ecological cost, which is controversial.

Cryptocurrencies have provided utility in terms of being able to purchase digital goods, such as NFTs. For institutions wanting to be of the digital art and goods, in the forms of collectibles, acceptance of these forms of currency could help bring in a new group of collectors.

Not until NFTs emerged, there was a gap in terms of how cryptocurrency could be spent. This has created a new rich class of collectors, usually by-passing institutions in favour of direct to market access provided by NFT marketplaces.

One consideration for artist to be aware of is how cryptocurrency income will be taxed in their jurisdiction. New legal laws, especially in Canada tax the income generated if converted to Fiat. Cryptocurrencies also fluctuate, changing the price of art daily, artists will have to take this into consideration when working with NFTs.

**Decentralized Finance (DeFi)** describes a peer-to-peer (P2P), yet public blockchain-based ecosystem, of financial services that circumvents central authorities. DeFi allows individuals to manage on their own what traditional banks typically support such as earn interest, borrow, lend, buy insurance, and trade derivatives or assets.

DeFi helps to flourish a decentralized system built on transparency, which means that the traditional ways of doing business through traditional banks and their middlemen, collapse in a future of DeFi. Most DeFi systems are built on opensource protocols. DeFi is offering new possibilities for financial markets that have been controlled and regulated by the government and central banks to a great degree. DeFi helps new forms of assets such as the NFTs to be easily purchased, exchanged and listed. This means trust is built into the smart contract system. The risks (Peter, 2022) of DeFi include token volatility, smart contract bugs and scam projects. The token volatility (Smith, 2021) also makes it risky for traditional art institutions such as museums to take part in a DeFi run protocol system (Peter, 2022) (Smith, 2021).

## 2.4 Industry Division

This section offers context that distinguishes NFT markets that operate within and catalyze the technology. As figure 5 (CoinTelegraph Research, 2021), illustrates the current NFT market can be understood as divided into the following three industry segments:

- **NFT Infrastructure:** This is the blockchain aspect of the NFT. A blockchain is the backbone and structure that allows for the verification and trackability of the digital work. Ethereum's blockchain is an example. Additional Infrastructure includes minting, storage, portfolio management and data intelligence.
- **NFT DApps:** DApps are decentralized applications that use smart contracts on a Blockchain (e.g., Ethereum) to incorporate the use of NFTs in their software. DApps are divided in different categories based on their utility. For example, DApps are virtual worlds, games, socials, sports and music.
- **NFT Marketplaces:** The NFT marketplaces are where non-fungible tokens are sold, traded, collected, and exchanged. The marketplace also facilitates lending and liquidity where NFTs can be listed as collateral, as illustrated in Figure 5 (CoinTelegraph Research, 2021). Some popular NFT marketplaces for artists to market their work, especially as a beginner in the world of NFTs, include Rarible, OpenSea, Nifty Gateway, SuperRare, Foundation and Hit et Nunc. It isn't necessary to use a marketplace but the one thing a marketplace guarantees are a pool of buyers. It is easier to gain traction and build a community amongst buyers and sellers. However, artists have used other ways to list their work on the blockchain.



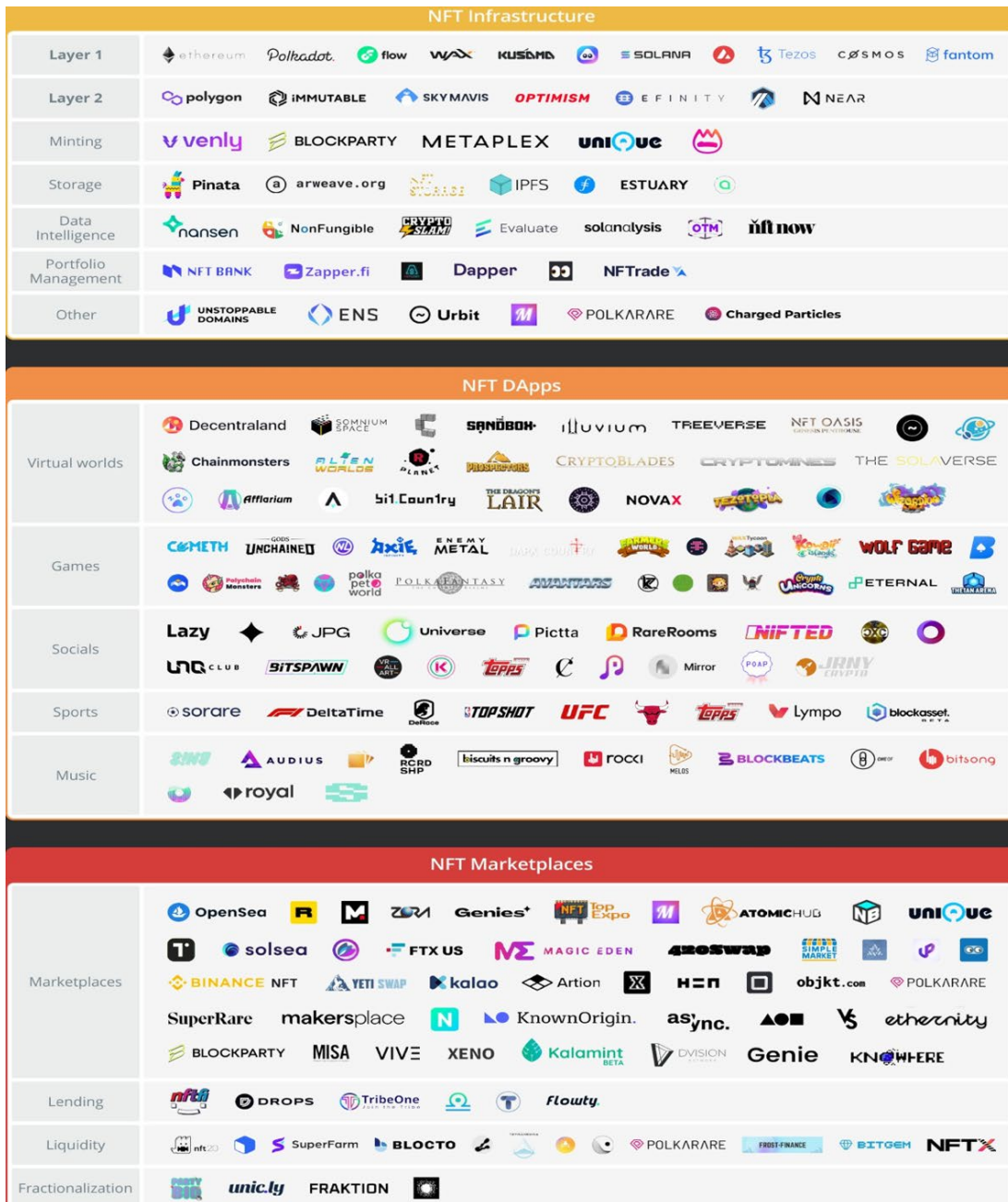


Figure 5: NFT Infrastructure by Cointelegraph Research Report (Cointelegraph Research, 2021)

Industry and public opinion are mixed as to whether NFTs are good and whether the market is viable for investment. Yet, figure 5 highlights the breadth of entities engaged in the market to date. This breadth of NFT marketplace players is propelling and amassing quickly.



## 3 CURRENT CONTEXT

### 3.1 Overview: At the time of research

*The report has thus far reviewed the methods, technology and drivers used to situate NFT production and consumption. The following section will contextualize the NFT market by drawing from range of examples to highlight how NFTs are currently being used and misused in the Canadian and international marketplace by artists, sellers and buyers. This context is particularly critical for responding to initial research questions but also for grounding report recommendations in the final section of the report.*

*A sector scan was conducted to look at how Canadians are using, regulating and taxing NFTs. NFT usage and key issues in Canada mirrors what's happening around the world. This is not surprising since the blockchain on which the NFT resides knows no geographic bounds. While several of the case studies referenced below were current and breaking when this report was presented, the NFT domain is rapidly changing.*

### 3.2 Drivers of Change

For the purposes of this report, four primary associative drivers, beyond the underlying drivers discussed in the previous section, were identified. Trends and drivers can often be confused but trends can be distinguished as short-lived whereas drivers are defined as affecting substantial change into the future (Saritas & Smith, 2011). Understanding associative drivers was particularly relevant for sharing them in the expert panel workshop as a foundation for diving deeper into scenario planning and modelling. This methodological process then helps build key futures literacy and knowledge that can inform policy making (Greenblott, O'Farrell, Olson, & Burchard, 2019).

In this report, associative drivers were identified and understood as technological, economic, environmental and legal events or entities, which substantially affect the development of an emerging technology, like NFTs. Across these four overarching associative drivers, were a total of fourteen examples of precise drivers impacting the timely or responsive rapid evolution of the NFT market.

#### Technology

**Web3 (or Web 3.0):** Web3 is a decentralized version of the Internet incorporating blockchain technologies and peer-to-peer nodes instead of being hosted by single-server cloud service providers. Web3 operates on crypto-economic protocols, which makes use of DApps (decentralized apps).

**Metaverse:** A shared social space where users "live" within a digital universe through avatars. It comprises a combination of virtual reality, augmented reality, and physical reality.

#### Economic

**Living Off Art:** NFTs offer artists both those that already have gallery credibility and those shunned by the establishment, but who have equal footing. Artists can now control how and to whom they sell their work and can also retain a ledger of ownership.

**Virtual Land Grab:** The value (cost) of digital land has seen an increase on par with and much higher than in real life (IRL) real estate markets. Some virtual estate platforms such as Cryptovoxels and Decentraland have led the way for new NFT gallery spaces and art markets.

**GameFi (Game Finance):** The rise of gaming as a cinematic medium with more people consuming games over movies, is driving the need for digital consumables and collectibles such as in game items for players. GameFi has great potential for incorporating NFTs for players. It allows them to "Earn to play," allowing them to acquire "ownership" over a game of assets.

**Decentralized Autonomous Organizations (DAO):** A DAO is an organization run by a group of people with no typical company hierarchy, who make their own rules and make decisions based on smart contracts on a blockchain. Dao's share a collective wallet and have been the largest purchasers of NFTs as assets for their respective DAO's.

**Growing Wealth Divide:** The increasing wealth disparity between the rich and poor also include the digital divide. There is significant discussion to whether NFTs exasperate or close these disparities.

**Loss of faith in Fiat Currency:** Political instability, rising inflation and income equality has caused a loss of faith in fiat currencies controlled by a central body and that are vulnerable as such. The impacts of the Russian invasion of the Ukraine have furthered this movement.

#### Legal

**Digital Authenticity:** In a world where everything digital and more and more physical can be perfectly copied in a matter of seconds, NFTs offer the ability to prove authenticity and ownership, helping art and design retain their value.

**Smart Contracts:** Smart contracts are simply programs stored on the blockchain that run once predetermined conditions are met. They are crucial to the functioning of NFTs. They are central to verify ownership of the NFT and handle transferability once the asset has been purchased.

**Pirating:** NFTs being distributed on the blockchain has not stopped the pirating of artworks. Even when ownership of an asset is linked to the blockchain, copies of JPEGs have made their way to pirating websites, which allows individuals to download the artwork, without compensating creators and owners.

**IP (Intellectual Property) Lawsuits:** Increasing lawsuits are taking place on rights to ownership. Many are between recognized brands and NFT artists and includes NFT 'pirating': where work and ownership verification may be duplicated or redirected, constituting theft.

#### Environmental

**Eco-cost of Crypto:** The high carbon footprint to mine cryptocurrencies (such as Ethereum and Bitcoin), has been increasing ever since the start of NFT hype. This gives way to more ecologically concerned blockchains, such as Holochain, and newer ones like, Solana and Cordana.

**Rolling Pandemics:** COVID-19 is the latest rolling pandemic, which forced people to physical distance (and for some: Work from home [WFH]), thereby increasing the appeal for a digital presence over IRL (In

Real Life), sharply driving the routines of Information Communication Technologies (ICTs) in education, employment and consumerism.

### 3.3 NFT Uses

This section reviews the uses of NFTs primarily in the cultural, heritage and investment sectors. Figure 6 below provides an illustration of the differing types of NFTs creation. An important reference in the figure below is that NFTs can retroactively credit an artist or creator, which is an important copyright consideration.

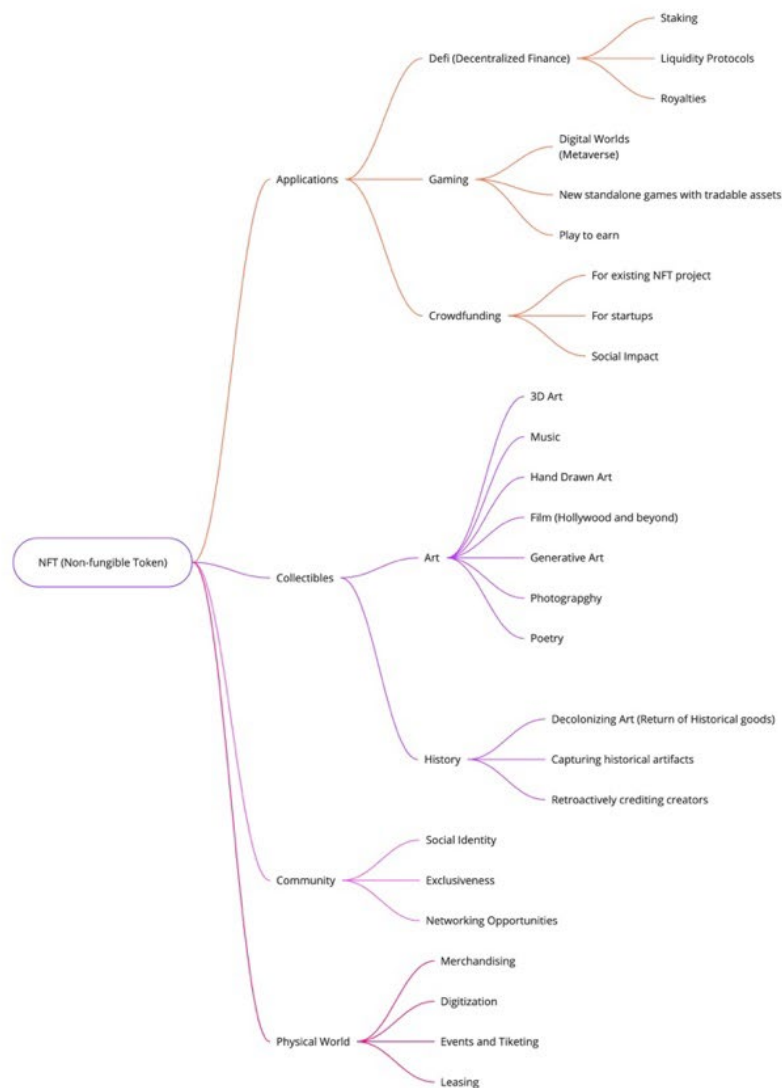


Figure 6: Illustration of Various NFT uses from Fomocap Research Discord Channel  
(Adapted by Ashraf for this report)

### 3.3.1 Artists

NFT art collectibles were the first to go mainstream in the global marketplace. This has also changed the way they are bought and sold across various platforms. NFTs are now becoming a part of how applications such as games, financial trading apps, and crowdfunding apps are designed, as illustrated in figure 6. NFTs are used by artists working in 3D art, music, hand drawn art, photography, film, poetry and generative art.

Canadian artists are not impervious to the allure of NFTs. Canadian digital artist Michah Dowbak (or Mad Dog Jones) joined the NFT art scene in November 2020. In one year, he has amassed net value at \$18 million and is now known worldwide as NFT “royalty.” This royalty is due in part to both the \$4.1 million NFT sale of his work titled *REPLICATOR* in August 2021 and to a *Fortune* (February 2022) magazine article. Dowbak’s work has been showcased at Christie’s, Sotheby’s and Phillips (Taylor, 2022). Of note, prior to Dowbak’s NFT success, he was already a commercially successful and recognized artist (Taylor, 2022). This is a relevant art market consideration because, unlike many emerging and marginalized artists, he had an established audience and clientele. In order to access the NFT market, however, he needed an art buyer open to purchasing his work using cryptocurrency.

IBPOC artists like Montreal-based Black artist Lana Denina (Spencer, Canadian Painter Earns Over \$300,000 Selling Paintings Representing Women of Color as NFTs, 2021) and Anishinaabe, Toronto-based artist Quinn Hopkins (Compton, 2021) were able to circumvent the traditional gallery business model and position their art for purchase in a larger marketplace. Denina leveraged her social media marketing skills to build-up her audience and clientele (Spencer, 2021). As of December 2021, Denina had earned \$300,000 from her NFT artwork (Spencer, 2021).

Other marginalized groups are leveraging NFT technology to create accessible and safe digital spaces. For example, Goge is an LGBTQ+ marketplace that trades NFTs using Doge coins (CBJ Newsmakers, 2022).

Recently, digital art galleries have filled the gap to provide NFT artists with exhibition and curatorial support, which is not an essential feature of online NFT marketplaces. In April of 2021, Transfer Gallery and Left Gallery partnered to present an online exhibition titled *Pieces of Me*. This exhibition was ground-breaking because it presented many forms of works, even games built by artists. Below, figure 7 shows a still from a game built by art collective Keiken (O'Regan, 2020).

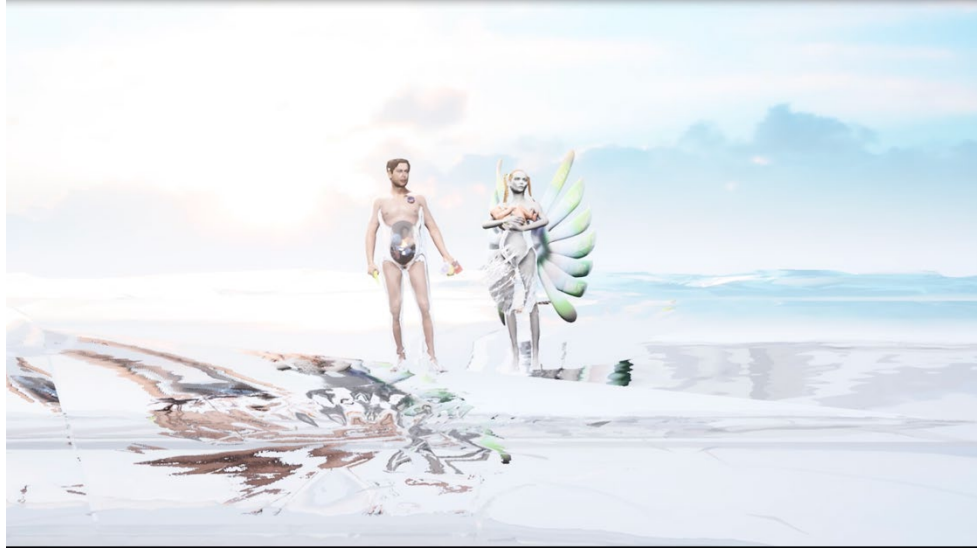


Figure 7: Still from art collective Keiken's *Wisdoms for Love 3.0 (Metaverse: We are at the End of Something)* (2019): ([www.piecesofme.online/](http://www.piecesofme.online/))

Artists looking for more curatorial support and established art practices now have access to newer online only galleries, but traditional art markets are also adopting hybrid models. There have been certain traditional galleries that are now in the metaverse, concentrating on NFTs (Thaddeus-Johns, 2022).

König Galerie was one of the first major art dealers to “rent virtual land” and to showcase artworks in Decentraland, an online metaverse and virtual world based on the blockchain (Kok, 2021). König Galerie’s first NFT show called 'THE ARTIST IS ONLINE. DIGITAL PAINTINGS AND SCULPTURES IN A VIRTUAL WORLD' (emphasis in the original copy) featured established digital artists (Kok, 2021).



A scene inside König Galerie's virtual show on Decentraland.

Figure 8: A scene inside König Galerie's virtual show on Decentraland (Kok, 2021)

NFT artists are located across Canada and a more comprehensive list or database can be provided in future research scopes.

### 3.3.2 New Models for the Arts

As the international art world adopts to the new realities of the NFT world, Canadian artists and galleries have been pushing the envelope on what is possible in terms of establishing new models for artists seeking support in terms of NFT curation and exhibition guidance.

The workshop conducted as part of the enclosed research was informative about how Canadian artists are minting their work and leading NFT innovations.

For example, Canadian artist Mitchell F. Chan (2017) presented one of the very first NFT shows at InterAccess Gallery in Toronto. Chan’s NFT artwork - titled “Digital Zones of Immaterial Pictorial Sensibility” - was “one of the earliest NFT artworks to be exhibited and minted in a legacy art gallery,” in 2017. In 2017, Chan’s artwork was also accompanied by a 33-page paper that helps artists, curators, and anybody in the artworld and beyond, grapple with the possibilities of art in the blockchain (Chan, August 2017). This echoes a need for NFT art education and literacy.

Some artists like Martin Lukas Ostachowski present their work directly on their website, rather than NFT marketplace websites (for e.g., OpenSea). Martin’s work is also a deeper inquiry into the blockchain. Ostachowski’s NFT pieces *Cloud Hashes* visualized many aspects of the Hash (#) function and algorithm of the blockchain (Ostachowski, 2020). Figure 9 shows a still from Ostachowski’s piece *Cloud Hash One*, which can be viewed and purchased directly through his website. Ostachowski further researches the constant flux in the definition of art in the blockchain. His research is a good primer for any artist trying to understand the different layers of art, that are in some cases NFTs (Ostachowski, 2020).



Figure 9: Screen shot Still of Martin Lukas Ostachowski's *Cloud Hash One*, an animated art exploring hash numbers of the blockchain (<https://mlo.art/artwork/cloud-hash-one/>)



### 3.3.3 NFT Galleries in Toronto

Across the world, NFTs are migrating from online digital marketplaces like OpenSea to the Metaverse to real-life art auction houses like Sotheby's and Christie's to museums like the British Museum, and finally spilling into brick-and-mortar galleries like Toronto's LALAContemporary, which held its first NFT art show in 2021. The gallery exhibited work by Mark Bland, a Toronto-based digital artist, who works both in print and digital media (Ferguson, 2021).

Philippine-based Ownly House of Art, which currently sells on the NFT marketplace OpenSea, also has NFT designs on a physical gallery in Toronto (Rico, 2021). This Toronto gallery offers a collection of tokenized physical art, onsite.

As promoted on *Hidden* recently, there is a Toronto-based NFT gallery operating as VERSE in secret city locations between April and December 2022 (VERSE NFT Gallery: Toronto, n.d.).

### 3.3.4 Collections Management: Art Galleries and Museums

As highlighted in figure 7 above, NFTs are being used in the historical milieu to decolonize art, capture artifacts and retroactively credit creators. Blockchain technologies have focused on developing marketplaces for the NFT space, however many in the art world believe that the impact of blockchain based tools on practices of curation and collective decision making will have massive if not revolutionary impact on art and art history.

The NFT technology may impact art gallery and museums' collection management and curatorial processes. The research report "A blockchain art history timeline" (Kinsey & Catlow, 2020) provides a real-time blockchain-based timeline that supports artistic research and curatorial underpinnings that are being developed and changed by blockchain-based technologies, like NFTs. Among the cultural industries included in this real-time blockchain is literary publishing.

As much as art is being changed by the NFT landscape, history especially historical artifacts can be retroactively brought onto the blockchain; this practice could have further consequences for the artist resale right. Yet, for museums and art galleries such a practice points to the decolonization of collections. In 2022, for example, after an unsuccessful 2020 loan request of a statue of a slain soldier by the Congolese Plantation Workers Art League (CATPC), a statue held in the collections of the Virginia Museum of Fine Art (VMFA) was minted as an NFT highlighting opportunities for decolonization (Balot, 2022). Now, in 2022, the statue is at the center of dispute with the VMFA, sparking what is construed as a "copyright violation" (CATPC Virginia Museum of Fine Arts Statue NFT Dispute, 2022). This example raises interesting and relevant considerations for the Canadian cultural sector especially in correlation to the long-standing exploration of decolonizing collections. Canada may want to take the lead in evolving copyright legislation as it relates to museum heritage and art gallery collections to support both decolonizing practices and to mitigate potential copyright lawsuits.

### 3.3.5 Other Uses

With the increase in media attention and celebrity endorsement, there is also a surge of interest from Canadian investors eager to be part of the NFT "gold rush". *The Globe and Mail* (Bradbury, 2022) and *MoneySense* (Barhat, 2022) have both published NFT buying guides.

As figure 6 shows (on page 26), NFTs are not just minted for artwork or collectibles, they are also being used for both virtual and physical assets in gaming, sports memorabilia, music and real estate. For example, after successfully minting and selling NFTs for a Gregory Marshall designed Yacht, *Cloud Yacht's* next step (code name Project Metaverse) is to “sell and build a physical superyacht” using NFT technology (Jackson, 2022). Also, in Florida, a house was purchased for \$653 thousand dollars through an NFT (Quizoz-Gutierrez, 2022). The advantage of using NFTs for real-estate is that it reduces the amount of paperwork required during the transaction and initiates an ownership ledger (Sonenreich, 2022).

Some NFTs border on the grotesque. For example, David Birch (2022) highlights how NFT technology documented an X-ray exam of a Paris Bataclan massacre survivor, which was later offered for sale by the attending surgeon (Birch, 2022).

For those too nervous to purchase an NFT, *The Globe and Mail* (Bradbury, 2022) recently published an article about how people can buy stock in companies that invest in NFTs as an alternative option. As an example, Bradbury pointed to Toronto-based Tokens.com, which bought \$2.4 million USD dollars of digital real estate in “Decentraland” - a metaverse (Bradbury, 2022).

However, *Koho's* Dan Bucherer (2021) warns that people should treat NFT trading as gambling or a potentially lucrative hobby. Bucherer (2021) further indicates that investments in NFTs should not replace buyers' Registered Retirement Savings account, and investors should be ready to lose the entirety of their investment.

### 3.4 Regulation and Policy Opportunities

This section helps situate regulatory and policy risks and opportunities for NFTs in the future and is drawn from the literature review and scan. It looks at the risks and opportunities from an environmental, equity and inclusion, financial, and safety regulatory perspective.

#### 3.4.1 Regulation

In the *New York Times' Sway* podcast titled “What the Heck are NFTs? Let's ask Beeple,” Kara Swisher (2021) reminds her audience that NFTs are still a nascent technology. Both Swisher and her guest artist Beeple – who sold a single NFT digital artwork for \$69 million – wonder what the future of NFTs looks like moving forward. Swisher (2021) asks: How will it be used? What will it look like? Such questions prove to be a real headscratcher for regulators who are trying to develop or enact policy for a moving target. Because how do you regulate technology that is quickly being adopted yet also evolving?

The United States and parts of Europe have regulated aspects of the underlying NFT technology. On March 9, 2022, the White House, reportedly shared an executive order ensuring responsible development of digital assets. This executive order highlighted that cryptocurrency might have an impact on the value of US currency at home and abroad as well as on the overall economy. The US government also acknowledged the threat of fraud and the use of cybercurrency for money laundering. This executive order is positioned for completion in under six-months with a “a corresponding legislative proposal” in a little less than seven months (Biden Jr, 2022). This highlights again how rapid the NFT market evolves and that there are significant and ongoing efforts to contain parts of the NFTs underlying technology.



In addition, both Canadian and American regulators are exploring if investment in NFTs should be treated as securities, like stock (Chisolm, Dewan, & Gebert, 2021) .

In other countries, NFTs are banned. For example, Cuban artists are unable to participate in the NFT marketplace in their own country and Thailand has also banned trading and minting of NFTs (Shah, 2021).

### Decentralization

Blockchain is decentralized, which means that there is no regulatory body overseeing it. This could mean that if there was an infraction of sorts, such as a large hack or a scam, there would be no regulation to enforce legal policy and governance.

### Smart Contracts

The blockchain runs on smart contracts which are not yet legally recognized in all countries as proof of ownership (Exchange, 2019; Exchange, 2019). This could mean negotiating jurisdiction especially for the heritage and arts sector. Further, implications involved negotiating within the international art market, especially NFTs on the blockchain.

The blockchain holds significant value for all industries, especially the cultural industries. This is because NFTs allow for authenticating through the blockchain, which means the creator or maker will always be credited and can be given a form of payment with every subsequent purchase of the artwork. This has relevance to Canadian Artists Representation (CARFAC) National and their advocacy for the Artists' Resale Right. NFTs have also opened new possibilities for conceptual and performance artists to be credited for their works (Cagnoli, 2020). The blockchain further gives back the control to makers, creators, and artists. In a report published by McKinsey and Company (Takahashi, 2017), figure 10 below provides five-key blockchain opportunities to protect the rights of the artists.

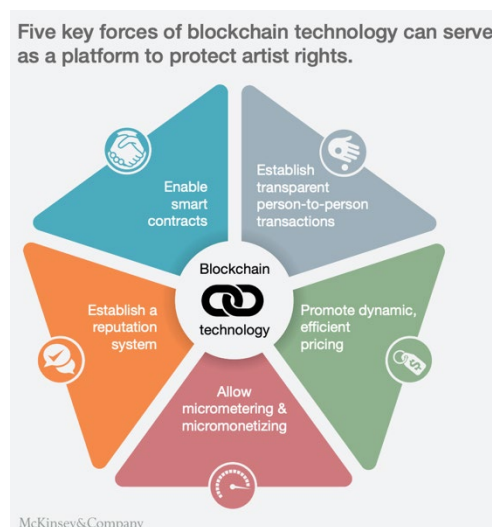


Figure 10: Five key forces of Blockchain (Takahashi, 2017)

Exploring how artists benefit from the blockchain including the potential for regulating or standardizing the smart contract in the Canadian cultural sector would have positive impacts on individual artists but may annoy collectors and auction houses.

### Fraud

In a mostly unregulated market, fraud is a concern. Global and financial journalist and commentator, David G.W. Birch (2022) suggested that 80 percent of the NFTs created for free on the [OpenSea] platform are "plagiarized works, fake collections, and spam." He further added: "It looks as if NFTs are providing a platform for innovation in fraud as well as innovation in creative works" (Birch, 2022). Birch (2022) also highlights another common NFT fraud, known as the "Rug Pull." The rug pull refers to a recurring NFT fraud scam where the fraudster announces an upcoming release of a highly valuable NFT then collects and accepts advance payment only to disappear without ever transferring or producing the NFT (Birch, 2022). Another known NFT scam is referred to as the "Honey Pot." This occurs when the programmer of the smart contract inserts backdoor code that stops any other wallet than their own from selling the token (Birch, 2022). Further, there are reports of "Wash Trading," where owners buy their own tokens to drive-up prices. This is but one example of fraud happening in the NFT marketplace (Tran, 2022).

### Intellectual Property (IP) and Copyright

An important consideration in the regulatory discussion is that an NFT purchase does not include IP ownership. The artist retains IP unless the copyright itself is sold, gifted or transferred to the investor. For example, *Star Wars Stormtrooper* helmets were photographed and sold as NFTs without permission. The collection called "Art Wars" sold for more than \$7.5 million dollars (Redman, 2021).

Plagiarized works aren't limited to digital copies or reproductions. For example, Nike™ is currently suing an online sneaker reselling platform named StockX because it sold 500 unauthorized "Nike-branded" NFTs with the promise that tokens can be redeemed for real life versions later (Brittain, 2022).

Overall, the literature review on regulation highlighted that the NFT market raised intellectual property, and fraud concerns. Interestingly, these same risks and opportunities were echoed by the research participants in the NFT workshop panel and will be discussed further later in the report.

### Tax Legislation and Investment

For investors, regulators are trying to adapt tax and investment laws to safeguard NFT trade.

The Canada Revenue Agency (CRA) is ahead of other regulators since they already regulate profits gained through cryptocurrency and have a policy in place for taxing profits earned from the sale of NFTs (Guide for cryptocurrency users and tax professionals, 2021).

In short, the policy prerogative is as follows: Buying an NFT is not taxable but selling one might be.

For those who view NFT has a viable investment, the CRA treats cryptocurrency as a commodity. For income tax purposes, it's up to individual taxpayers to determine and report cryptocurrency activity resulting in income or capital gain; if it's a business activity, CRA expects records of all transactions and market value to be stored for a maximum of six years.

If cryptocurrency is used to purchase goods or service, it is considered a barter transaction. However, if profits are made, it is considered a business transaction.

If a taxable property or service is exchanged for cryptocurrency, GST/HST is calculated based on fair market value at the time of the transaction (Canada Revenue Agency, 2021).

For those purchasing NFTs as investment, regulator discourse as per legal firm McMillan, revolves around NFTs and their implications under the Canadian Securities Law (Chisolm, Dewan, & Gebert, 2021). The Canadian Securities Administrators (CSAs) have historically been known to rely on the “Howey Test”, a framework developed by the United States’ Securities and Exchange Commission to determine if an investment should be considered a security. To be considered as such, the investment contract must answer the following four questions:

1. *Has there been an investment of money or assets?*
2. *Does the investment of money or assets involve a common enterprise?*
3. *Is there a reasonable expectation of profit?*
4. *Does any profit come from the efforts of a promoter or third party?*

To date, the CSAs have indicated that NFTs do not meet the second and fourth question. However, the CSA did not take into consideration “Fractionalized NFTs”, which refers to the development of new marketplaces that offer investors the opportunity to purchase and sell fractions of an NFT.

McMillan is unsure of how the Ontario Securities Act will regulate NFTs in their province since they don’t rely on American laws to guide legal decisions.

Meanwhile in the U.S., regulators are also trying to assess if NFTs “qualify as securities and should be regulated like stocks” (Baystreet Staff, 2022).

In addition to regulatory consideration, environmental and equity, diversity and inclusion are key considerations that were raised in the literature.

### **3.4.2 Policy Opportunities**

#### Environmental

The environmental cost of minting, processing and storing an NFT is well documented. This is due to blockchain and how it works: miners with access to massive computing power are needed to solve encrypted puzzles to approve transactions on the blocks. This is time consuming and uses a lot of energy. Further, the Proof-of-Work protocol, or blockchain’s “consensus mechanism,” is a system that allows all the computers in a crypto network to agree about which transactions are legitimate. This understanding is important because it provides protocol context. The PoW protocol is used to verify new transactions, add them to the blockchain, and create new tokens – a process that requires and uses a considerable amount of energy.

In the *New York Times*, Hiroko Tabuchi (2021) reported that “an average NFT has a stunning environmental footprint of over 200 kilograms of planet-warming carbon, equivalent to driving 500 miles in a typical American gasoline-powered car.” Similarly, technologist and art practitioner, Memo Atken’s (2020) *Medium* article “The Unreasonable Ecological Cost of #cryptoart” caused a significant stir in the blockchain and NFT industry because it highlighted the energy and the resulting carbon emissions

required to mint an NFT. Atken (2020) illustrated that the minting of an NFT was equivalent to the carbon emissions during a one and a half-hour flight. In addition, selling an NFT with a few bids is comparable to a three-to-four-hour flight, while an extremely popular NFT with more bids and more sales would have the carbon footprint of five or more-hour flight (Atken, 2020).

### Equity and Inclusion

To increase access to the NFT market, in early 2021 Francophone Canadian artist Nicolas Sassoon intentionally invited Canadian IBPOC artists to “Foundation” – an invite only NFT marketplace (foundation.app). This invitation ensured more equitable representation of NFT artists. In addition, the Harbour Collective recently put out a call for applications inviting Indigenous Canadian artists to participate in a series of workshops to introduce them to NFT production. Further targeting marketplaces and educational workshops to under-represented groups, while providing them funding to enter the NFT market and reduce barriers (Coastline, 2022).

As highlighted by IBPOC artists Lana Denina and Quinn Hopkins (on page 28), the use of NFTs to support equity deserving groups has shown great promise in helping artists circumvent the traditional art marketplace.

Overall, the focus on encryption and security, still makes it a litigious medium. The token is not the art piece or the art file. Just like its physical counterparts, NFT minted digital art is subject to copyright and intellectual property infringement. Furthermore, the various blockchains that NFTs rely on, are not impervious to hacking and theft, but the smart contract can at least protect NFT creators and help them manage payment and circulate tracking.

## **4 A VIEW FROM THE FUTURE: NFT INDUSTRY IN 2030**

### **4.1 Overview**

*This section frames content gathered during a March 2022 workshop, which discussed NFT art and cultural practices, the changing NFT landscape, and matters of consideration for the Canadian government, with insight from cultural industry experts. The seven participating NFT experts were chosen for their range of insights and to aid the research through a design-thinking, innovation-driven and inclusive lens. The workshop involved future scenario modelling, which supports better program development and planning, today.*

*To ground future scenarios of the NFT market as it relates to the Canadian cultural sector, this section first reviews how the research participants contextualized the current NFT technology in Canada. Next, this section presents two futures scenarios of the NFT market in Canada. The first scenario reflects on the condition of the NFT market soaring or thriving into and beyond 2030. The second scenario considers the NFT market reversing or stagnating. To conclude this section, the report positions a view to the future to draw upon the reports’ key considerations and themes.*

### **4.2 Positioning the Expert View of the Current Canadian NFT Market**

The impacts of NFTs are varied and sometimes conflicting in outcome. Below we identify the impacts of NFTS on art (inclusive of cultural products) and art markets (inclusive of cultural business) detailing changing roles, players and concerns in the Canadian art market including issues related to local

communities, cultural sectors, and policies, and international markets, including differing usages and comparisons with other countries.

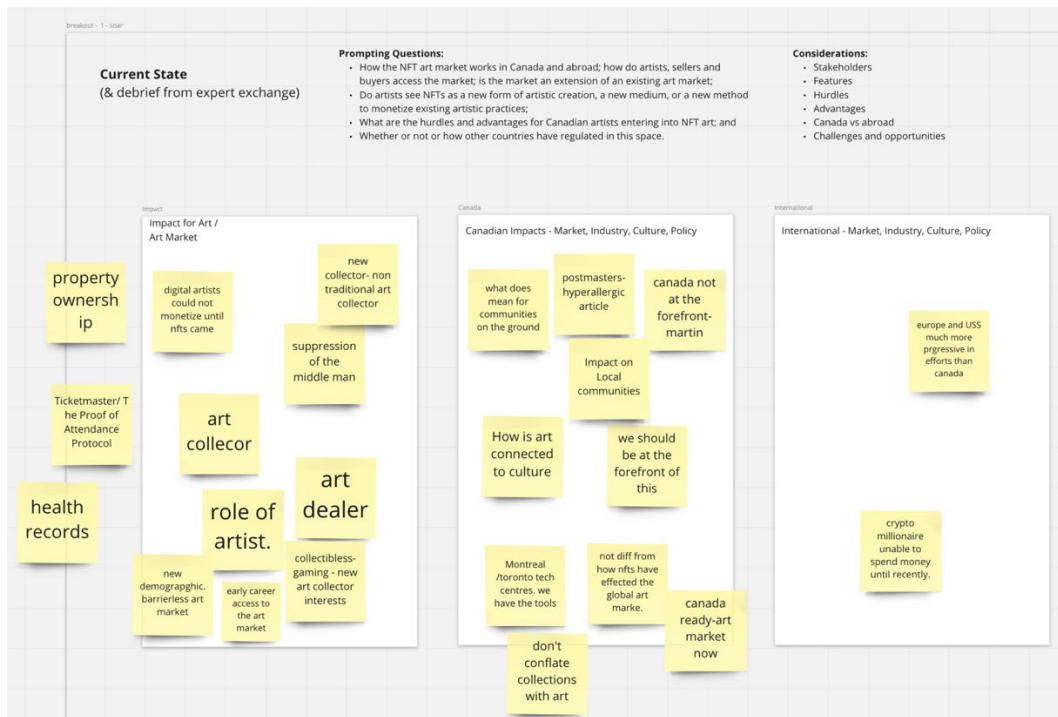


Figure 12: Current State (Soar group) data capture from workshop Miro board

## Impact for Art and Art Market

### Roles

NFTs are changing what it means to be an artist. A number of the workshop participants identified with the term 'artist' and some felt that they were also better categorized within the culture sector as producers: of cultural products or culture businesses / enterprises. The domain range of our expert NFT creators spanned from the arts to architecture to broader new media sectors, and sometimes without distinction.

For artists, peer-to-peer technology are allowing artists to sell direct-to-market, adopting the traditional roles and responsibilities of traditional art dealers or circumventing them all together.

Art collection itself as a category was changing, participants felt entry barriers dissolving, and the art market becoming almost barrierless. This meant an influx of new people, outside the traditional art world, becoming collectors. As a result, what they are collecting is also changing. This ranges from trading cards, trending curiosities (like CryptoKitties) and other game items, representing the crossover of art and culture products.

### Education

Currently artists, collectors and vendors find information on NFTs on Twitter, Discord and last year on Clubhouse. None of our experts rely on Facebook to retrieve NFT information.

### Monetization

NFTs currently impact the art market positively by providing artists new avenues to monetize their work. As a result, it's changing the relationship artists have with money. One participant shared that this is really the first time they can think about money without a sense of guilt or feeling bad for wanting to monetize their work.

However, many don't understand the cost involved in minting an NFT (which was estimated to average close to \$200) and the risks associated with this technology (e.g., see fraud below). Many warned that NFTs uphold class distinctions already prevalent in the art world unless one already has wealth, the NFT art market will be unattainable or unavailable to many artists.

### Fraud and Ethics

Scams are ruining NFT marketplaces. For example, "pump-and-dump" systems may organize to over- or hyper- value digital art. Although not fraud per se, there are multiple tactics to inflate trading prices, such as hiring celebrities to boost the NFT craze and, consequently, valuation. Ethical concerns also include environmental considerations such as using blockchains that operate on a consciously reduced ecological footprint. Unfortunately, for higher financial gains, nothing currently beats the cryptocurrency Ethereum.

### Technology

Some in the group saw NFTs not so much as a new story, but a natural evolution of art influenced by the introduction of this emerging technology. Technology and art co-evolve. There was debate between stakeholders on the use of an open versus closed platforms (think NFT art market). An open platform reduces overhead and regulation, but a closed platform provides more security.

### Impact for Canadian Market

When focusing solely on the impact of NFTs on the Canadian art market, discussion revolved around the lack of funding, the lack of Canadian identity and the lack or slow adoption of NFTs in our country. It was hard for one participant to differentiate issues between Canada and the world because the Internet crosses geographical (national) boundaries.

### Funding

Canadian art is not traditionally market driven. It is rather grant or ARC driven. NFTs are opening a new market driven avenue for Canadian artists. The difficulty is that in the NFT world you sometimes don't even know the artist's or vendor's real name or where they are based geographically. This makes it hard for Canadian artist to get funding. The Canadian funding model focuses on the nationality of the creator, yet on the Web that's often not readily available.

### National Identity

There is little national identity expressed in the NFT space. Most NFT issues are global. One expert shared that in early 2021 Franco-Canadian artist Nicolas Sassoon was intentionally inviting Canadian IBPOC artists to Foundation – an invite only (i.e., private) NFT marketplace.

### NFT Adoption

Canada is not at the forefront of the global NFT art world. Canada's art market is seen as conservative, especially in Toronto, and often focused on mere financial interests.

What is required to begin, is a hybrid business model one that makes space for both physical and digital art. However, traditional institutions, including granting agencies, are slow to adopt. Some participants found the support from cultural focal points such as museums and galleries, did not provide Canadian artists with the necessary support in the space, such as curation support.

It was expressed that Canada's position as a relatively egalitarian nation, with higher social investments and broader access to internet than many other countries, gave the nation a unique position suited to become a global leader in the NFT space. Yet, it was felt by many expert workshop participants that even though there was hope for change, Canada was thus far doing less than most other nation-states.

A thriving and diverse Canadian NFT arts scene could be propelled by our thriving technology hubs. For example: Montreal with its focus on gaming and AI, and Toronto with its efforts on attracting global tech giants.

### **Impact for International Market**

One expert viewed the international adoption of the NFT technology favorably because the US and Europe are more progressive than Canada in their overall approach to arts and culture. Although international adoption is viewed more favorably, views on NFTs between the art market, international governments and industry verticals, differ greatly.

### Art Market

Digital art, which was on the periphery of the art world, found its way to the mainstream because of NFTs. As previously discussed, this has evaporated geographic boundaries and changed roles and responsibilities. The global NFT opened new avenues for people to collect art but requires curatorial practices to expand.

### Government

Although cryptocurrencies and the web may cross geographical boundaries, banking structures and government regulations mostly do not. For example, Cuban artists must rely on Canadian peers to mint their NFTs because they are unable to do so in their own country; and Thailand has banned trading and minting of NFTs (Shah, 2021). Sometimes the platform themselves are banning countries, for example: OpenSea has blocked users in Iran due to U.S. Sanctions (Irwin, 2022).

### Vertical Industries

Vertical industries like the videogame industry are very polarized about NFTs. Many independent creators are against NFT growth whereas bigger gaming houses like AAA studios started introducing the idea of NFTs and have been met with anger from some game players.

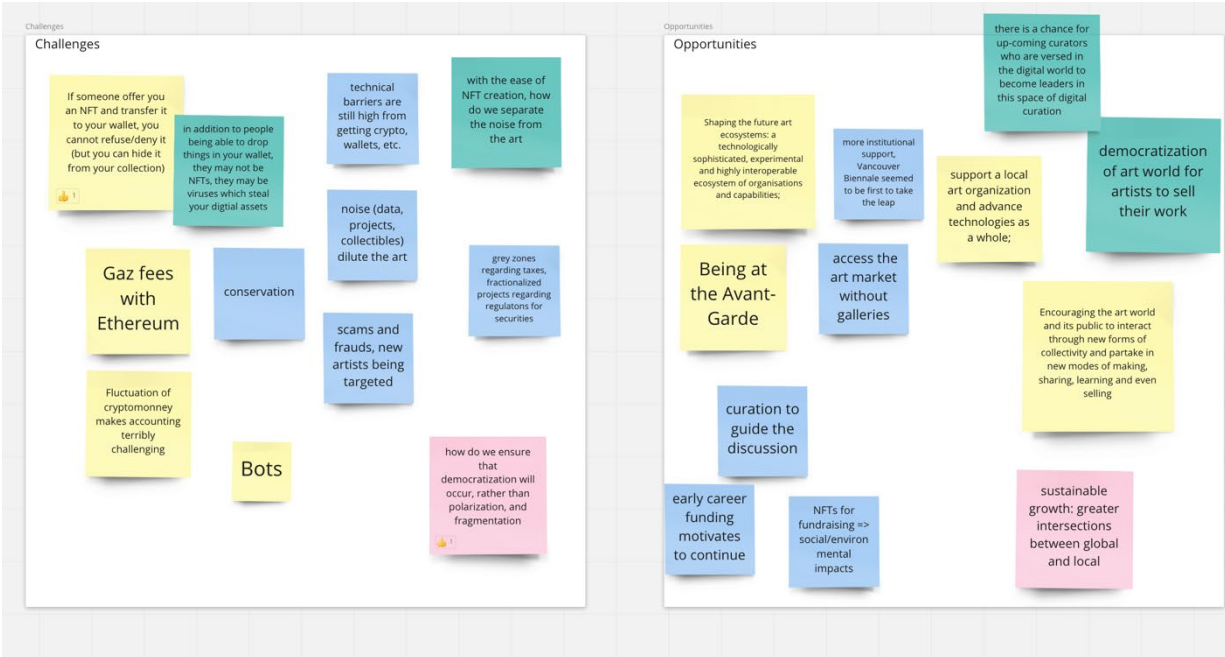


Figure 11: Challenges and Opportunities (Soar group) Miro board from workshop

## Current Challenges

The discussion on current challenges revolved around the lack of education available and access to the technology required to use NFTs. The volatility of cryptocurrency used to purchase tokens and their environmental impact were also noted as challenges. Finally, blockchain technology is fraught with safety issues. As such, how do you get people to explore or adopt emerging technology that is expensive yet not secure?

### Lack of Education and access to Technology

Broadband internet access with unlimited data transfer is not yet available or affordable for all. Further, access to education on the minting and use of NFTs or setting up a cryptocurrency wallet is not readily available to artists or easily understood. There is a lot of contradictory data shared online. How do we ensure democratization will happen as opposed to even deeper polarization and stop political forces that only exacerbate the class and access division that already exists?

### Volatility of Cryptocurrency

Speculation does not just happen on the value of an artwork. Because NFTs are bought with cryptocurrency, the speculation on and ever-changing value of cryptocurrency changes the value of NFTs. There are also challenges surrounding the conversion of fiat currency to crypto and crypto to fiat.

### Environmental Impact

The minting and use of NFTs or any other current blockchain derivative requires a lot of electrical energy negatively impacting the environment. Artists wonder if they are stuck with two choices: make money or stand your moral ground.

Ethereum, the top cryptocurrency used for NFTs in the art world, offers you the option of making more money. Tezos, another cryptocurrency, is more environmentally friendly yet not as popular or widely



used. NFTs on one crypto platform cannot be purchased with another currency; the prospective buyer, would have to exchange currencies elsewhere to enter the blockchain of the desired NFT. NFTs are tied to their blockchains by cryptocurrencies.

### Safety

There are several scams and frauds targeting artists and collectors and cryptocurrency wallets are occasionally hacked. Platform choice can help protect artists. Do you choose an open platform like Hic et Nunc and OpenSea or do you go the safer, private route like SuperRare and Foundation?

One participant questioned the use of NFTs. He said all it did replace or decentralize existing tools like Digital Rights Management, Escrow payments, Fractional shares/ownership and Governance that were safe and secure.

With all the fraud and hacks, the biggest challenge is trust. How do you engender trust on a “trust-less” platform and what does the idea of trust mean to different users?

### **Current Opportunities**

Without a doubt, NFTs have opened a wealth of opportunities for the art world. Discussion centered around new marketing avenues for artists, new revenue models and most importantly the opportunity to elevate the role of artist within community.

### Marketing Avenues

NFTs are encouraging the art world and its public to interact through new forms of collectivity and partake in new ways of making, sharing, learning, and even selling art. The promise of NFTs is that it levels the playing field and opens the art market to a broader range of creators than the current established system of galleries and museums (seen by experts as gatekeepers), which circulate and promote art. As a result, super local art organizations can now leverage these new advances in technologies to thrive on the global art stage.

For emerging artists, participation in NFT marketplaces today allows them to differentiate themselves, perhaps establishing a new era of Avant Garde.

### Revenue Models

One participant felt that the implicit value statement in NFTs is that “ownership” is a positive trait. Since digital art is easily reproducible, it offers the purchaser proof of ownership and offers the artist residuals on future sales. Additionally, the use of smart contracts offers interesting possibilities for revenue sharing and credit.

### Artists’ Role

The role of artist is finally elevated in modern world society. Digital technology allows emerging artists and curators to build a lucrative career more easily, and the space and opportunity to shape the future of art.

Working in tandem with other artists, curators, and collectors, they could create sustainable and technologically sophisticated experimental art or creative culture ecosystems with interoperable capabilities which ideally could help address other global problems.

### 4.3 NFTs' Soar

Four Canadian NFT industry experts explored the NFT Soar scenario model. This group took a utopian view of NFTs as their use continues to grow and thrive for the next eight years. For the most part, this was an easy task since all of the experts in this group, naturally see great potential in the technology.

However, even though the future looks bright, they did flag that the NFTs continued success would have two very bleak consequences: The first a dramatic wealth (and digital) divide and the second a severe climate impact including ecological disasters brought on by the profound reliance on high carbon producing processes necessary to create and circulate NFT art.

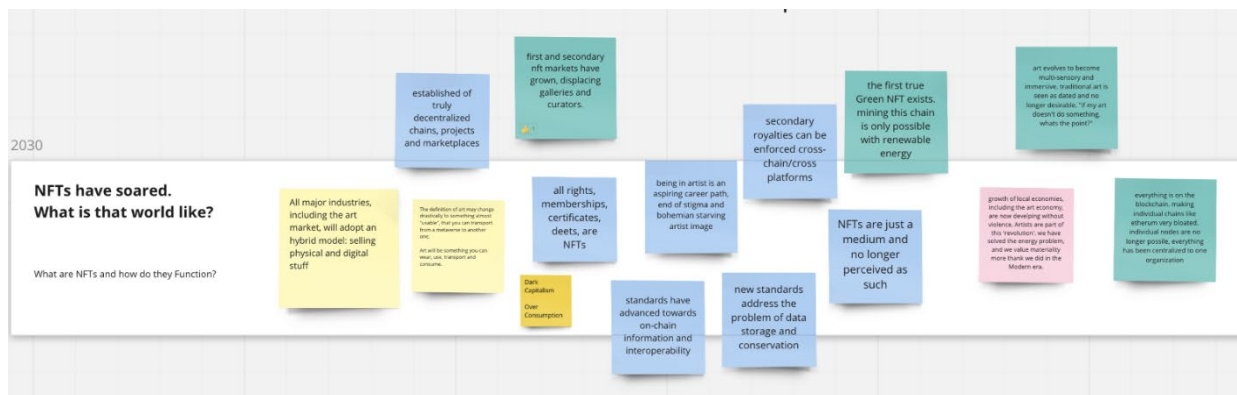


Figure 12: Data capture of "NFTs have soared in 2030"

In 2030, broadband Internet access and NFTs have hypothetically become a part of our day-to-day reality. The stigma around being a “starving artist” is disappearing. Our migration to the metaverse allows us to go from one virtual reality to the next - creating even more opportunities to create art in a variety of new ways. As a result, the definition of what is art has changed. Traditional galleries find themselves completely displaced by current NFT markets and new emerging hybrid powerhouse galleries.

Art will be worn, transported, and consumed both virtually and in real life. It truly is the golden age of artists. Opportunities abound and the artist profession becomes aspirational. Artists are the driving force of this new revolution and have forced blockchain creators and developers to find more energy efficient solutions. As a result, there is greater legal and technology provenance and the standard and protocols have continued to evolve to allow for more “on chain” governance. (Note: “On Chain” means a system of governance that manages and implements changes to the cryptocurrency blockchain code). However, just like in real life, society continues to overconsume; this is reflected through the massive consumption of cryptocurrency and energy-requiring digital goods and services. All real and virtual assets are tokenized. Everything owned is tracked, and sometimes housed, on a blockchain, which is quickly “bloated”.



Figure 13: Data capture of Soar Groups "who Benefits and who is excluded in this world".

Figure 13 illustrates the data captured on who is benefited in this soaring world in 2030 and who is excluded.

### Who benefits in this world?

Early adopters including gamers, those that work in tech, emerging and digital artists with highly specialized technical skills all benefit in this world. The cost of cryptocurrencies will price out most late comers. What does this mean exactly? Nothing has changed, existing power structures with the capital to invest in new platforms continue to benefit from advancements in technology. Elites will continue benefiting because they have the monetary access to be early adopters. If this continues, they will still be benefiting in 2030.

### Who is excluded?

The art dealers and auction houses who work in traditional art markets and who refuse to change. If access to affordable broadband isn't a reality in 2030, old people, poor people, rural people, and people with generally limited access to technology and urban tech hubs will be excluded. If decentralization isn't achieved, in other words if governments or large corporations control the NFT markets, then access will be weaponized against certain countries and social groups.

### Is this what we want?

Although excited about the promise of NFTs, these experts believe that unless decentralization, education and access to the Internet is available to everyone, it will become (or remain just like the traditional art market), the realm of the privileged and the rich

#### 4.4 NFTs' Reverse

The NFT Reversal breakout group included three participants. More sober in their views than the Soar group, the expert panel saw NFTs as being wrought with challenges, currently, yet not disappearing or changing soon. They described a world where the use of NFT technology would instead fracture, evolve, refine and change. Here's how they envisioned a 2030 dystopian NFT future:

In eight years-time, current trends will only be exacerbated. As chip shortages and supply chain issues continue to slow manufacturing, access to technology is still not ubiquitous and as a result, the digital divide continues to grow. Pirating, hacking and deception continue to plague NFT marketplaces. Digital forgeries are even harder to differentiate, and lawmakers are left scrambling while trying to decipher which NFTs are real and which ones aren't (for e.g., are 'pirated').

Over the eight years, carbon pricing is globally adopted and NFTs are outlawed as being too carbon intensive. The costs outweigh the benefits. Over time, greener technology and energy production is introduced. IP issues abound and will only get worse. Artists find their work ripped off and this will escalate as there is no appetite to police this.

Who's going to enforce any IP or copyright regulation? Digital governance breaks down when there's no consequences in the 'real world'. Ownership is usually enforced by laws. Decentralization and open markets encourage the same bad behaviour experienced in the real world.

As a result, two NFT platforms co-exist. Open marketplaces pander to money launderers while closed markets are regulated, safe and secure for artists, vendors and collectors alike.

Canadian Heritage establishes a closed platform for registering artists and granting funding. This becomes the dominant blockchain for elite art trading. As a result, Canadian artists take their place competing in a decentralized, global market.

With the adoption of centralized and regulated marketplaces comes, perhaps paradoxically, the opportunity to decentralize art and creative culture making. Decentralized artworks are now possible. Collective fans can create story worlds that establish a new franchise (i.e., Marvel Cinematic Universe). Individual contributions can be captured and microtransactions can allow an entire fan community to be rewarded for mainstream success.

A bonus 2050 scenario from a participant highlights that digital governance is connected to AI systems that make them 'real' because they are linked to analog systems.

##### How did this happen? What was the reversal?

This world is already in full fruition and will expand over the next eight years. How will Canadian Heritage know if it finds itself in this world? Disillusioned with decentralization and tired of being pirated or financially exploited, artist will leave current NFT marketplace.

As international thought-leaders, Canada could start developing a safe, regulated, and closed NFT market today. If they did, they can expect 10 percent of artists, vendors, and collectors to

join by 2024, 50 percent to follow in 2027 with another 30 percent to join by 2030. There will always be 10 percent who refuse to join.

#### Who benefits in this world?

For the closed system, the people already in this space, the people with money. For the open system, criminal activity, such as oligarchs (and others) who need to launder their money, will thrive.

#### Who is excluded?

As usual, it's those stakeholders who enter the market late or who don't have access nor come from financial wealth. Over time, it may be the artists who drop out of the current (open system) market because they realize NFTs aren't really serving them.

Like the regular art world, the 2030 NFT world has layers: local scenes, outsider art and the international blockbuster scene. The way in for many of these artists will be through lower cost chains like Cardano and Tezos.

Finally, there exists systems of discrimination that inform and fuel decentralized models. The status quo, for example "White tech bros" (Masters of the Universe), will 'colonize' early and benefit the most.

#### Is this what we want?

For the experts in this group, this scenario is desirable only if it meets the following criteria:

- NFT art markets compensates artists in a fair way
- NFTs offers artists resale rights and compensation
- Art Councils offer different grant funding models
- Art Councils includes NFTs as part of production or exhibition grants

## **4.5 Opportunities for Today**

The research experts joined each other to present their scenarios and discuss the following final question: Now that we've seen the future, what should we do to support Canadian artists' and creatives' today?

As recommendations to Canadian Heritage, the expert panel suggested the following strategies and actions, which coalesce under the principle that we must collectively continue to foster diversity in the arts, as current forces may continue to exclude artists and their work.

*The panel suggested that supporting artists may be done through offering financial support to a range of artists to create (mint) NFTs; help with hybridizing physical curatorial and market spaces to include NFTs (and metaverses); creating or fostering private and secure marketplaces; and extending education and opportunity efforts to help Canadian artists succeed.*

### **4.5.1 Reducing Barriers for a Diverse and Flourishing Art Practice in Canada**

Both scenarios depicted end points where growing divisions of wealth and access to technologies were deeply concerning.

Despite the “democratizing promise” of the decentralized forces, NFT trends and investments are favoring those with financial resources and, relatedly, access to technologies (namely the Internet). As the future of art in Canada will become more Internet dependent, the Canadian government must continue to pursue full broadband or other means of Internet access to ‘the last mile’ and to those that have been ‘priced out’.

As the art market moves toward a hybrid existence, meaning people occupy both physical and virtual realities, the world may proactively spur a blurring line between physical and digital spaces. It was felt that immersive technologies (e.g., Augmented Reality-AR and Virtual Reality-VR headsets) are going to be as normal as having a mobile phone. Anticipating this increased need for support for Canadian artists will be important, as it will stimulate a change in present art practices, galleries, commissions, and markets that will broaden accessibility in some cases.

Helping to foster safe and secure private marketplaces for Canadian artists and groups of artistic communities (e.g., the NFT marketplace Foundation.app), would significantly support artists and Canada’s creatives. NFT artists are especially vulnerable to fraud, pirating, wallet hacking and speculation from those with nefarious and self-invested interests. Despite the security of the underlying blockchains, scams and fraudulent activities that hurt artists will rise, if not addressed, soon.

Investing in NFT experimentation will be key for Canadian artists and creatives. One expert suggested the institutionalization of micro grants that support testing and minting experimentation to improve artist accessibility and capacity building. Another expert pointed to a past Canada Council for the Arts digital originals program as an example of a micro-grant program that supported testing digital media.

All experts echoed a high priority for education supports. There may be a range of programs – those that are quick and easy, lowering the bar to entry. Education may also help ensure that NFT art is included in critique; popularizing the inclusion of NFTs in art criticism would support and advance artists by setting a standard of excellence.

If NFTs rapid market evolution reverses, experts noted that the Canadian government can still initiate processes that strive to support and prioritize artists facing promotional and representation barriers in the art market.

## **5 CONCLUSION AND KEY AREAS OF CONSIDERATION**

### **5.1 Overview**

*This section brings together data from the expert workshop and key themes from scenario planning and the horizon scan to highlight additional nuances in the previous sections recommendations towards responding to the guiding research questions.*

### **5.2 Shared Perspectives**

The data collected from our experts during the workshop mimics the key opportunities and risks associated with the literature review. Of note, just like we saw in Gartner’s Hype Cycle, NFTs are still

nascent technology finding its way in current society. The technology is still in development and people are still figuring out how and when to use them.

Like what was revealed by the research participants, there are existing solutions that already solve what NFTs offer – proof-of-ownership. However, the decentralization of blockchain technology breaks down traditional closed market barriers allowing others to participate in various markets. In other words, artists that create NFTs or participate in the NFT market no longer need to rely on agents, auction houses, galleries, and museums to represent their art. Instead, artists can market directly to collectors. There is also the added potential for artists to leverage digital media to market their product, build audience clientele, sell using cryptocurrency and track ownership using NFTs.

With the arrival of the metaverse, artists can now create and sell both in the real and virtual world – or a blend of both – to increase their revenue channels and marketing opportunities. Yet, more research needs to be conducted to more fully understand the metaverse in a context of artists and art galleries especially as artists re-emerge to studio spaces, brick and mortar gallery spaces and where the threat of the next pandemic looms. The metaverse presents new questions on how artists are supported in a hybrid art world as well as residencies in immersive environments.

The promise of NFTs for artists in all regions, of all types, disciplines, genders, cultures and socio-economic status, is that it reduces accessibility and knowledge barriers to ensure a more equitable and culturally representative art market. Like, digital and social media, which has increased the voice of artists marginalized by geography, art discipline, race, gender affinity or sexual preference, NFTs allow equity-identifying and marginalized artists a platform to monetize their work and survive and advance as an artist.

However, the platform still poses digital inequity barriers. In order to mint an NFT, for example, reliable Internet access is necessary as is top of the line equipment. Other barriers include knowledge of how to mint and the seed funding to mint an NFT, which exceeds two hundred dollars. Without such resources, chances of accessing and being successful as an artist in the NFT market are reduced.

The findings highlighted in this report have the potential to shape and inform greater equity, accessibility and empowerment of Canadian artists. Cultural policies that address key issues will positively shape the future of the Canadian art and cultural sector, by making it more equitable.

NFTs currently impact the art market positively by providing artists new avenues to monetize their work. However, many artists are unaware when they enter the NFT market that it costs to mint and get an NFT on the blockchain. Further, minting NFTs is not straight-forward. Artists must invest time in figuring out and becoming versed in the technology. Artists should also learn about the associated risks like a buyer beware manual, before participating in the NFT market. In this way, NFTs can be seen upholding fine art establishment. In other words, the NFT platform can be unattainable or unavailable to artists who lack financial capital, have few economic resources or limited cryptocurrency buyers.

### 5.3 Policy Making

NFTs are neither good or bad but they position both pros and cons for regulation. A balanced perspective positions the need for regulations that protect the creator, more equitably distribute NFT resources and support and regulate NFT marketplaces to ensure broad accessibility and representation.

### 5.3.1 Protecting the Creator

#### Smart Contract and Copyright

The NFT format and platform has several implications for Canadian artists. First, it allows artists to potentially have greater control over their work, including distribution and payments via the smart contract. There is additional potential of artists ability to oversee how their minted NFTs are accounted for in recording contracts and business plans. Furthermore, NFTs allow artists to keep track of who owns the art and this could potentially support them in simplifying their tracking of royalty payments, especially for works of art that are distributed more broadly than one-off creations.

NFTs are also following marketplace dynamics like those seen around fine art, including the 2021 auction at the renowned auction house - Christie's, which sold work by American artist Beeple for \$69 million in US dollars. This marketplace similarity suggests that NFTs may move to being part of auction houses' regular curation and that art galleries will more regularly host NFT exhibitions. Fine art auctions have a particular reputation in the Canadian art market for exploiting often deceased artists and retaining the full net profit. Canadian Artists Representation (CARFAC) National are steadfast advocates for the resale right. CARFAC National notes that: "The Artist's Resale Right would allow visual artists to receive 5% when their work is resold [...]. The full value of an artwork often isn't seen on the first sale. It is common for visual art to increase in value over time, as the reputation of the artist grows" (CARFAC National, 2022). Yet, as the NFT technology shows the smart contract is a major apparatus in which the NFT operates and therefore allows the artist to not only profit from each sale of their work but to also track collections and royalty payments.

Retroactively crediting artists via the smart contract on the blockchain not only could support the artist resale right but also offers opportunities for decolonizing heritage and artworks held in museum and gallery collections. Both would require copyright legislation changes first.

#### Safety

Safety is paramount for the success of NFT usage by Canadians. Two options were recommended in the workshop:

- One is a directory of platforms along with their safety level, as well as opportunities and the risks associated with them.
- The other is the creation of a closed platform that is truly Canadian and protects both artists and buyers both national and international alike.

The safety and security of the artist or creator is a key consideration as scams are ruining NFT marketplaces. For example, pump-and-dump systems hyper value digital art and celebrities are being hired to boost awareness and consequently valuation. These put artists and creators at risk and raise safety considerations.

Open and closed platform use is another consideration related to artists safety. Among participants, there is some debate between the use of an open versus closed platform. On the one hand, an open platform reduces overhead and regulation; on the other hand, a closed platform provides more security.



### 5.3.2 Equity and Inclusion

The research highlighted the barriers to accessing the NFT market as well as the work in which various IBPOC artists are engaged to ensure that under-represented demographics are included in the NFT market.

#### Funding

A key barrier is the cost to mint a NFT and our experts shared that funding and program policies for both art production and art events must be modernized to include the production and use of NFTs and cryptocurrencies.

Artists also require funding for hardware (laptop or tablet) and access to the Internet as well as money to mint NFTs.

According to the workshop participants, NFTs are opening a new market-driven avenue for Canadian artists but pose challenges for the way that Canadian art is funded. For example, the workshop participants identified Canada's funding model eligibility focused on Canadian citizenship or the nationality of the artist as an NFT artwork barrier; in the global NFT market, the artists' identity and location is often intentionally unknown. In this way, the lack of identity and location of NFT artists can pose an issue for Canadian artists' seeking grant council funding.

#### Education

Both artists and curators require education from Canadian and international experts in the field. Education includes the purchase, use and trade of cryptocurrencies as well as how to mint an NFT, price digital art competitively and which platform to choose. Education should also include best practices and platform safety and security for Canadian collectors and investors.

Education should begin as soon as possible so that Canadian artists, curators, investors, and buyers are not excluded from international opportunities.

Most of the experts acknowledged that NFTs were incredibly hard to access, and it was a tough market to break into for artists and curators. Education and new funding opportunities will help break down some of these barriers and should especially strive to ensure resources are accessed by IBPOC creatives to enable their entry into the NFT art market.

### 5.3.2 Underlying Technology

NFT technology and markets require constant tracking and media monitoring to fully comprehend their rapidly evolving implications. What has been identified in this report, as a containable snapshot in time, however, is that the underlying drivers that support NFT including the blockchain and cryptocurrency are worthy of cultural policy consideration. These technologies are stable and consistent and not likely to change.

### 5.3.3 Drivers

Many of the NFT drivers of change, cited both in the report and throughout the workshops, are divided into the core categories of technology, economic, legal and environmental. These drivers of change are interstitially woven, and implicated or adjacent to NFT art production, circulation and valuation. Under these four key drivers, the report framed fourteen subsidiary drivers, which offer their own set of

unique challenges and opportunities but may form part of a national strategy and series of programs to further foster the possibilities for a preferable future forward.

#### Environmental considerations

All technology creators, developers and stakeholders must be held accountable for improving current services or creating digital blockchain related or reliant products that require less energy and leave a reduced carbon footprint.

Another consideration is the ecological footprint of NFTs. If users want to be more ethical and consider the environmental impacts of their work, they should go with a cryptocurrency that has a reduced ecological footprint. However, if they want big money, nothing currently beats Ethereum.

### 5.4 Summarizing Thoughts

*The ultimate success of a foresight project lies, as in most projects, in the extended outcome; that is, the implementation of foresight knowledge in policies, strategies and actions. (Karlsen, 2014, p. 8)*

The purpose of this research was to answer questions posed by Canadian Heritage about what is already known about NFTs, including the NFT market, current NFT users, and what the Government of Canada needs to consider for ongoing support of Canadian creatives as NFTs evolve.

Strategic foresight methodologies seek to gather data and make sense of it so that people can think in different and new ways about the future (Conway, 2008). Yet, “knowledge about the future cannot deliver ‘hard evidence.’ It does not give a representation of a physical or empirical reality it cannot be predicted, just imagined and perceptually explored” (Karlsen, 2014, p. 9). The research presented in this report is dense, multi-layered, and risks becoming out of date quickly, yet foresight research creates necessary groundwork to highlight key traceable drivers and their implications for follow-up study, assessment and policy pivots.

As the Government of Canada moves forward in its consideration of regulating parts of the NFT market, the following opportunities should be discussed:

- Expansion of artist funding and grant programs to support NFTs and experimentation in the artistic metaverse milieu
- Center creator protections and assurances when regulating aspects of the NFT blockchain, marketplace platforms or cryptocurrency as safety is paramount for the success of NFT artists
- Broaden educational opportunities and access points for all artists to enter the NFT market with particular attention to IBPOC artists
- Explore smart contracts and blockchain as prototypes for how Canada can better protect and advance artists into the future, including their resale rights
- Evolve collection management copyright legislation to support decolonization practices that retroactively credit the original owner of the work using NFT technology
- Prioritize protecting creative remuneration and safety when regulating parts of NFTs technology and marketplace platforms
- Reduction of the environmental impact and cost of mining NFTs, especially as Canada works toward net zero in 2050

In addition, this report highlighted that the NFT market is rapidly evolving; understanding NFTs and their overall ecosystem will require ongoing research and study.

Future discussion will require collaboration and cross-departmental engagement as many of the issues involve Government of Canada policy departments that inform decisions outside of the creative sector and Canadian Heritage. These departments may include Environment, Finance, and Innovation, Science and Economic Development, among others.

As the global economy recovers and re-emerges from the COVID-19 pandemic, the ever-changing new normal will require ongoing adaptation to survive in new conditions. Foresight methods are a useful way to explore these changes and should be employed to support ongoing Canadian Heritage and Government of Canada research as these discussions evolve.

## 6 APPENDIX

### 6.1 References

#### 6.1.1 Bibliography

- (COVID-19), O. P. (2020, September 7). *Culture shock: COVID-19 and the cultural and creative sectors*. Retrieved from oecd.org: <https://www.oecd.org/coronavirus/policy-responses/culture-shock-covid-19-and-the-cultural-and-creative-sectors-08da9e0e/0x03e9>. (2021, December 7). *Rethinking “gamification” for DAOs*. Retrieved from watermusic.mirror.xyz: [https://waterandmusic.mirror.xyz/fgYrh2v0XxK-Gmv1g5utreOF247k\\_fPSgkO6btQNuSg0xA95A](https://waterandmusic.mirror.xyz/fgYrh2v0XxK-Gmv1g5utreOF247k_fPSgkO6btQNuSg0xA95A). (2022, January 29). *A list of open problems in DeFi*. Retrieved from crypto.mirror.xyz: [https://crypto.mirror.xyz/0guEjOCYt5V8J5AKur2\\_UNKyOhONr1QJaG4NGDF0YoQ0xd577](https://crypto.mirror.xyz/0guEjOCYt5V8J5AKur2_UNKyOhONr1QJaG4NGDF0YoQ0xd577). (2022, February 27). *NFT gaming innovations with crypto guilds and communities as the main protagonists*. Retrieved from mirror.xyz: <https://mirror.xyz/0xd57722111412Bf8fD260827426202A04de47899F/11E-t19uzn0qfNaU5WZycTPKIkErM2rIOLw2cXzvtLk0xd577>. (2022, March 14). *Top undervalued NFT blockchains making big steps forward*. Retrieved from mirror.xyz: <https://mirror.xyz/0xd57722111412Bf8fD260827426202A04de47899F/wa4ZM-TNrgPgsZdQH-d7JFR3Og3OLdju-mS2tIFhUZQ115-111>, S. N. (2018). *The Future of Money: Digital Currency Hearing before the Subcommittee on Monetary Policy and Trade of the Committee of Financial Services U.S House of Rep*. Washington DC: U.S. Government Publishing Office.
- Analysis, O.-L. (2021, October 26). *Art collector's court case signals potential legal and contractual issues with NFTs*. Retrieved from pinsentmasons.com: <https://www.pinsentmasons.com/out-law/analysis/court-case-potential-legal-contractual-issues-nfts>
- Artists, V. (n.d.). *THE ARTIST IS ONLINE. DIGITAL PAINTINGS AND SCULPTURES IN A VIRTUAL WORLD*. KÖNIG GALLERIE, Decntraland.
- Atken, M. (2020, December 14). *The Unreasonable Ecological Cost of #CryptoArt (Part 1)*. Retrieved from Medium: <https://memoakten.medium.com/the-unreasonable-ecological-cost-of-cryptoart-2221d3eb2053>
- Bailey, D. (2022, March 3). *No one knows who's on the hook if a DAO gets sued*. Retrieved from businessofbusiness.com: <https://www.businessofbusiness.com/articles/dao-lawsuit-sued-litigation-accountability/>
- Ball, M. (2020, January 13). *The Metaverse: What It Is, Where to Find it, and Who Will Build It*. Retrieved from matthewball.com: <https://www.matthewball.vc/all/themetaverse>
- Balot. (2022). Retrieved from Human Activities: <https://www.humanactivities.org/en/balot/>
- Barhat, V. (2022, 02 07). *How to buy NFTs in Canada*. Retrieved from MoneySense: <https://www.moneysense.ca/save/investing/crypto/how-to-buy-nfts-in-canada/>
- Barsotti, S. (n.d.). *Carnegie Mellon University: Heinz College*. Retrieved from The art of Blockchain: How a Hot New Technology could reshap creative Industries : <https://www.heinz.cmu.edu/media/2019/March/art-of-blockchain-hot-technology-could-reshape-creative-industries>
- Baystreet Staff. (2022, 03 03). *U.S. Regulators Launch Probe Into NFT Market* . Retrieved from Baystreet.ca: <https://www.baystreet.ca/cryptonews/213/US-Regulators-Launch-Probe-Into-NFT-Market>

- BBC. (2022, March 4). *Ukraine conflict: Government to sell NFTs to fund war against Russia*. Retrieved from BBC: <https://www.bbc.com/news/business-60613613>
- Bell, G. (2022, February 8). *The metaverse is a new word for an old idea*. Retrieved from technologyreview.com: <https://www.technologyreview.com/2022/02/08/1044732/metaverse-history-snow-crash/>
- Belova, K. (2021, November 2021). *Which Blockchain to choose for Your NFT Project?* Retrieved from <https://pixelplex.io/blog/top-ten-blockchains-for-nft-development/>
- Biden Jr, J. R. (2022, 03 09). *Executive Order on Ensuring Responsible Development of Digital Assets*. Retrieved from The White House: <https://www.whitehouse.gov/briefing-room/presidential-actions/2022/03/09/executive-order-on-ensuring-responsible-development-of-digital-assets/>
- Birch, D. G. (2022, 02 20). *NFTs: New Fraud Targets*. Retrieved from Forbes: <https://www.forbes.com/sites/davidbirch/2022/02/20/nfts-new-fraud-targets/?sh=8aa0e394f377>
- Blair, E. (2022, February 9). *How trademark infringement applies to NFTs*. Retrieved from npr.org: <https://www.npr.org/2022/02/09/1079655055/how-trademark-infringement-applies-to-nfts>
- Botz, A. (2018, December 7). *Art Basel: Is blockchain the future of art? Four experts weigh in*. Retrieved from Art Basel: <https://artbasel.com/news/blockchain-artworld-cryptocurrency-cryptokitties>
- Bradbury, D. (2022, 01 19). *Not all NFTs are equal – here’s how to guide clients on digital assets*. Retrieved from The Globe and Mail: <https://www.theglobeandmail.com/investing/globe-advisor/advisor-news/article-not-all-nfts-are-equal-heres-how-to-guide-clients-on-digital-assets/>
- Brittain, B. (2022, February 03). *Nike cries foul over virtual shoes, suing retailer that sells sneaker NFTs*. Retrieved from Reuters.com: <https://www.reuters.com/technology/nike-cries-foul-over-virtual-shoes-suing-retailer-that-sells-sneaker-nfts-2022-02-04/>
- Burcher, D. (2021). *Are NFTs taxable in Canada?* Retrieved from Koho: <https://www.koho.ca/learn/are-nfts-taxable-in-canada/>
- Buterin, V. (2014, May 6). *DAOs, DACs, DAs and More: An Incomplete Terminology Guide*. Retrieved from blog.ethereum.com: <https://blog.ethereum.org/2014/05/06/daos-dacs-das-and-more-an-incomplete-terminology-guide/>
- Buttonwood. (2021, May 29). *The boundary between crypto and fiat money is becoming more permeable*. Retrieved from economist.com: <https://www.economist.com/finance-and-economics/2021/05/29/the-boundary-between-crypto-and-fiat-money-is-becoming-more-permeable>
- Cagnoli, M. V. (2020, June 16). *Media laws: Law and Policy of the Media in a Comparative Perspective*. Retrieved from Media Laws EU: <https://www.medialaws.eu/blockchain-for-the-art-market-applications-and-implications/>
- Calma, J. (2021, March 15). *The climate controversy swirling around NFTs*. Retrieved from verge.com: <https://www.theverge.com/2021/3/15/22328203/nft-cryptoart-ethereum-blockchain-climate-change>
- Canada Revenue Agency. (2021, 06 26). *Guide for cryptocurrency users and tax professionals*. Retrieved from Canada.ca: <https://www.canada.ca/en/revenue-agency/programs/about-canada-revenue-agency-cra/compliance/digital-currency/cryptocurrency-guide.html>
- Canny, W. (2022, January 20). *Jefferies Sees the NFT Market Reaching More Than \$80B in Value by 2025*. Retrieved from Coindesk: <https://www.coindesk.com/business/2022/01/20/jefferies-sees-the-nft-market-reaching-more-than-80-billion-in-value-by-2025/>
- CARFAC National. (2022). *The Artist Resale Right*. Retrieved from CARFAC National: <https://www.carfac.ca/campaigns/artists-resale->

- right/#:~:text=The%20Artist's%20Resale%20Right%20would,reputation%20of%20the%20artist%20grows.
- Catlow, R., Garrett, M., Jones, N., & Skinner, S. (2017). *Artists Re:Thinking the Blockchain*. Torque Editions & Furtherfield.
- CATPC *Virginia Museum of Fine Arts Statue NFT Dispute*. (2022, February 22). Retrieved from Art News: <https://www.artnews.com/art-news/news/catpc-virginia-museum-of-fine-arts-statue-nft-dispute-1234619770/>
- CBJ Newsmakers. (2022, January 17). *GOGÉ, LGBTQ AWARENESS PROJECT, IS SET TO INTRODUCE NEW UPDATES*. Retrieved from The Canadian Business Journal: <https://www.cbj.ca/goge-lgbtq-awareness-project-is-set-to-introduce-new-updates/>
- Chan, M. F. (August 2017). *Digital Zones of Immaterial Pictorial Sensibility*. Toronto.
- Chan, M. F. (n.d.). *Digital Zones of Immaterial Pictorial Sensibility*. InterAccess Gallery , Toronto.
- Chatham House. (2021, 11 24). *Chatham House Rude*. Retrieved from Chathamhouse.org: <https://www.chathamhouse.org/about-us/chatham-house-rule>
- Chisolm, A. D., Dewan, R., & Gebert, J. P. (2021, August 16). *NFTs and Implications Under Canadian Securities Law*. Retrieved from McMillan: <https://mcmillan.ca/insights/nfts-and-implications-under-canadian-securities-law/>
- chokshi , S., Basich, Z., & Wuollet, G. (2021, November 20). *Decentralized Autonomous Organizations (DAOs) Canon*. Retrieved from future.a16z.com: <https://future.a16z.com/dao-canon/>
- Coastline*. (2022, March). Retrieved from Harbour Collective: <https://harbourcollective.ca/coastline-introduce-and-development-for-non-fungible-tokens-for-indigenous-visual-artists-and-moving-image-makers/>
- Cointelegraph Research. (2021, November 30). *NFT sales aim for a \$17.7B record in 2021: Report by Cointelegraph Research*. Retrieved from cointelegraph.com: <https://cointelegraph.com/news/nft-sales-aim-for-a-17-7b-record-in-2021-report-by-cointelegraph-research>
- Colin, W. (2021, March 30). *Artificial Scarcity: NFTs, Scarcity, and the Diamond Water Paradox*. Retrieved from letsknowthings.com: <https://letsknowthings.com/episode253/>
- Compton, F. (2021, March 13). *Anishinaabe artist selling non-fungible tokens says they're 'paying off in more ways than one'*. Retrieved from cbc.ca: <https://www.cbc.ca/news/indigenous/anishinaabe-artist-non-fungible-tokens-1.5945611>
- Conway, M. (2008). *An Overview of Foresight Methodologies*. Thinking Futures. Retrieved from Thinking Futures.
- Cottom, T. M. (2022, January 31). *Wealth Inequality Drives the Appeal of Crypto*. Retrieved from nytimes.com: <https://www.nytimes.com/2022/01/31/opinion/crypto-nfts-inequality.html>
- Daily, N. (2022, January 6). *NFTs ballooned to a \$41 billion market in 2021 and are catching up to the total size of the global fine art market*. Retrieved from Business Insider: <https://markets.businessinsider.com/news/currencies/nft-market-41-billion-nearing-fine-art-market-size-2022-1>
- Davis, E. (2021, March 26). *The carbon footprint of creating and selling an NFT artwork*. Retrieved from qz.com: <https://qz.com/1987590/the-carbon-footprint-of-creating-and-selling-an-nft-artwork/>
- Deschooling the Blockchain*. (2017, November 7). Retrieved from Fathom Network: <https://fathom.network/blog/archive/deschooling-society/deschooling-and-the-blockchain>
- DiLella, C., & Day, A. (2022, January 12). *Investors are paying millions for virtual land in the metaverse*. Retrieved from cnbc.com: <https://www.cnbc.com/2022/01/12/investors-are-paying-millions-for-virtual-land-in-the-metaverse.html>

- Dulude, R., & Fakhoury, B. (n.d.). *The Future is DAO: A Primer on DAOs and Their Explosive Growth*. Retrieved from underscore.vc: <https://underscore.vc/blog/the-future-is-dao-a-primer-on-daos-and-their-explosive-growth/>
- Elizabeth, K. (2021, April 22). *Why Bitcoin is Bad for the Environment*. Retrieved from newyorker.com: <https://www.newyorker.com/news/daily-comment/why-bitcoin-is-bad-for-the-environment>
- Emergen Research. (2022, January 19). *Non-Fungible Token (NFTs) Market Size to Reach USD 3,57,316.3 Million in 2030 | Increasing Use of NFTs in Supply Chain and Logistics and Rising Demand for Decentralized Marketplaces are Some Key Factors Driving Industry Growth, According to Emergen Resear*. Retrieved from CISION - PR Newswire: <https://www.prnewswire.com/news-releases/non-fungible-token-nfts-market-size-to-reach-usd-3-57-316-3-million-in-2030--increasing-use-of-nfts-in-supply-chain-and-logistics-and-rising-demand-for-decentralized-marketplaces-are-some-key-factors-driving-indust>
- Ethereum*. (n.d.). Retrieved from ETHEREUM DEVELOPMENT DOCUMENTATION: <https://ethereum.org/en/developers/docs/>
- Ethereum Gas Fees*. (2022). Retrieved from Ethereum : <https://ethereum.org/en/developers/docs/gas/>
- Exchange, I. (2019, December 9). *Smart Contracts in the International Legal Space*. Retrieved from Medium: <https://medium.com/the-capital/smart-contracts-in-the-international-legal-space-4cd75c9d2b49>
- Ferguson, M. (2021, July). *Toronto galleries are reopening and one is hosting the city's first NFT art show*. Retrieved from BlogTO: <https://www.blogto.com/arts/2021/07/toronto-galleries-reopening-nft-art-show/>
- Gabriele, M. (2021, October 31). *DAOs: Absorbing the Internet*. Retrieved from readthegeneralist.com: <https://www.readthegeneralist.com/briefing/dao>
- Gallery, E. (2021, May 19). *What is Crypto Art?* Retrieved from Eden Gallery: <https://www.eden-gallery.com/news/what-is-crypto-art>
- Gartner. (2021). *Hype Cycle for Emerging Technologies*. Retrieved from Gartner: <https://www.gartner.com/document/4004623?ref=AnalystProfile>
- Gault, M. (2021, November 19). *Someone Made a Pirate Bay for NFTs*. Retrieved from vice.com: <https://www.vice.com/en/article/xgdxvw/someone-made-a-pirate-bay-for-nfts>
- Gemini* . (n.d.). Retrieved from Crptopedia Glossary: <https://www.gemini.com/cryptopedia/glossary#consensus-mechanism>
- Gemmel, M. (2021). *Is Crypto Culture Changing the Livlihood of Digital Art Objects?* Retrieved from arthelp.com: <https://www.artshelp.net/is-crypto-culture-changing-the-livelihood-of-digital-art-objects/>
- Gomez, A. W. (n.d.). *Cyberscrilla*. Retrieved from Minting Your NFT: File Size Upload Limitations and Restrictions: <https://cyberscrilla.com/minting-your-nft-file-size-upload-limitations-and-restrictions/>
- granger, C. (2021, December 9). *"Is Web3... anything?"*. Retrieved from chris-granger.com: <https://chris-granger.com/2021/12/09/is-web3-anything/>
- Grasso, A. (2019, May 2). *Smart Contracts: Real-Life Use Cases*. Retrieved from antgrasso.medium.com: <https://antgrasso.medium.com/smart-contracts-real-life-use-cases-f1dd03a76d5>
- Greenblott, J. M., O'Farrell, T., Olson, R., & Burchard, B. (2019). Strategic Foresight in the Federal Government: A Survey of Methods, Resources, and Institutional Arrangements. *World Futures Review*, 245-266.
- Guide for cryptocurrency users and tax professionals*. (2021). Retrieved from Canada.ca: <https://www.canada.ca/en/revenue-agency/programs/about-canada-revenue-agency-cra/compliance/digital-currency/cryptocurrency-guide.html>



- Gupta, V. (2017, February 28). *A Brief History of Blockchain*. Retrieved from Harvard Business Review: <https://hbr.org/2017/02/a-brief-history-of-blockchain>
- Healey, J. (2022, February 7). *Why are celebrities buying million-dollar ape cartoons? NFTs, explained*. Retrieved from finance.yahoo.com: <https://finance.yahoo.com/news/why-celebrities-buying-million-dollar-130001897.html>
- Heger, T., & Rohrbeck, R. (2012). Strategic foresight for collaborative exploration of new business fields. *Technological Forecasting & Social Change*, 819-831.
- Heijne, S. (2022, January 11). *Welcome to the year of NFTs, metaverses and multiplayer games*. Retrieved from medium.com: <https://medium.com/gameeye/welcome-to-the-year-of-nfts-metaverses-and-multiplayer-games-6ff13ce360eb>
- Howcroft, E. (2022, February 7). *Unreal demand? Irregular sales worth billions fire up wild NFT market*. Retrieved from japantimes.com: <https://www.japantimes.co.jp/news/2022/02/07/business/tech/nft-irregular-sales/>
- Hube, K. (2022, February 26). *It's Not Just Bitcoin. How to Invest in the Crypto Economy*. Retrieved from barrons.com: <https://www.barrons.com/articles/buy-nvent-stock-pick-industrial-electric-51648248227#:~:text=It%E2%80%99s%20Not%20Just%20Bitcoin.%20How%20to%20Invest%20in%20the%20Crypto%20Economy.>
- Ideo. (2020, 05 08). *7 Simple Rules of Brainstorming*. Retrieved from Ideou.com: <https://www.ideo.com/blogs/inspiration/7-simple-rules-of-brainstorming>
- Insights, L. (2022, February 4). *Sotheby's sued over Quantum NFT auction*. Retrieved from cobosocial.com: <https://www.ledgerinsights.com/sothebys-sued-over-quantum-nft-auction/>
- Irwin, K. (2022, March 3). *NFT Marketplace OpenSea Blocks Users in Iran Due to U.S. Sanctions*. Retrieved from decrypt: <https://decrypt.co/94316/opensea-iran-users-claim-blocked-ethereum-nft-marketplace>
- Jabotinsky, H. Y., & Sarel, R. (2021, March 26). *How the Covid-19 Pandemic Affected the cryptocurrency Market*. Retrieved from Columbia Law School's Blog on Corporations and The Capital Markets: <https://clsbluesky.law.columbia.edu/2021/03/26/how-the-covid-19-pandemic-affected-the-cryptocurrency-market/>
- Jackson, R. (2022, March 09). *First new build project for sale through NFT*. Retrieved from Superyacht News: <https://www.superyachtnews.com/owner/first-new-build-project-for-sale-through-nft>
- Jagati, S. (2021, August 16). *Poly Network hack exposes DeFi flaws, but community comes to the rescue*. Retrieved from Cointelegraph: <https://cointelegraph.com/news/poly-network-hack-exposes-defi-flaws-but-community-comes-to-the-rescue>
- James, G. G., Bourne, T., & Khoury, G. (2022, February 26). *Are You Ready for Web3.0 and the Legal Issues it Will Bring?* Retrieved from natlawreview.com: <https://www.natlawreview.com/article/are-you-ready-web30-and-legal-issues-it-will-bring>
- Johnson, P. (2021, December 19). *1stDibs*. Retrieved from NFTs Are Making 1990s Net Artists Collectible in Their Native Mediums: <https://www.1stdibs.com/introspective-magazine/mark-amerika-nfttime/>
- Jr, J. D. (n.d.). *Web3 Starter pack*. Retrieved from Web3 Starter pack google docs report: [https://docs.google.com/document/d/1SWJw\\_NTyUvgdB\\_asRzsnVyKjciW8dZbeqQeUeWsEiQc/edit#](https://docs.google.com/document/d/1SWJw_NTyUvgdB_asRzsnVyKjciW8dZbeqQeUeWsEiQc/edit#)
- Kafka, P. (2022, February 1). *Web3 is the future, or a scam, or both So what exactly is Web3, and why is everyone in Silicon Valley obsessed with it?* Retrieved from vox.com: <https://www.vox.com/recode/22907072/web3-crypto-nft-bitcoin-metaverse>
- Kaplan, E. (2021, May 21). *Cryptocurrency goes green: Could 'proof of stake' offer a solution to energy concerns?* Retrieved from NBC News: <https://www.nbcnews.com/tech/tech-news/cryptocurrency-goes-green-proof-stake-offer-solution-energy-concerns-rcna1030>

- Karlsen, J. E. (2014). Design and application for a replicable foresight methodology bridging quantitative and qualitative expert data. *Eur J Futures Research*, 1-12.
- Kei. (2021, July 21). *A Prehistory of DAOs*. Retrieved from gnosis guild: <https://gnosisguild.mirror.xyz/t4F5ritMw4-mlpLZf5JQhElbDfQ2JRVKAzEpanyxW1Q>
- Kinsey, C., & Catlow, R. (2020). *A Blockchain Art History Timeline?* Retrieved from Furtherfield.org: [https://www.furtherfield.org/wp-content/uploads/ABlockchainArtHistoryTimeline%20\(2\).pdf](https://www.furtherfield.org/wp-content/uploads/ABlockchainArtHistoryTimeline%20(2).pdf)
- Kok, J. (2021, April 01). *KÖNIG GALERIE's first-ever NFT Auction*. Retrieved from the Artling: <https://theartling.com/en/artzine/konig-galerie-presents-the-artist-is-online/>
- Lawyers, Q. E. (n.d.). *NFTs: Legal Risks from "Minting" Art and Collectibles on Blockchain*. Retrieved from quinnemanuel.com: <https://www.quinnemanuel.com/the-firm/publications/nfts-legal-risks-from-minting-art-and-collectibles-on-blockchain/>
- Levi, S. D., Lipton, A. B., & Skadden. (2018, May 26). *An Introduction to Smart Contracts and Their Potential and Inherent Limitations*. Retrieved from corpgov.law.harvard.edu: <https://corpgov.law.harvard.edu/2018/05/26/an-introduction-to-smart-contracts-and-their-potential-and-inherent-limitations/>
- Levulyté, L., & šapkauskienė, A. (2021, November). *Cryptocurrency in context of fiat money functions*. Retrieved from sciencedirect.com: <https://www.sciencedirect.com/science/article/abs/pii/S1062976921001265>
- Livni, E. (2021, October 10). *Can Crypto Go Green?* Retrieved from nytimes.com: <https://www.nytimes.com/2021/10/10/business/dealbook/crypto-climate.html>
- Maouchi, Y., Charfeddine, L., & Montasser, G. E. (2021, December 8). *Understanding digital bubbles amidst the COVID-19 pandemic: Evidence from DeFi and NFTs*. Retrieved from sciencedirect.com: <https://www.sciencedirect.com/science/article/pii/S1544612321005341>
- Marlinspike, M. (2022, January 7). *My first impressions of web3*. Retrieved from moxie.org: <https://moxie.org/2022/01/07/web3-first-impressions.html>
- Marraccini, A. (2021, November 30). *Betting on Babel*. Retrieved from outland.art: <https://outland.art/pak-lost-poets/>
- Marsanic, D. (2021, 09 30). *Non-Fungible Tokens (NFTs)*. Retrieved from Crypto Adventure: <https://cryptoadventure.com/researches/non-fungible-tokens-nfts/>
- McMaster, J. (2022, January 27). *Moving forward in the metaverse — are DAOs the future of the web?* Retrieved from venturebeat.com: <https://venturebeat.com/2022/01/27/moving-forward-in-the-metaverse-are-daos-the-future-of-the-web/>
- Melville, C., Stein, S., Kramer, M., Ashraf, A., & Blais, E. (2022). *Decrypting the Medium: A report on the non-fungible token (NFT) market*. Canadian Heritage.
- Mitobe, S. (2022, 02 02). *Opinion: Vancouver is Canada's NFT hub, and here's why*. Retrieved from Daily Hive: <https://dailyhive.com/vancouver/vancouver-nft-hub-canada>
- Mittendorf, B., & Sean, S. S. (2021, December 12). *4 Reasons Why Museums Aren't Cashing in on NFTs Yet?* Retrieved from cryptonews.com: <https://cryptonews.com/exclusives/4-reasons-why-museums-arent-cashing-nfts-yet.htm>
- Montoya, J. (2021, February 7). *The Pandemic, Web 3 and a Decentralized Future*. Retrieved from mexicobusiness.news: <https://mexicobusiness.news/entrepreneurs/news/pandemic-web-3-and-decentralized-future>
- Moy, C., & Gadgil, A. (n.d.). *Opportunities in the metaverse: How businesses can explore the metaverse and navigate the hype vs. reality*. Onyx: J.P. Morgan.
- Nader, D. (2021, September 8). *What is Web3? The Decentralized Internet of the Future Explained*. Retrieved from freecodecamp.com: <https://www.freecodecamp.org/news/what-is-web3/>
- Nakamoto, S. (2008, October 31). *Bitcoin*. Retrieved from Bitcoin: A Peer-to-Peer Electronic Cash System: <https://bitcoin.org/bitcoin.pdf>

NFT Culture. (2021, 03 05). *NFTs and the Hype Cycle (March 2021 Edition)*. Retrieved from NFT Culture: <https://www.nftculture.com/nft-art/nfts-and-the-hype-cycle-march-2021-edition/>

NFT Ventures. (2021). Retrieved from NFT Ventures: <https://www.nft-ventures.com/>

Nystrom, M. (2021, August 10). *Messari*. Retrieved from The NFT Stack: Exploring the NFT Ecosystem: <https://messari.io/article/the-nft-stack-exploring-the-nft-ecosystem>

Ohlheiser, A. (2021, March 25). *Some artists found a lifeline selling NFTs. Others worry it's a trap*. Retrieved from technologyreview.com: <https://www.technologyreview.com/2021/03/25/1021215/nft-artists-scams-profit-environment-blockchain/>

O'Regan, K. (2020, January 29). *Sleek Magazine*. Retrieved from Keiken art collective making hybrid experiences): <https://www.sleek-mag.com/article/keiken-the-berlin-london-art-collective-making-hybrid-collaborative-experiences/>

Ostachowski, M. I. (2020). *MLO Art Cloud Hash One*. Retrieved from Martin Lukas Ostachowski: <https://mlo.art/artwork/cloud-hash-one/>

Peter, A. (2022). *Odyssey DAO*. Retrieved from What is DeFi: <https://www.odysseydao.com/articles/what-is-defi>

Peter, A. (n.d.). *What is Defi?* Retrieved from odysseydao.com: <https://www.odysseydao.com/articles/what-is-defi>

Poloczek, J. (2020, March 18). *Trust in Blockchain and Smart Contracts*. Retrieved from madewithtea.com: <https://www.madewithtea.com/posts/trust-in-blockchain-and-smart-contracts>

Popper, R. (2008). How are foresight methods selected? *Foresight*, 62-89.

Quizoz-Gutierrez, M. (2022, 02 12). *Someone just bought a Florida home for \$653,000 through an NFT sale*. Retrieved from Fortune.com: <https://fortune.com/2022/02/12/nft-florida-home-sale-ether-crypto/>

Radhakrishnan, K. (2017, May 1). *CryptoCurrency- "Proof of Work" Vs "Proof of Stake"*. Retrieved from Medium.com: <https://medium.com/@karthik.seshu/cryptocurrency-proof-of-work-vs-proof-of-stake-e1eee1420b10>

Redman, J. (2021, 12 01). *\$7.5 Million NFT Collection Accused of Using Art Without Permission Threatened by Legal Action*. Retrieved from Bitcoin.com: <https://news.bitcoin.com/7-5-million-nft-collection-accused-of-using-art-without-permission-threatened-by-legal-action/>

Rico, M. G. (2021, 11 25). *Ownly House of Art: A Modern Gallery Through The Use of NFTs* . Retrieved from Medium: <https://medium.com/ownlyio/ownly-house-of-art-a-modern-gallery-through-the-use-of-nfts-49b52378a440>

Rivera, P. (2021, June 15). *a16z*. Retrieved from <https://future.a16z.com/a-taxonomy-of-tokens-distinctions-with-a-difference/>

Robertson, H. (2021, December 27). *A co-founder of The Sandbox explains what on earth is going on in the metaverse — where land is selling for millions and Snoop Dogg is hanging out*. Retrieved from markets.businessinsider.com: <https://markets.businessinsider.com/news/stocks/metaverse-the-sandbox-virtual-world-land-sales-decentraland-nfts-crypto-2021-12>

Rodriguez, J. (2022, January 21). *Game Theory in DeFi Protocols Part I: Types of Games*. Retrieved from medium.com: <https://medium.com/intotheblock/game-theory-in-defi-protocols-part-i-types-of-games-267c779d540c>

Rossolilo, N. (2022, March 7). *Fool*. Retrieved from A Complete Guide to Minting NFTs (Using OpenSea as an Example): <https://www.fool.com/investing/stock-market/market-sectors/financials/non-fungible-tokens/nft-minting/>

- Rouviere, S. d. (2022, March 12). *Building Expansive NFT Universes: CCO, Fidelity, & On-Chain Building*. Retrieved from simondlr.com: <https://qz.com/1987590/the-carbon-footprint-of-creating-and-selling-an-nft-artwork/>
- Saritas, O., & Smith, J. E. (2011). The Big Picture - trends, drivers, wild cards, discontinuities and weak signals. *Futures*, 292-312.
- Selinger, E. (2022, March 2). *The Gospel of the Metaverse*. Retrieved from techpolicy.press: <https://techpolicy.press/the-gospel-of-the-metaverse/>
- Shah, S. (2021, 06 14). *Thailand bans meme coins and NFTs as part of crypto crackdown*. Retrieved from Engadget: <https://www.engadget.com/thailand-bans-meme-coins-nft-113518980.html>
- Shin, L. (2022). *The Cryptopians: Idealism, greed, lies, and the Making of the first big cryptocurrency craze*. New York: PublicAffairs.
- Simon, A. (2020, May 15). *How COVID-19 Is Leading Us to the Metaverse, Part One*. Retrieved from medium.com: <https://medium.com/ipg-media-lab/part-1-how-covid-19-is-pushing-us-closer-to-the-metaverse-c76a46e21cd2>
- simus, M. (2018, September 3). *How Bitcoin's footprint is impacting water use*. Retrieved from thesourcemagazine.com: <https://www.thesourcemagazine.org/how-bitcoins-footprint-is-impacting-water-use/>
- Smith, S. S. (2021, December 12). *Crypto News*. Retrieved from 4 Reasons Why Museums Aren't Cashing in on NFTs yet: <https://cryptonews.com/exclusives/4-reasons-why-museums-arent-cashing-nfts-yet.htm>
- Sonenreich, A. (2022, 02 16). *NFTs And The Future Of Commercial Real Estate*. Retrieved from Forbes: <https://www.forbes.com/sites/forbesbusinesscouncil/2022/02/16/nfts-and-the-future-of-commercial-real-estate/?sh=696f21ff9bac>
- Spencer, A. I. (2021, December 7). *Canadian Painter earns over \$300,000 selling paintings representing women of color as NFTs*. Retrieved from Black Enterprise: <https://www.blackenterprise.com/canadian-painter-earns-over-300000-in-nfts-selling-paintings-representing-women-of-color/>
- Spencer, A. I. (2021, December 7). *Canadian Painter Earns Over \$300,000 Selling Paintings Representing Women of Color as NFTs*. Retrieved from Black Enterprise: <https://www.blackenterprise.com/canadian-painter-earns-over-300000-in-nfts-selling-paintings-representing-women-of-color/>
- Staff, C. (2022, March 17). *Gemini*. Retrieved from Crypto Wallets for Beginners: What You Need to Know: <https://www.gemini.com/cryptopedia/crypto-wallet-types#section-understanding-crypto-wallets>
- Swisher, K. (2021, 03 22). *What the Heck are NFTs? Let's Ask Beeple*. Retrieved from nytimes.com: <https://www.nytimes.com/2021/03/22/opinion/sway-kara-swisher-beeple.html>
- Tabuchi, H. (2021, April 13). *NFTs Are Shaking Up the Art World. They May Be Warming the Planet, Too*. Retrieved from NY Times: <https://www.nytimes.com/2021/04/13/climate/nft-climate-change.html>
- Takahashi, R. (2017, August 8). *How can creative industries benefit from blockchain?* Retrieved from McKinsey: <https://www.mckinsey.com/industries/technology-media-and-telecommunications/our-insights/how-can-creative-industries-benefit-from-blockchain>
- Tangermann, V. (2021, November 19). *NEW WEBSITE SHOWS HOW SILLY NFTS ARE BY PIRATING THEM*. Retrieved from <https://futurism.com>: <https://futurism.com/the-byte/website-pirating-nfts>
- Taylor, A. (2022, February 8). *This artist is being called NFT royalty and has sold art valued at more than \$18 million. Here's how he did it*. Retrieved from Fortune: <https://fortune.com/2022/02/08/nft-artist-royalty-sold-art-valued-18-million-heres-how/>

- Thaddeus-Johns, J. (2022, March 11). *Art Market*. Retrieved from NFT's Promised to Revolutionize the Art World- but Are Galleries on Board?: <https://www.artsy.net/article/artsy-editorial-nfts-promised-revolutionize-art-galleries-board>
- Thompson, N. (2022, March 7). *It's Complicated: The relationship Between Crypto and NFTs*. Retrieved from CoinDesk.com: <https://www.coindesk.com/layer2/2022/03/07/its-complicated-the-relationship-between-crypto-and-nfts/>
- Tran, T. (2022, 02 07). *Evidence is piling up that a huge number of NFT sales are fake*. Retrieved from Futurism: [https://futurism.com/the-byte/evidence-nft-sales-fake?utm\\_campaign=trueAnthem\\_manual&utm\\_medium=trueAnthem&utm\\_source=facebook&fbclid=IwAR15CgwTMocq6RNMK3Dwa-HjIQnCMnOhcKZPgxSyjM4dJWYcmZykDrrzcK4](https://futurism.com/the-byte/evidence-nft-sales-fake?utm_campaign=trueAnthem_manual&utm_medium=trueAnthem&utm_source=facebook&fbclid=IwAR15CgwTMocq6RNMK3Dwa-HjIQnCMnOhcKZPgxSyjM4dJWYcmZykDrrzcK4)
- Villa, A. (2022, February 22). *Congolese Sculpture Held by Virginia Museum Is at the Center of a Dispute Involving NFTs*. Retrieved from artnews.com: <https://www.artnews.com/art-news/news/catpc-virginia-museum-of-fine-arts-statue-nft-dispute-1234619770/>
- Volpicelli, G. M. (2022, February 9). *Assange's NFT Clock Sale Rides a Wave of DAO Crowdfunding*. Retrieved from wired.com: <https://www.wired.com/story/assange-dao-nfts-crypto/>
- Warburg, B., Wagner, B., & Serres, T. (2019). *Basics of Blockchain: A guide to building literacy in economics, technology and business of blockchain*. Animal Ventures.
- Warren, S., Sumedha, D., & Werbach, K. (2021). *Decentralized Finance(DeFi)*. World Economic Forum: In collaboration with Wharton Blockchain and Digital Asset Project.
- Waterworth, K. (2022, January 3). *3 Ways the Pandemic Is Influencing the Metaverse Boom*. Retrieved from fool.com: <https://www.fool.com/real-estate/2022/01/03/3-ways-the-pandemic-is-influencing-the-metaverse/>
- Wintermeyer, L. (2022, January 15). *NFTs, DAOs, MobileWeb3, And The Metaverse: Off And Running In 2022*. Retrieved from forbes.com: <https://www.forbes.com/sites/lawrencewintermeyer/2022/01/15/nfts-daos-mobileweb3-and-the-metaverse-off-and-running-in-2022/?sh=507ca04e11cd>
- Woo, E., & Roose, K. (2022, March 2). *This Social Club Runs on Crypto Tokens and Vibes*. Retrieved from nytimes.com: <https://www.nytimes.com/2022/03/02/technology/friends-with-benefits-crypto-dao.html>
- Wright, B. (2022, January 12). *The British Museum Should Think again on NFTs*. Retrieved from telegraph.co.uk: <https://www.telegraph.co.uk/business/2022/01/12/british-museum-should-think-nfts/>
- Wu, C., & Dixon, C. (2021, October 27). *Investing in Friends With Benefits (a DAO)*. Retrieved from a16z.com: <https://a16z.com/2021/10/27/investing-in-friends-with-benefits-a-dao/>
- Yakovenko, A. (2021, April 14). *Gemini*. Retrieved from Solana (SOL): Scaling Crypto to the Masses: <https://www.gemini.com/cryptopedia/solana-blockchain>
- Zora. (2021, September 22). *Manifold on Smart Contracts and Creative Sovereignty*. Retrieved from zine.zora.com: <https://zine.zora.co/manifold-s-eric-diep-on-smart-contracts-and-creative-sovereignty>

### 6.1.2 NFT Artists Referenced

Artist name	Website (Artist Page)
Beeple (Mike Winkelmann)	<a href="https://www.beeple-crap.com/">https://www.beeple-crap.com/</a>
Bland, Mark	<a href="https://foundation.app/@markbland">https://foundation.app/@markbland</a>
Chan, Mitchell F.	<a href="https://chan.gallery/">https://chan.gallery/</a>
Denina, Lana	<a href="https://www.lanadenina.com/nfts">https://www.lanadenina.com/nfts</a>

Dowbak, Michah (a.k.a Mad Dog Jones):	<a href="https://opensea.io/collection/mad-dog-jones">https://opensea.io/collection/mad-dog-jones</a>
Hopkins, Gregory Keiken Collective	<a href="https://foundation.app/@Indigital">https://foundation.app/@Indigital</a> <a href="https://www.itsnicethat.com/articles/keiken-feel-my-metaverse-digital-091019">https://www.itsnicethat.com/articles/keiken-feel-my-metaverse-digital-091019</a>
Marshall, Gregory	<a href="https://cloudyachts.io/">https://cloudyachts.io/</a>
Ostachowski, Martin Lukas	<a href="https://mlo.art/">https://mlo.art/</a>

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### 6.2 A How-To Guide for Minting an NFT

To begin, minting an NFT essentially means converting art to a token by publishing the art works “unique publishable token,” which makes the artwork available for purchase using cryptocurrency (Rossolilo, 2022). Minting an NFT can seem like a monumental task, however with a few clear steps, artists can convert their work to digital formats to upload to the blockchain.

There are many platforms available to artists that make the upload easy to follow. One thing artist’s need to be aware prior to minting their artwork is the “gas fee.” Some blockchains such as Ethereum that use a Proof-of-Work (PoW) structure currently, require a fee that goes to pay miners and other stakeholders in the chain to authenticate the work. Transaction costs such as gas fees are needed to pay for the computational resources and efforts required to execute the order to the blockchain (Ethereum Gas Fees, 2022). For the artist worried about the ecological cost, there are many market places like Hit Et Nunc (<https://www.hicetnunc.xyz/>) that accept Proof-of-Stake (PoS) cryptocurrency such as Tezos (<https://tezos.com/>). Apart from some of the climate worries surrounding NFTs, the technology presents a great opportunity for artists to build their own collector base and locate a direct audience.

The very first step is to have a digital file. If the work isn’t a digital file, such as a film photograph, it needs to be converted to a digitally accepted format. Commonly accepted digital formats for NFTs are gif, jpg, png, svg, wav, ogg, glb, glt, webm, mp3 and mp4. Below, figure 15 shows the most popular NFT marketplaces and the size accepted size of the work that can be minted (Gomez, n.d.).

<b>NFT Marketplace</b>	<b>File Minting Size/ Accepted File Types</b>
<b>OpenSea.io</b>	<b>Maximum file size of 100MB</b> (Image, video, audio, and 3D model file types are supported)
<b>Rarible.com</b>	<b>Maximum file size of 30MB</b> (PNG, GIF, WEBP, MP4, or MP3.)
<b>Mintable.app</b>	<b>Maximum file size of 200MB</b> (All image formats, mp4 videos, and GLB 3D files.)
<b>Foundation.app</b>	<b>Maximum file size of 50MB</b> (JPG or MP4 format)
<b>SuperRare.co</b>	<b>Maximum file size of 50MB (Thumbnail: 10MB)</b> (Image, video, audio, and 3D model file types are supported)
<b>KnownOrigin.io</b>	<b>Maximum file size of 75MB (Cover Image: 25MB)</b> (Image, video, audio, and 3D model file types are supported)

Information gathered from each individual site.

Figure 14: NFT Market places and Minting File Size (Gomez, n.d.)

One of the integral components of minting the artwork involves setting up a wallet. A wallet holds the cryptocurrency needed to connect to marketplace. Wallets allow the artists to pay for any transaction fees required when the file is uploaded. The crypto wallet also determines when the NFT is ready to be authenticated and listed, before it is made purchasable by the larger public. There are quite a few different types of wallets, so it is paramount that the artist does their research prior to choosing a wallet (Staff, 2022). Metamask is one of the most popular wallets of choice as it can be easily integrated into most marketplaces.

Once the wallet is set up, the cryptocurrency is purchased and artwork converted to a digital file format, the artist must choose a listed price for the artwork. The artwork can be listed with a fixed price or as a time-based auction. A time-based auction allows bidders to set the price, this process can be more informative to the artist to understand the market price of their artwork.

The popular NFT marketplaces for artists to list their work, especially as a beginner, include:

- **Rarible** (<https://rarible.com/>)
- **OpenSea** (<https://opensea.io/>)
- **Nifty Gateway** (<https://niftygateway.com/>)
- **SuperRare** (<https://superrare.com/>)
- **Foundation** (<https://foundation.app/>)



- **Hit et Nunc** (<https://www.hicetnunc.xyz/>)

It is unnecessary to use a marketplace; however, the one thing a marketplace guarantees is a pool of buyers. It is easier to gain traction and build a community amongst buyers and sellers. However, artists have used other ways to list their work on the blockchain.

Currently, the art world provides exciting opportunities for artists trying to get into the world of Crypto art and NFTs. Today an artist has the power to gain a following through marketplaces, or even find a way into the established institutional art world. Artist's working in the digital format, have now not just ways to monetize their work, but also to reach a new collector base. Minting a NFT is just the start to possibilities of thinking about art on the blockchain.

## 6.3 Expert Workshop Panel Bios



**Candice Houtekier** is a virtual reality enthusiast and a metaverse explorer, since 2015. She founded Art Collision in 2019, a Toronto-based creative studio focusing on digital tools, metaverses, and VR. Her background is in Art History and Video Game Studies. As a Futurist, she collaboratively explores and constructs new virtual realities to develop, transform, and enrich the international art scene. Houtekier's interest in NFTs is focused on art history using a digital lens: How will NFTs change the future of art? For more information, visit <https://www.cryptovoxels.com/play?coords=SW@372W,644S>.



**Dimitri Papatheodorou** is a visual artist, musician, professor and architect. He is working on establishing an NFT gallery, called 'Seeking the Periphery', with two Ryerson Architecture School Master's students. For more information, please visit <https://www.theperiphery.ca/>.



**Evan Jones** is the founder of [Stitch Media](#), an interactive media production services company which tells stories using new technology and timeless techniques. A two-time Emmy Award winner, Evan's work combines television, radio, web, mobile, games & the real world and were recognized in the 'Top 10 New Media Groundbreakers' by the Bell Fund. Stitch Media projects range from interactive documentary ('Best in Electronic Culture' by the UNESCO World Summit) to branded entertainment ('Best in Digital Marketing' by the Digi Awards). Evan has guest lectured on the art & business of interactive story internationally at the Canadian Film Centre, the Australian Film, Television & Radio School and the University of Southern California. International clients include Microsoft, Disney, FOX, Discovery, CBC, Bell & The Movie Network.



**Farah Yusuf** is an independent curator based in Toronto. Her practice explores themes of cultural identity, hybridity, language, and technology. She has held curatorial residencies at the Textile Museum of Canada and Humber College Galleries and currently works at the Centre for Emerging Artists and Designers at OCAD University. She is the recipient of grants and awards from the Canada Council for the Arts, Ontario Association of Art Galleries, and the Ontario Arts Council. Yusuf holds an MA in Experimental Digital Media from the University of Waterloo (2013) and a BFA in Criticism and Curatorial Practices at OCAD University where she was awarded the Curatorial Practice. For additional information, please visit <https://farahyusuf.wordpress.com/>.



**Martin Lukas Ostachowski (MLO)** is an award-winning new media and crypto artist based in Montreal, QC, Canada. He has created crypto art and NFTs since 2018, co-authored a published position paper on crypto art in 2019 and documents the history of crypto art since 2020, gaining himself the nickname of crypto art historian. For more information, please visit <https://mlo.art/>.



**Dr. Michelle Kasprzak** is an established contributor to the fields of digital cultures, speculative futures, and innovation as a curator, educator, writer, and artist. She recently received the support of the Creative Industries Fund NL for a research and experimentation platform on NFTs. For more information, please visit <http://michelle.kasprzak.ca>.



**Nicole Vella** is an interdisciplinary artist based in Toronto, Canada. She is currently studying Digital Futures at OCAD U University and has a background in Computer Science and Graphic Design. She has spoken on panels regarding Sustainable Processes within Artistic Creation at OCAD U University. Her work has been exhibited in [VIDEO FEVER](#) at Trinity Square Video (2020) and [Our Histories With Objects](#) at The Gladstone Hotel (2022). FOR3V3R was exhibited in the Video Fever Festival and streamed on <https://www.bumptelevision.com/>.