Emerging Space Brief

Nonfungible Tokens

Originally published on April 1, 2021

Top companies by total VC raised | Total raised: $3.0B

Contact

Research

Ryan Vaswani Analyst, Emerging Technology
ryan.vaswani@pitchbook.com

pbinstitutionalresearch@pitchbook.com

Overview

Nonfungible token (NFT) startups develop the protocols, infrastructure, marketplaces, and applications necessary to enable virtual ownership of unique digital assets. NFTs are growing in popularity, partly due to the global rise in legitimacy of cryptocurrencies and partly because NFTs are a viable way to ensure trusted and authenticated ownership using the blockchain. Companies within this space enable the minting of new NFTs; develop online gaming, art, and collectible ecosystems that utilize NFTs; and build marketplaces that streamline the exchange of NFT assets.

Applications

Art

The recent explosion of interest in NFTs has been fueled by the digital art boom, headlined by multimillion-dollar sales from artists such as Grimes and Beeple. Digital artists in particular flock to NFTs for three primary reasons: greater accessibility to the market, proof of ownership, and unique forms of monetization. While traditional art sales require gaining access to a legacy network of art dealers and going through established channels and auction houses, digital sales driven by NFTs empower smaller and digitally focused creators to gain access to a wider market than previously possible. Furthermore, the infrastructure underpinning NFTs finally allows for a recognized and secure pathway to legitimately “own” a digital asset, thus enabling buyers to feel more comfortable participating in the digital art market. Finally, NFTs can be used in smart contracts, which allow creators to earn royalties on future transactions involving their work.

Gaming

The past decade of mobile and online gaming has experienced a steady and lucrative rise in money spent on microtransactions and in-game purchases. One analysis showed that Fortnite players who made a purchase in the game spent on average about $85.[1] Game developers working with NFTs—which include the likes of major publishers such as Assassin's Creed developer Ubisoft Entertainment (PAR: UBI)—believe that this model is one-sided. Consumers are clearly willing to pay for in-game cosmetics or abilities that may be used only for a short while, but what if an ownership stake existed in these purchased assets? Suddenly, players would be able to share in the value of rare in-game items, thereby giving them financial incentive to invest further time and money in a game's ecosystem. Similar to the royalty structure described above with digital art, game publishers would earn a fee every time an in-game item is bought and sold through an NFT marketplace. Needless to say, the gaming applications of NFTs are nascent. It's yet to be seen which model, if any, will emerge as dominant.

Collectibles

Much of the foundation for the current NFT collectibles craze was laid in 2017 with the launch of the blockchain game CryptoKitties, which allowed users to buy and sell the rights to digital cats, each with its own unique appearance, personality, and family history. In the years since, numerous NFT collectibles marketplaces have sprung up—most notably the launch of NBA Top Shot in October 2020, which has already had $390 million in sales of NBA moments such as dunks, blocks, and famous highlights.[2] As the collector title implies, many of these marketplaces deal in niche areas of interest. However, those with wider brand recognition such as the NBA are betting that the mass appeal of their brands will inherently boost the legitimacy and value of their marketplaces and their related assets. Ultimately, in the collectibles space, NFTs represent a way to take a longstanding model—wanting to own a scarce asset in a concentrated market—and enable that model to exist under the new paradigm of digitization. Why would someone want to own an intangible asset such as a video highlight instead of a physical asset such as a baseball card? There isn't one definitive answer, but the internet ecosystem's maturity, along with cryptocurrencies' explosive growth, suggests that a new generation of collectors believes that these platforms have reached a plateau of permanency that will embed them—and their cultural relevance—far into the future.

Technologies & processes

Fundamentally, NFTs create digital scarcity. Fungibility suggests that assets can be exchanged for other assets of identical value. In other words, trading one bitcoin for another bitcoin leaves both sides no better or worse off. Nonfungibility is the opposite: the idea that the asset in question has no comparable good for which it can be directly exchanged. In other words, the item is unique, not easily interchangeable, and has a market-determined value.

NFTs can easily be minted, a process whereby the creator of a digital asset attaches a blockchain-backed token to the asset. Though some systems allow for

[1] "The Finances of Fortnite: How Much Are People Spending on This Game?" Mike Brown, Lendedu, June 26, 2018
[2] "NFTs Are Shaking Up the Art World – But They Could Change So Much More" Andrew R. Chow, Time, March 22, 2021

fractional ownership, it's easiest to conceptualize each NFT as having one owner. During an NFT purchase, information pertaining to the transaction—such as sale date, purchase amount, and participants—are securely stored on a digital ledger. The purchased token then acts as a virtual deed of ownership, which gives that individual the rights to resell the NFT but not the rights to the underlying content. For example, an owner of an NFT cannot resell the content in other forms, such as by printing digital artwork on a T-shirt. Furthermore, the original content creator always has the ability to remove, alter, or otherwise destroy the digital existence of the original work.

At the moment, the Ethereum blockchain mints the majority of NFTs, primarily due to its superior infrastructure for handling these types of assets, using a standard called ERC-721. Companies gravitate to Ethereum for a variety of reasons, including the simplicity and security of proving ownership history, the difficulty of stealing ownership, the ability to trade NFTs peer to peer, and the portability of Ethereum products, which allow NFT owners to easily sell their assets on a variety of Ethereum-backed platforms. Even so, prohibitive gas prices—transaction fees—and the climate implications of Ethereum have sent creators looking for alternatives, such as the recently created Flow blockchain. It is quite difficult to transfer NFTs across competing blockchains, which makes the portability of ownership an issue that needs a long-term solution.

Outlook

Climate concerns

Given that Ethereum is the primary blockchain standard backing these tokens, the recent explosion of NFT-related interest and transactions resulted in increased Ethereum usage. As a result, energy usage associated with verifying blockchain transactions on Ethereum skyrocketed, with the total energy consumption of the Ethereum network comparable to the annualized energy usage of Slovakia.[3] However, connecting this energy demand directly to carbon emissions is a hotly contested debate topic in the space; proponents reference estimates suggesting that 70% of mining operations may be powered by clean sources.[4] Even if true, the number fluctuates seasonally and sometimes pushes adjacent energy users toward "dirty" energy sources if the clean sources are used up by mining. Other blockchain standards such as Flow claim to use less energy to verify transactions. Ethereum's developers are developing a proof-of-stake framework that should be less carbon intensive, but there is no clear adoption timeline. Given the ever-increasing international focus on decarbonization, the voracious energy appetite of NFTs could prove to be a costly impediment toward widespread adoption of NFTs.

[3] "Ethereum Energy Consumption Index" Digiconomist, March 24, 2021
[4] "NFTs Are Hot. So Is Their Effect on the Earth's Climate" Gregory Barber, WIRED, March 6, 2021

An asset bubble

Many observers and even some creators agree that the current NFT assets prices—especially in the digital art space—are likely a product of rampant speculation by buyers looking for the next hot thing, as well as those stuck at home looking to invest. Beeple, now a household name due to his work "Everydays: The First 5000 Days" fetching $69.3 million at auction, pronounced, "NFT art is absolutely in a bubble".[5] Given that the stability and long-term prospects of NFTs are far from certain, it should be undeniable that existing prices will be unsustainable. Fears sparked by new regulations, climate worries, or simply a chill in buyer appetite could—and likely will—humble existing valuations. Nonetheless, though a crash in prices may send some participants packing, the underlying fundamentals of NFTs should remain strong—especially given that they enable a unique form of digital ownership with a broad variety of uses.

New models of monetization

In the long run, NFTs promise to fundamentally change the paradigm of monetization related to digital assets. Beyond the existing, overblown hype and asset valuations, the NFT protocol's structure and its connection to the blockchain represents an opportunity for blockchain to finally deliver on some of its revolutionary promises. Notably, the idea that NFT owners can have stakes in the financial proceeds of typically demonetized assets, combined with the functionality allowing creators to earn royalties, means that there are dual incentives for market actors to promote both the ecosystem and asset ownership. Moreover, this system democratizes access for traditionally disenfranchised creators, thereby creating a new mechanism of wealth generation for a historically marginalized class of people. Though areas such as art, gaming, and collectibles are experiencing the largest surge in this early wave of attention, we predict that NFTs will have innovative applications in decentralized finance, music, and social media, among others.

Quantitative perspective

411 companies	**553** deals	**1,575** investors	**18** exits
$725.0M largest deal	**$4.4B** capital invested	**$14.7MM** median post-money valuation	

*As of November 23, 2021

[5] "Prices in a 'Bubble,' Beeple Says After His $69 Million NFT Sale" Ros Krasny, Bloomberg, March 21, 2021

Recommended reading

“NFTs Are Hot. So Is Their Effect on the Earth’s Climate,” WIRED, Gregory Barber, March 6, 2021.

“Collectibles, Crypto NFTs, and the Monetization of Influence,” The Information, Sam Lessin, March 2, 2021.

“NFTs Explained: What’s Driving Prices for LeBron James and Kings of Leon Digital Collectibles,” The Wall Street Journal, Caitlin Ostroff, March 11, 2021.

“NFTs, Explained,” The Verge, Mitchell Clark, March 11, 2021.