

In collaboration with
Bain & Company



Evolution of Non-Fungible Tokens

INSIGHT REPORT
OCTOBER 2023



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Foreword



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In the last year, non-fungible tokens (NFTs) have captured the spotlight in the digital world and generated a significant amount of discussion and, at times, confusion. NFTs represent an innovative intersection between ownership models, technology, communication and economics, and their ongoing transformation has not gone unnoticed.

Fundamentally, NFTs are digital certificates that hold the potential to deliver significant value for both end users and organizations. Moreover, they provide content creators unprecedented opportunities to assert ownership rights, new means to engage communities and access new financial prospects within digital landscapes. However, the world of NFTs has been marked by volatility and uncertainty, primarily driven by speculative investors, raising doubts among various interested parties.

Acknowledging this complexity, the World Economic Forum and Bain & Company have combined their expertise to develop a balanced perspective on the NFT landscape through this comprehensive report. We have gathered in-depth insights from conversations with over 40 top-tier organizations, examining the main NFT applications, potential pitfalls and hurdles to overcome.

The results of our research indicate that NFTs have the potential to notably improve customer engagement, create innovative avenues for communication and facilitate novel experiences for fans and customers. They can act as a powerful medium for creative industries to promote meaningful connections with their audience while generating new income streams.

Nevertheless, companies must undertake a strategic reflection to determine how NFTs can be integrated into their existing operations. A well-planned go-to-market strategy for introducing NFTs is essential to build sustainable communities, generate real value for users and avoid mere speculative hype.

The journey towards broader NFT adoption will inevitably confront numerous challenges, with regulatory, compliance, implementation and IT-related considerations chief among them. However, by overcoming these obstacles, we open doors to an exciting future defined by creativity, collaboration and digital empowerment.

We hope that, through this report, we are contributing towards this exciting future.

Executive summary

Non-fungible tokens, or NFTs, are digital representations of unique assets stored on the blockchain. They are a key component of Web3, allowing for new forms of digital interactions, ownership and exchange. NFTs are unique, and their ownership is recorded on the blockchain, so they cannot be duplicated or counterfeited.

NFTs gained popularity between 2021 and mid-2022, with transaction volumes peaking at the beginning of 2022. By the second half of 2022, volumes started to drop due to cryptocurrencies' volatility and overall market instability, leading to transactions plummeting by the end of 2022.

Companies have been testing different use cases to integrate NFTs through new forms of loyalty programmes, royalties, physical and digital collectables, or new gaming experiences, among others.

The adoption of NFTs has different maturity levels across industries, with sports, ticketing, luxury, gaming, consumer product goods/retail, and art leading the way in terms of the adoption and development of use cases. Nevertheless, as NFTs continue to evolve and new use cases are identified,

adoption will likely continue to grow across a wide range of industries.

The future development of NFTs relies on several pillars, such as regulation, interoperability, market momentum and ease of user experience. Regulatory and legal clarity remains a challenge due to the lack of standardized taxonomies and regulatory frameworks across jurisdictions. Further development of the Web3 ecosystem and a favourable macroeconomic situation could encourage broader NFT adoption.

Finally, the development of interoperability standards will be critical for the development of NFTs, as well as a smooth, frictionless, safe and secure user experience. Technological developments will also need to address the key elements of a solid chain: affordability, scalability and security.

Although the current success of NFTs has been initially driven by digital collectables and limited to small-scale proof of concepts in other use cases, the broader adoption of NFTs will rely on the evolution of all described pillars.

Introduction to non-fungible tokens (NFTs) and their main benefits

NFTs, powered by blockchain, have the potential to revolutionize digital content ownership, allowing for the creation, purchase and sale of unique digital items.



NFT definition

An NFT or non-fungible token is a unique digital asset stored on the blockchain that serves as proof of ownership or authenticity for a digital or physical item/right. Unlike fungible assets, NFTs

are one-of-a-kind and cannot be replaced. They use blockchain technology to provide decentralized, secure and transparent records of ownership and transfers.



History and market overview

Initial development (2017-2021)

The development of the NFT ecosystem can be traced back to 2014, when the first NFT, Quantum, was minted by Kevin McCoy and Anil Dash. However, the initial growth of NFTs began in 2017 with digital art and collectables like CryptoPunks, an Ethereum-based collection of 10,000 unique characters, which gained significant attention from investors and the public.

In 2018, the introduction of the ERC-721 standard on the Ethereum network further fuelled the popularity of NFTs. This standard established guidelines for creating, managing and transferring NFTs, supporting the customization and uniqueness of tokens and bolstering the phenomenon. In 2017, the launch of OpenSea, one of the world's first digital marketplaces for crypto collectables and NFTs, played a significant role in the early development of the NFT ecosystem. OpenSea provided a platform for the public to explore and trade digital collectables, contributing to the market's growth.

As the NFT ecosystem matured, it attracted attention from non-digitially native brands. Notably, the NBA ventured into the space by creating Top Shot, an officially licensed collection of NBA-themed NFTs. Top Shot operates a 24/7 marketplace and has garnered more than 1.5 million users to date.¹

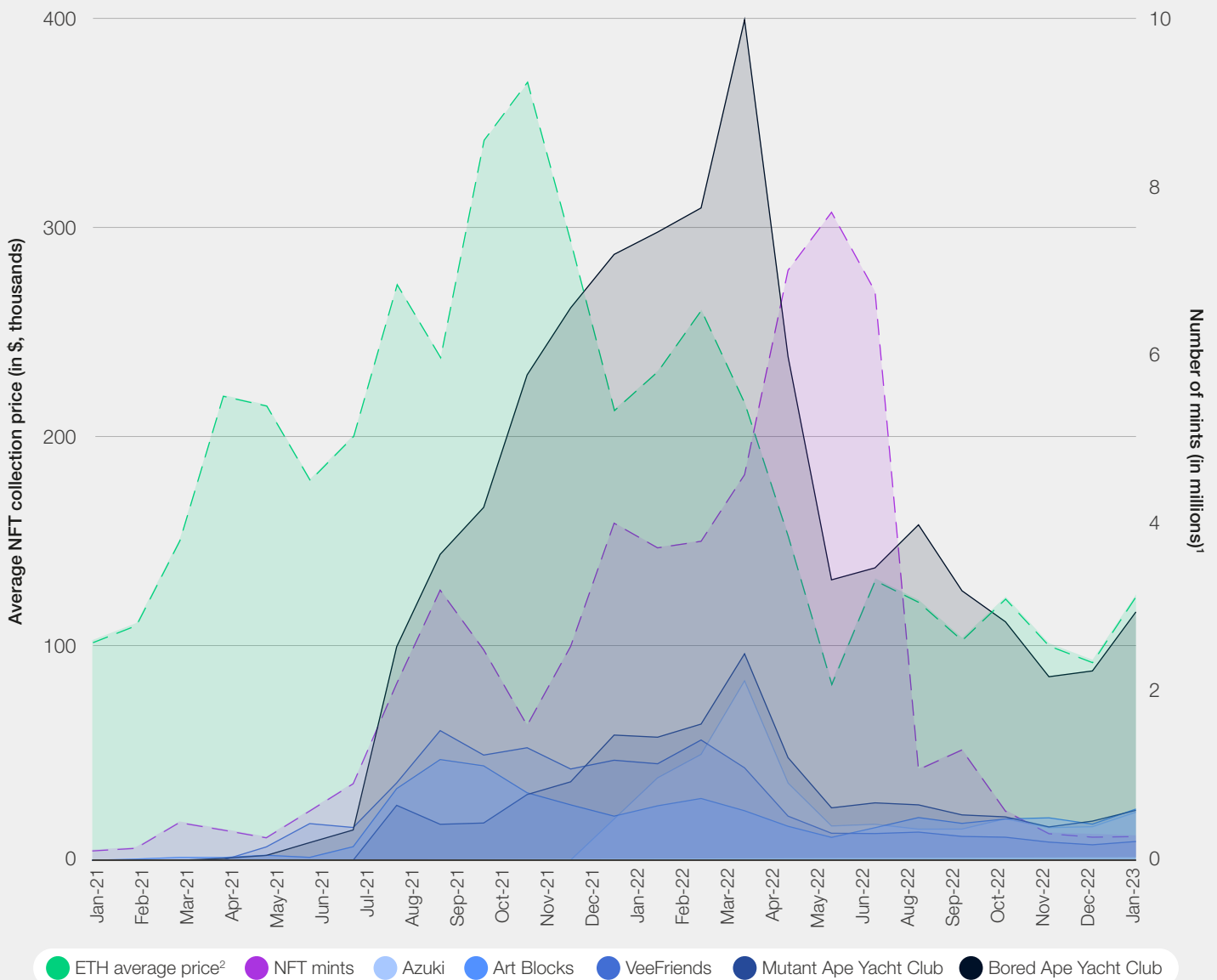
Hype and evolution (2021-2022)

Starting in 2021, a bullish cryptocurrency market contributed to the increased demand for NFTs. From mid-2021, Ethereum price began to rise, and a similar trend occurred with some of the most popular NFTs collections (particularly the Bored Ape Yacht Club).

The demand for NFTs continued to surge, driven by various factors such as speculative interest, the increasing number of celebrity endorsements, several record-breaking NFT transactions or the expansion of marketplaces, and was definitively fuelled by the sustained rise of the crypto market.

“ The initial growth and popularity of NFTs began in 2017 with digital art and collectables like CryptoPunks, which gained significant attention from investors and the public.

FIGURE 1 | NFTs selected collection price, number of mints and ETH average price



Notes: 1) Excludes mints performed outside of Ethereum; 2) Evolution shown as reference; values are not pertinent.

Source: Crypto Slams; Yahoo Finance

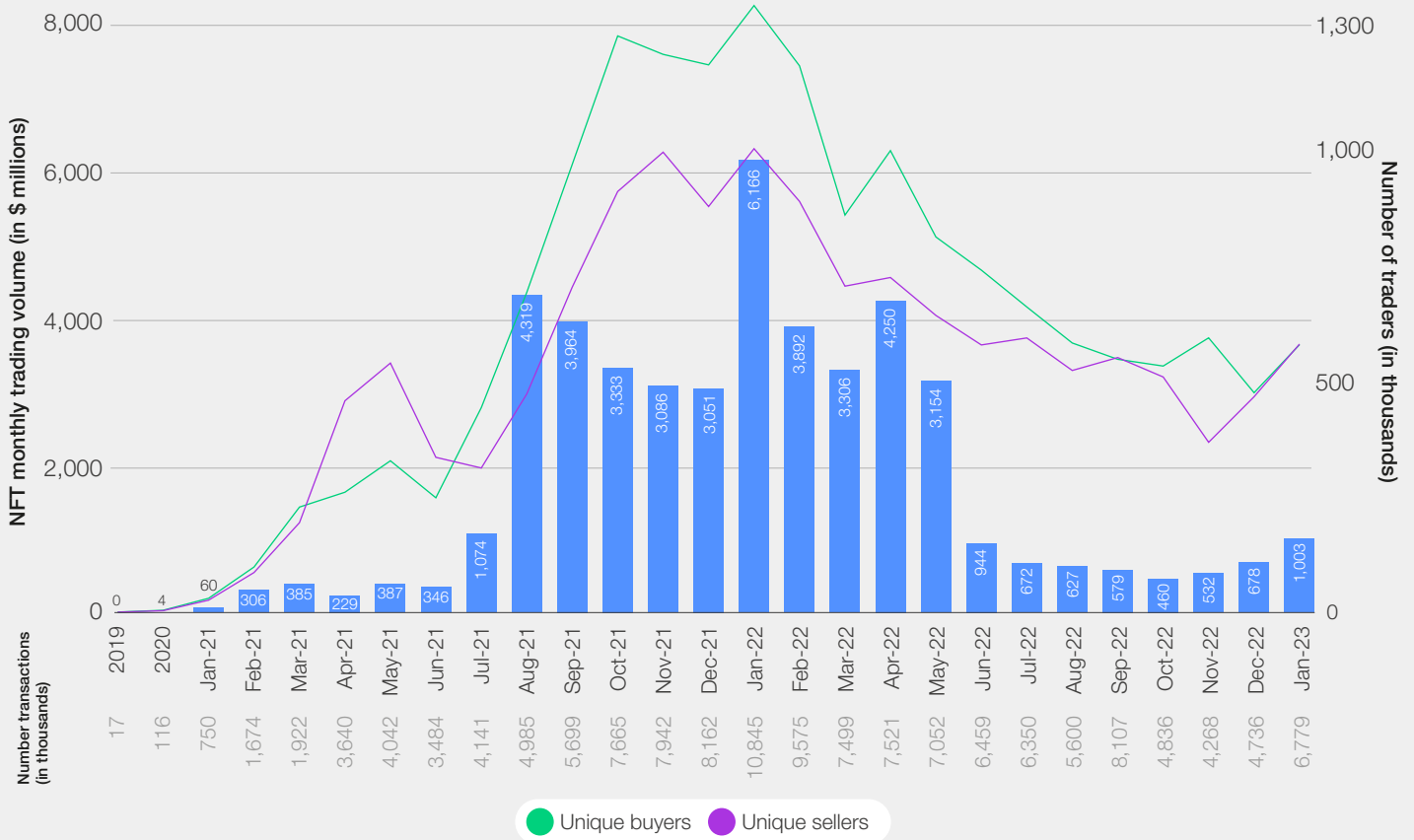
The rise in popularity of NFTs pushed global brands to start experimenting in the industry. During this period, several global brands entered the NFT ecosystem, such as Nike, with its acquisition of RTFKT in 2021² or Coca-Cola launching a series of animated NFTs in 2021.³ This led more brands to enter the space, some without a coherent strategy or value proposition.

Back to fundamentals (mid-2022-present)

The hype cycle was followed by an approximate 90% crash in the same metric between January and November 2022.⁴ The end of the NFTs hype cycle cleared the way for viable NFT business use cases beyond digital collectables and financial speculation.

Approximately \$6.1 billion⁵ worth of NFTs (in Ethereum) were traded during January 2022 (around 34% higher than its previous all-time-high). However, the environment quickly changed in a matter of months, with Ethereum NFTs transaction volumes plummeting to approximately \$500M by November 2022.⁶ This decline was driven by several factors, such as the overall downturn in global financial markets and a series of public scandals in the cryptocurrency industry (e.g. the crash of cryptocurrency coin Luna in May 2022⁷ and the crash of the exchange FTX in November 2022⁸). The transaction volume decreased by 70% between May and June 2022, signalling the end of the hype period, with the numbers of unique buyers and sellers also plummeting by the end of Q3 2022.

FIGURE 2 | NFT trading volume, number of transactions and number of traders



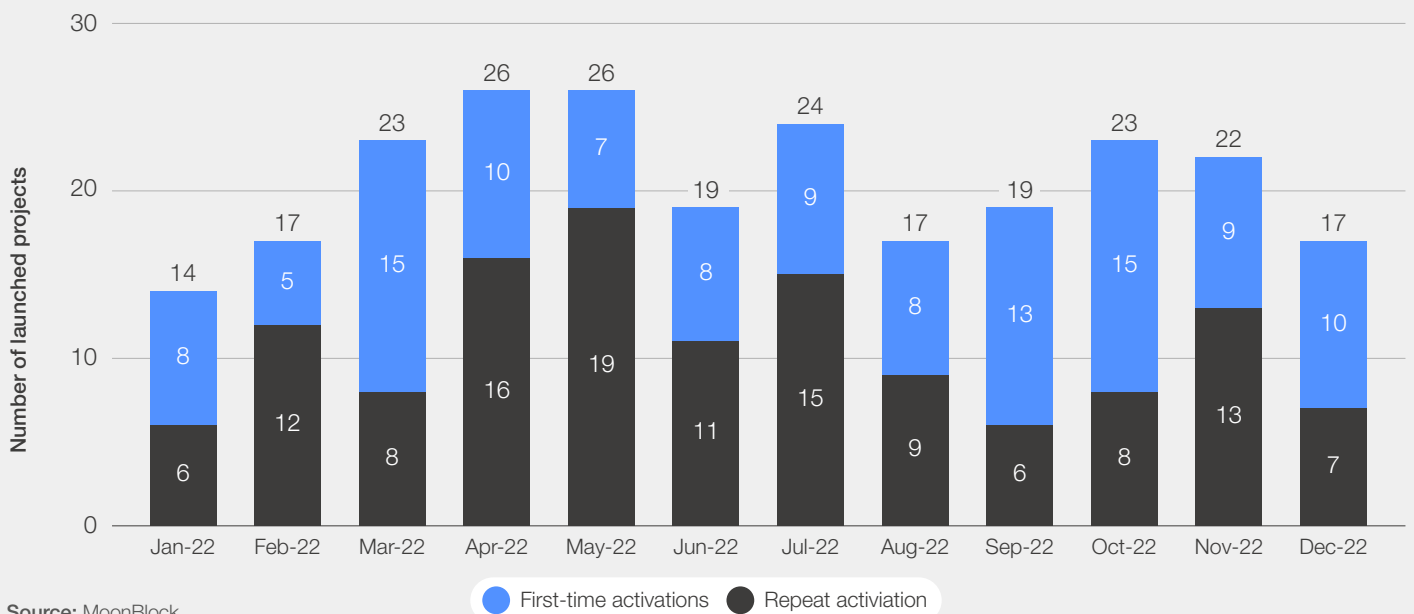
Note: Values shown for 2019 and 2020 represent the yearly average.

Source: CryptoSlams; The Block

Despite the market downturn from mid-2022, the adoption of NFTs by institutions and global brands has remained constant, given that users still perceive the potential value of the NFTs. Some examples of major brands launching NFTs

in late 2022 include Prada, Warner Records and Starbucks.⁹ While the adoption is not yet mainstream, it indicates that brands are building infrastructures and exploring more sustainable business use cases for NFTs.

FIGURE 3 | Number of brand-backed NFT projects launched – first-time vs repeat



Source: MoonBlock




NFTs use case taxonomy

Today there is no clear use case taxonomy in place, which makes it hard for market participants and regulators to reach a common understanding. After conducting market research and comprehensive interviews with some of the most active players in the space, a taxonomy of 10 use cases was defined. These can be categorized as: “tied to physical”, representing NFTs that correspond to a physical object, and “pure digital”, for NFTs solely linked to digital realms.


This suggested taxonomy intends to cover the entire universe of use cases but is not mutually exclusive. An NFT project can fall under several categories and serve various purposes (i.e. an NFT ticket could satisfy several taxonomies, such as ticketing, a digital collectable and native art).


FIGURE 4 NFT taxonomy

Tied to physical NFTs related to a physical counterpart or experience


1 


Physical collectible
Phygital experience and digital twin with a physical equivalent




2 

Ticketing
Individualized ownership of access rights. Hard to counterfeit and possibility to resell under predefined requisites




3 


Loyalty
New suite of benefits to build relationships and reward loyalty




Pure digital NFTs only related to digital environments


7 


Gaming experiences
New set of gaming experiences. Rise of play-to-earn model




8 


Digital collectable
Unique digital representation for collectables in media, sports etc.




4 


Certificate of ownership and authenticity
Proves ownership of different real-world assets (e.g. mortgage, investment, product, watch, wine bottle, etc.)




5 


Sourcing traceability
Record of product history and supply chain




6 


Identity
Digital identity to represent an entity or individual as well as its credentials, reputation, achievements, etc.




9 

Native art
New form of artistic expression. Pieces made using software, computers or other electronic devices



10 

Royalties
Assets' ownership, management and governance, which can be used as a source of revenue



Source: Bain & Company

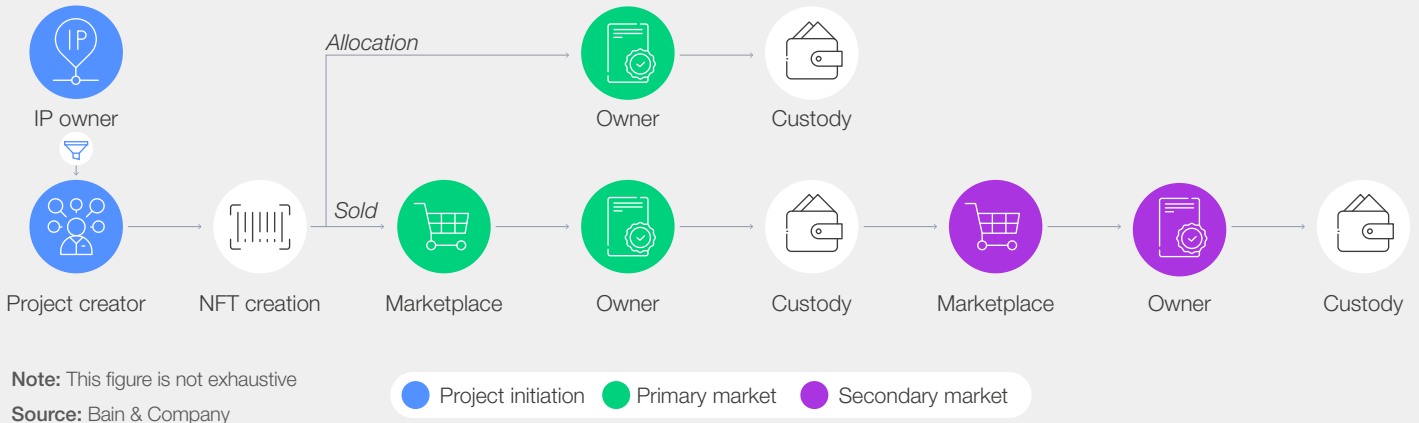
How NFTs are created

The NFT life cycle can vary based on the intended purpose or expected outcome. Below is an illustrative journey which encompasses the relevant

key steps within an NFT life cycle: 1) project initiation, 2) NFT creation, 3) primary market, 4) custody, and 5) secondary market (not always applicable).

FIGURE 5 NFT journey

Example of an NFT journey starting with project initiation, followed by the minting process before entering the buying and selling cycle



Project initiation

The project initiation has two key stakeholders: the IP owner and the project creator. An IP owner refers to the person or entity with exclusive rights to use, license or sell their intellectual property (e.g. NBA, Marvel, Disney, etc.). The project creator is responsible for the initiation of the NFT project. Examples of project creators include companies such as Dapper or Sorare.

NFT creation (go-to-market and minting)

When launching an NFT, the IP owner, together with the project creator, should consider a solid go-to-market (GTM) strategy, which can include the following activities:

- **Design/curation:** Determine the specific NFT art or media content.
- **Marketing:** Build NFT launch campaigns, set supply and price, and determine placement on platforms, as well as ongoing community management.
- **Infrastructure:** Determine the underlying technology to launch the NFT.
- **Regulatory environment:** Assess the regulatory implications of the launch.

- **NFT functionality:** Determine the unique functionality and/or fan experiences tied to the NFT (e.g. unique access, holder rewards, etc.).

Once the GTM strategy has been defined, the IP owner and the project creator should create or “mint” the NFT. Minting is the process of issuing a new NFT on a blockchain. It involves uploading a digital file (such as an image or video) to a blockchain platform that supports NFTs and then creating a smart contract that defines the ownership and characteristics of the token. Alternatively, the NFT could point to a digital asset elsewhere on the internet (e.g. the InterPlanetary File System (IPFS)).

Primary market

Like in the off-chain world, the primary market refers to the initial transaction in which the NFT is issued, allocated or sold for the first time. Minted NFTs can be directly allocated to a customer (e.g. company loyalty programmes) or sold in a marketplace (e.g. collectables).

- **Allocation:** The NFT is allocated directly to the client with no monetary exchange or trading purposes (e.g. Starbucks Odyssey loyalty programme).
- **Sale:** NFTs generated with the possibility of trading/sale issued on a marketplace to allow collectors or fans to purchase and exchange (e.g. Bored Ape Yacht Club).

“Minting is the process of issuing a new NFT on a blockchain. It involves uploading a digital file (such as an image or video) to a blockchain platform that supports NFTs.”

5-20%
of a secondary
sale goes back
to the IP owner

In both cases, the NFT changes ownership from the creator to the buyer/new owner in a process that needs to be validated by nodes on the blockchain. This validation process involves charging the buyer a fee, called the “gas” fee, to compensate for the verification and processing of transactions.

Custody

The custody of an NFT refers to its secure storage and management. Custody services include keeping the NFTs safe from theft, loss or unauthorized transfer. The secure storage of an NFT is done through dedicated NFT wallets.

Secondary market

The secondary market is where NFTs are traded after the primary sale. The owner could offer the NFT on a marketplace for re-sale if the NFT were created with that purpose at the onset. The key difference between the primary and subsequent sales is the potential royalties paid to the original IP owner, representing a new revenue source. The terms and conditions are registered on the blockchain network by the owner in the form of smart contract terms. Today, the overall economics of the secondary sale is as follows:

- **Approximately 90-92.5%** to the previous owner of the NFT
- **Around 5%** to the IP owner of the NFT as a royalty fee (this can range from 5% to 20% – the average royalty fee for Ethereum-based NFT projects launched in 2022 was around 5%)
- **0-5%** to marketplace (around 2.5% is a common standard).

BOX 1 Gas fees

As in a primary sale, additional gas fees should be added to execute the transaction. Gas fees are highly dependent on the blockchain, the amount of traffic, transaction complexity, etc.; therefore, it is difficult to provide a cost range, although these are important to consider.

Gas prices in Ethereum (ETH) are denoted in gwei, with each gwei equal to 0.000000001 ETH (10^{-9} ETH). For example, instead of saying that your gas costs 0.000000001 ETH, you can say your gas costs 1 gwei.

Currently, the Ethereum gas fee comprises a base fee and a tip, with the total transaction fee = gas units (limit) \times (base fee + tip).

Example: Juan must pay Anna 1 ETH. The transaction’s gas limit is 21,000 units, and the base fee is 10 gwei. Juan includes a tip of 2 gwei. The base fee is a value set by the protocol, and the priority fee is a value set by the user as a tip to the validator ($21,000 \times (10 + 2) = 252,000$ gwei or 0.000252 ETH).

When Juan sends the money, 1.000252 ETH will be deducted from his account. Anna will be credited 1.0000 ETH. The base fee will be burned, and the validator will receive the tip.

Additionally, a maximum amount to pay (for gas) for the transaction can also be set up prior to transaction execution.



NFTs infrastructure

Blockchain

How are NFTs recorded?

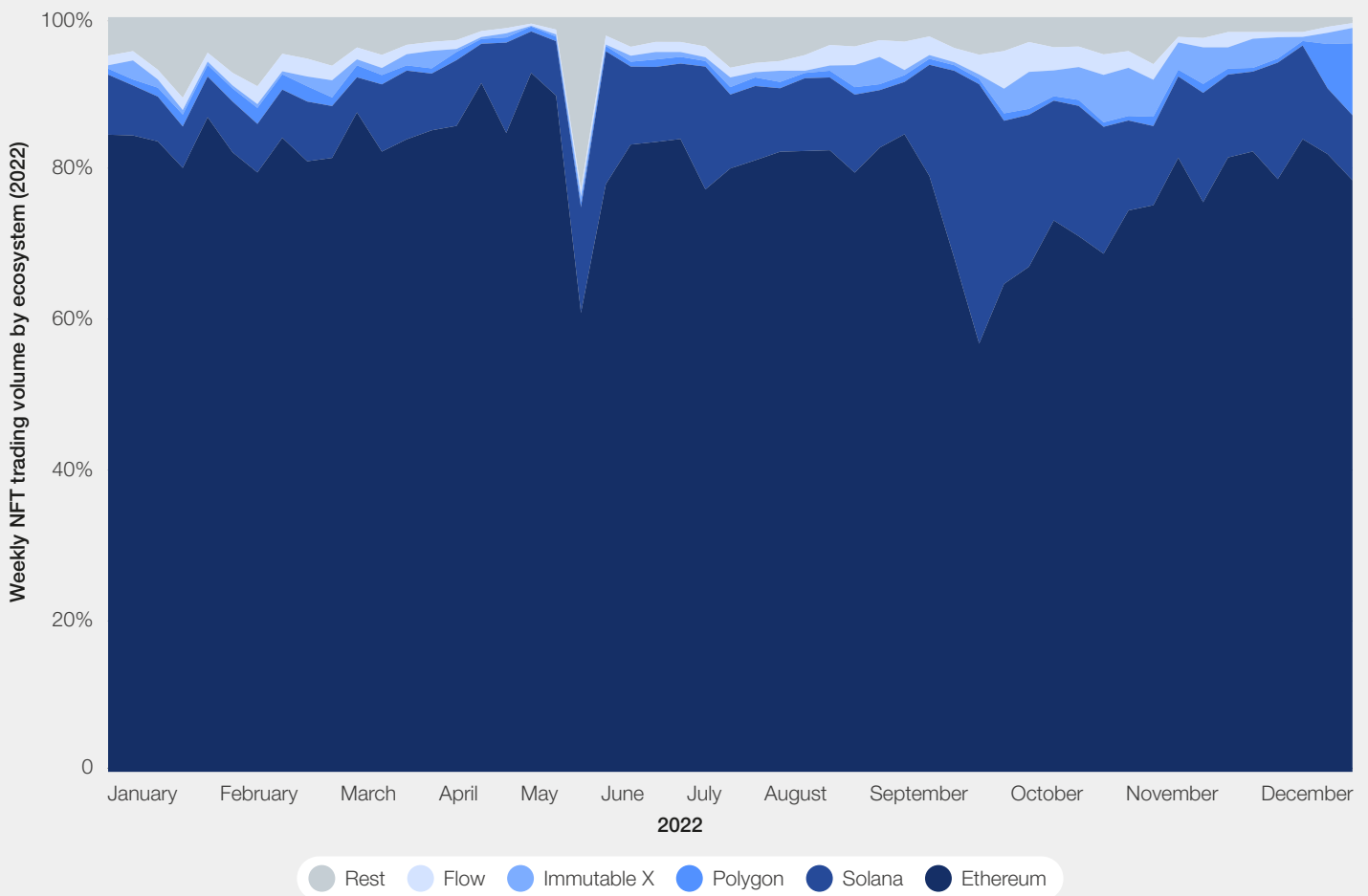
NFTs are digital assets that use existing blockchain networks like Ethereum, Polygon or Solana and are created and managed through technical standards and smart contracts. Technical standards, such as ERC-721, define the requirements for NFT creation and use on different blockchains. Smart contracts are necessary for recording NFTs on the blockchain, tracking ownership, transfers and important information. The recorded data is validated by nodes and stored on the blockchain.

What are the requirements for one blockchain vs another?

Several blockchain networks support NFT creation and trading, the most popular being Ethereum, which consistently represents more than 75%¹⁰ of NFT trading volume. Ethereum is followed by Polygon, Solana, Immutable X and Flow, among others.

FIGURE 6 Weekly NFT trading volume by ecosystem

Ethereum is the clear market leader with approximately 80% share, Solana less than 10% and Polygon gaining traction recently



Source: The Block, DeBank

The criteria for choosing a blockchain network will depend on the specific use case and goals of the NFT project. Some factors impacting the choice of

blockchain network are security, scalability, costs, smart contracts support, developers' community, interoperability and environmental impact.

“ Each type of NFT marketplace has its own unique features, user base or selection of NFTs and not all marketplaces interact with all blockchain networks.

Wallets

The safe storage of an NFT requires a dedicated digital wallet. The most common types of NFT wallets are the following:

- **Non-custodial:** The owner of the NFT has full control of the asset and its private keys. The most common types are hardware wallets (which allow for the offline storage of the NFTs’ private keys, such as Ledger) or software wallets (downloadable wallets to be installed on the user’s computer or device, such as MetaMask or Phantom).
- **Custodial wallets:** Typically provided by third-party companies. The advantage of custodial wallets is that the owner does not need to manage their own private keys.

Marketplace

What is a marketplace, and what are the main types?

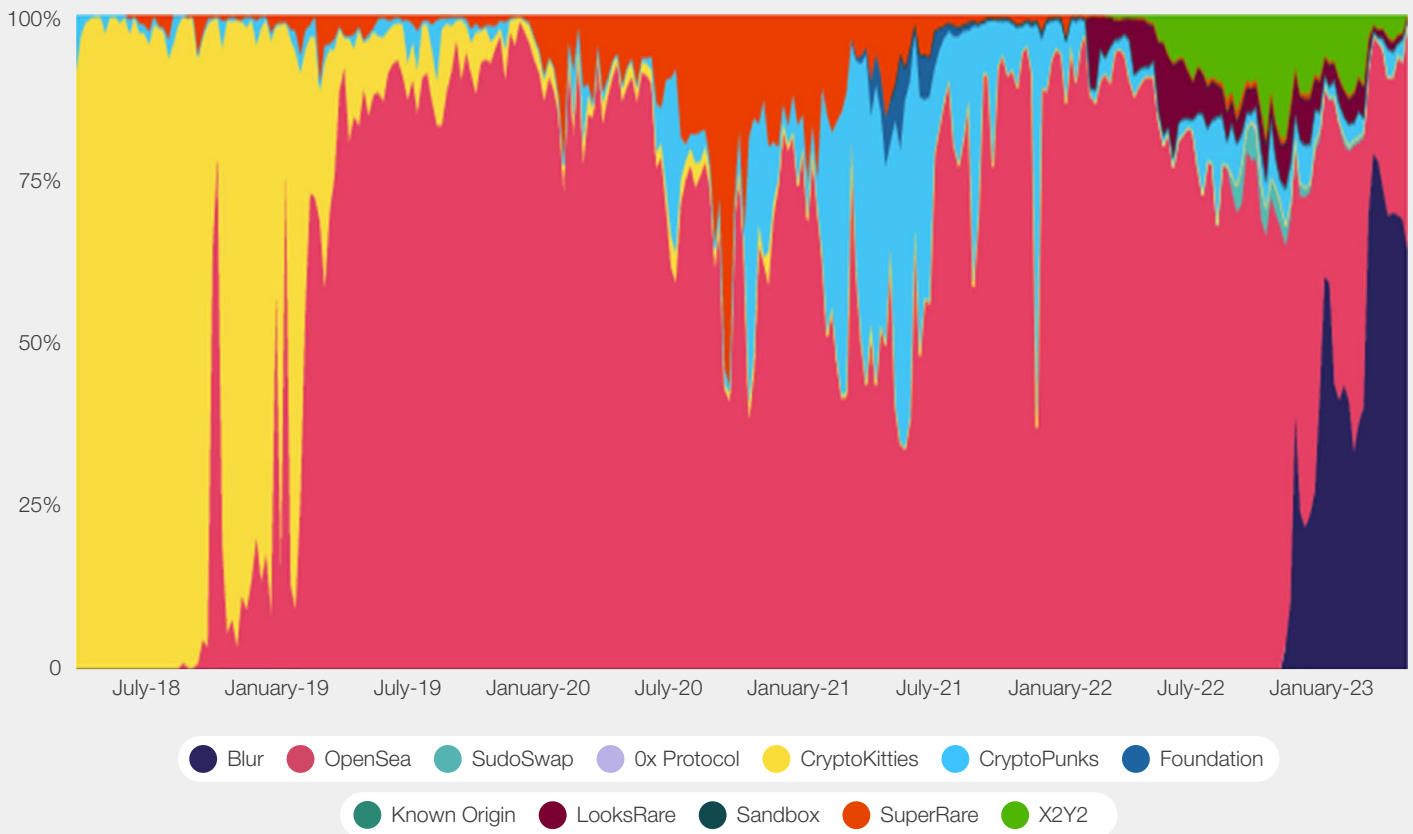
An NFT marketplace is a digital platform where NFTs are exchanged, bought or sold. Although in constant evolution, some of the most common NFT marketplaces are:¹¹

- **Open:** broad marketplaces where anyone can create and sell NFTs.
- **Crypto native:** platforms that require contributors to be approved to create NFTs and sell them on the platform.
- **Existing closed:** platforms that use their own storefront and branding.
- **White-labelled:** from those that will provide a white-label storefront to full back-end infrastructure that enables the development of a custody marketplace.

What are the main NFT exchange platforms?

Some relevant marketplaces allowing users to manage and sell NFTs in Ethereum include OpenSea, Blur, Rarible or Nifty Gateway. Each type of NFT marketplace has its own unique features, user base or selection of NFTs and not all marketplaces interact with all blockchain networks. In terms of operating model, traditionally, an NFT marketplace provides a platform for users to list, browse, buy and sell their NFTs. However, more developed marketplaces might also allow for a minting service, which provides a one-stop-shop for minting, listing, browsing and transferring an NFT.

FIGURE 7 Volume share of Ethereum NFT trading by marketplace





Main advantages of NFTs

NFTs offer several advantages over traditional digital assets. They provide a higher level of protection against fraud, making them a safe asset compared to others that can be plagiarized, stolen or lost.

TABLE 1 NFT advantages

NFTs have some advantages over today's digital and physical assets

Characteristic	NFT	Legacy digital assets	Legacy physical assets	Why the characteristic is important?
Standardization	●	●	●	Standardization enables the use of assets across multiple ecosystems (e.g. using the same car in Grand Theft Auto and Need for Speed).
Tradability	●	● within platforms (e.g. a game)	●	Tradability is prerequisite for owners to monetize their asset on the market .
Liquidity	●	● within platforms (e.g. a game)	●	Degree of liquidity defines how easily an asset can be bought or sold in the market at a price reflecting its intrinsic value.
Immutability	●	●	●	Immutability ensures that an asset's inherent characteristics (and thus the basis of its value) does not change during its lifetime outside of what is governed in its (smart) contract.
Provable scarcity	●	●	●	Fraud-safe scarcity proofs are key to ensure stability of value and to avoid fraud risk discounts/insurance cost .
Programmability, interoperability	●	●	●	Programmability allows for easy individualization of the asset and can spur growth potential ; interoperability and composability lowers development costs and make it quicker.
Widely accepted as store of value	●	●	●	The size and strength of a community that sees value in an asset determines the demand and enables further use cases (e.g. using asset as collateral).

Characteristic does not apply ● ● ● ● ● Characteristic fully applies ●

Source: OpenSea; Bain & Company

“ NFTs can promote community ownership and engagement, enabling new ways of mobilizing communities and creating bonds between users.

In addition, NFTs offer users a variety of benefits such as increased accessibility, transparency, exclusivity and the capacity to experience new services, increasing fan engagement. NFTs can promote community ownership and engagement, enabling new ways of mobilizing communities and creating bonds between users, allowing greater interaction, new communication channels and nurturing new fundraising models. Companies can also better understand their customers, enabling a more tailored offer of products and services.

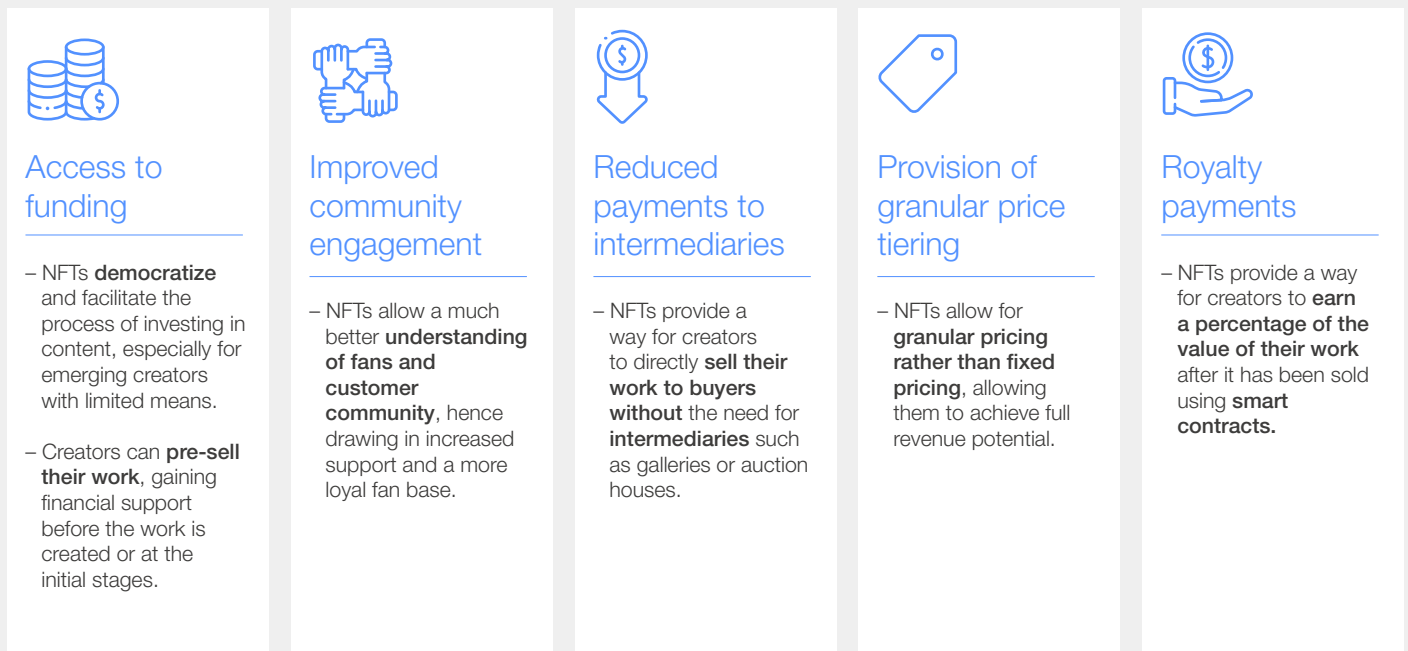
NFTs provide a new channel for individuals to purchase, own and trade digital assets cultivating a unique sense of digital ownership and participation. This innovative channel allows end users to deepen their interaction with products they regularly use and experience or participate in governance processes, ultimately creating a more holistic ecosystem for engagement.

Finally, NFTs can facilitate community ownership by empowering individuals to participate collectively in creating and owning digital assets. This can be done through decentralized autonomous organizations (DAOs) and governance tokens where communities can collectively govern and make decisions regarding the organization’s development. This empowers community members to have ownership in shaping the direction and value of their assets, promoting a stronger sense of belonging and shared purpose within such communities.

More broadly, tokenization can create new models of ownership through fractional ownership, which may result in new opportunities for people to invest in assets that were previously out of reach.

FIGURE 8 NFT benefits for users

NFTs provide advantages for the sellers and owners, changing creator economics in five fundamental ways



Source: Bain & Company

1

NFT development by industry

Investigating NFT maturity across industries reveals prominent use cases, major challenges and lessons from noteworthy initiatives.



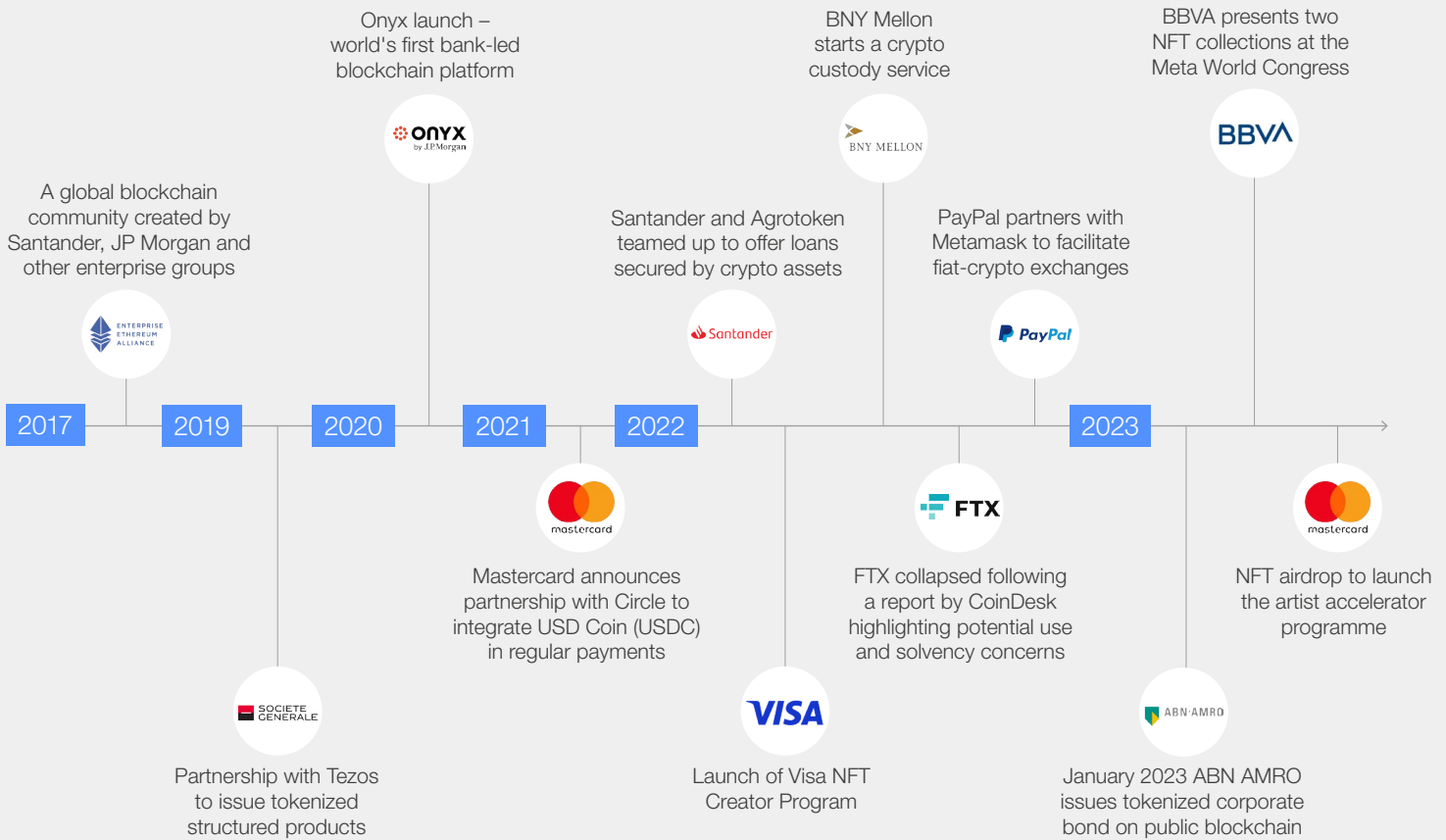
1.1 | Financial services

Overview

FIGURE 9 | NFT timeline in the financial services industry

Financial services

Main players in the industry have run pilot tests to experiment with the blockchain technology



Source: Medium; Bisontrails; CNBC; Ethereum

Existing use cases

- **Tokenization of real-world and financial assets:** The process of converting the rights to an asset into a digital token on a blockchain.
- **Santander and Agrotoken** teamed up to develop the possibility of making loans secured by tokens related to agricultural products such as soya beans, corn and wheat in Argentina.¹²
- **JP Morgan** is undertaking several tokenization efforts through Onyx, its digital assets platform (e.g. BNP Paribas' tokenized fixed income assets fund, BlackRock's tokenized Money Market Funds (MMFs) and used them as collateral, etc.).¹³

Loyalty: The process of using NFTs to promote customer engagement and loyalty initiatives.

- **Mastercard** released NFTs to help musicians expand their visibility. Moreover, they have launched an Artist Accelerator¹⁴ programme to help musicians and creators grow through an incubator.
- **Visa** has launched several initiatives intending to engage fans in the crypto and commerce spaces (e.g. 2022 FIFA World Cup NFT collection launch).¹⁵ It also launched a one-year immersive programme, which offers tools for creators in film, gaming and fashion to build sustainable businesses with NFTs through customer engagement and a focus on monetization.¹⁶

- **BBVA** is actively exploring Web3 and has launched two NFT collections through Avalanche to celebrate the 90th anniversary of the bank in Mexico.¹⁷

Other – infrastructure development: Financial institutions can play a role in developing the supporting infrastructure for NFTs use cases.

- **Expanding payments networks:** new payment models in the emerging digital ecosystem.
 - **Visa, PayPal and Mastercard** have partnered with some of the most relevant players in Web3 to offer payment services (e.g. Visa’s partnership with Crypto.com to issue a debit card backed by cryptocurrencies, Mastercard and Coinbase’s partnership to buy NFTs with fiat, PayPal’s partnership with MetaMask to facilitate fiat-crypto exchanges).^{18,19,20}

- **Digital assets marketplaces:** offer exchange platforms and marketplaces for NFT trading.

- **Custody solutions:** safe infrastructures for digital assets storage.

- **BNY Mellon**, the world’s largest custodian bank, is actively developing a financial infrastructure to support both digital and physical assets. In October 2022, they announced a Digital Asset Custody platform²¹ to hold cryptocurrencies on behalf of their customers.

- **Copper** focuses on institutional-grade custody architecture for enterprises. Copper’s Head of Research believes that the future of digital asset custody will fall in line with the emergence of NFTs as “there will be increased need for joint control of vaults and the multi-party computation model which helps mitigate overall risk and secure recovery options”.



Lessons learned

Financial institutions are prioritizing fungible tokenization and other blockchain use cases vs NFTs

Financial services institutions have prioritized more mature digital assets use cases (e.g. tokenized securities, developing infrastructure, etc.) before targeting NFTs. “Tokenization has gained a lot of traction, however mostly focused on fungible tokenization”, explains an interviewed expert. NFT projects for the industry are therefore limited to proof-of-concept tests. Copper’s Chief Executive Officer suggests “institutions should explore established digital assets and leverage blockchain’s benefits of being faster, cheaper and safer before jumping into NFTs”.

Smooth customer experience is critical

Regardless of the use case, the banking industry agrees that NFT adoption should have a smooth user experience. “Offering a smooth user experience is vital for mass adoption”, argued Circle’s Vice-President of Product. Financial services institutions’ customer base is mainly non-crypto-native. Therefore, companies

should implement user-friendly experiences (e.g. built-in minting, wallets and custody) to ensure clients can easily access and benefit from NFTs.

Launching NFTs implies significant operating complexities

The industry faces significant operational complexities when implementing NFT projects. As a result, the preferred way to use NFTs is through third-party partnerships with native Web3 companies (e.g. gas as a service). One of the main operating complexities is integrating the new infrastructure with the legacy systems, which requires high investment and effort. The industry believes integrating NFTs with traditional banking systems is incredibly complex, but it is needed to ensure interoperability.

No appetite for banks to become a bridge with NFTs marketplaces

Currently, financial services institutions are hesitant to serve as a bridge from clients to NFT marketplaces, as the lack of regulatory clarity – e.g. know your customer (KYC), anti-money laundering (AML), intellectual property (IP) protection, etc. – entails high compliance and reputational risks, exposing their clients.

“ Companies should implement user-friendly experiences (e.g. built-in minting, wallets and custody) to ensure clients can easily access and benefit from NFTs.

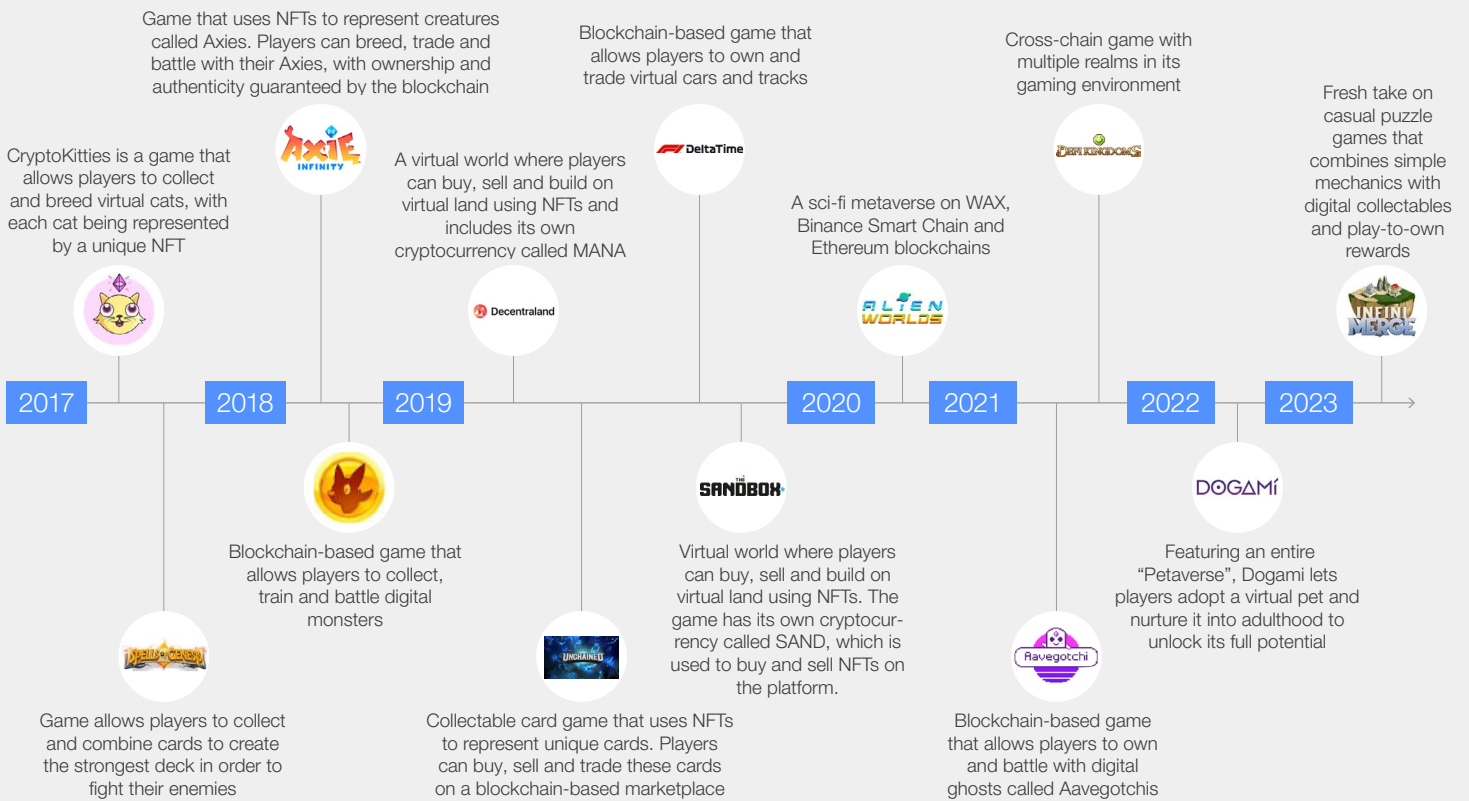
1.2 Gaming

Overview

FIGURE 10 NFT timeline in the gaming industry

Games

NFTs first gained attention in 2017 and have experienced sustained growth through the years



Source: Medium; Bisontrails; Citi; Bitwise; Ethereum; Flipboard; Kraken

Existing use cases

Gaming experiences – new revenue sources: NFTs allow users to acquire ownership and control of digital assets, as well as the ability to buy, sell and trade their in-game items, which allows players to profit from their digital assets.

- In June 2021, **Ubisoft** announced its partnership with the blockchain platform Tezos to explore NFTs and other blockchain-based solutions for gaming. Ubisoft launched its first NFT platform, Ubisoft Quartz, allowing users to acquire exclusive digital items for the Ghost Recon: Breakpoint game.²²

Gaming experiences – play-to-earn: Play-to-earn games reward players with NFTs for their

gaming experiences. Rewards earned can be sold or bought, allowing players to earn money through playing. Popular play-to-earn games use existing metaverses such as Decentraland or The Sandbox, adding the possibility of creating and trading NFTs.

- **Axie Infinity** (Animoca Brands): a blockchain-based game that uses NFTs to represent unique creatures called "Axies". Players can buy, sell and breed Axies using cryptocurrency and earn rewards for participating in battles and completing quests.²³

Loyalty – customer engagement: NFTs can be used to authenticate and reward player-created content, such as custom skins, mods or maps. This encourages creativity and innovation within the gaming community. Moreover, it creates a more engaged community around the game.



Lessons learned

Interoperability and cross-platform integration are critical

In gaming, the development of ownership for in-game items plays a key role but needs to be accompanied by interoperability across platforms. Web3 allows the player to buy an item and transfer it to another game, use it and/or sell it. Leading Web3 gaming companies, such as Animoca Brands, believe that interoperability is key and inevitable for gaming and that, according to Chief Executive Officer Robby Yung, “interoperability standards will have to be developed to overcome technical hurdles”. Additionally, interoperability allows users to trade in-game items across multiple platforms, which provides a customized experience and increases their lifetime value in the game.

Importance of a strong community and player engagement

Successful games have shown that creating a strong, engaged community is crucial for the game’s growth and sustainability. Game developers can create and heighten players’ sense of

community by involving users in the development and governance of the game. NFT-based games allow users to be rewarded and design their own in-game items that can be used and traded, adding a sense of ownership to the game. Blockchain and Web3 Solutions Project Manager of Telefonica stated that “NFTs can create a new social model, creating user synergies that give back to users part of the value they generate”. Furthermore, NFT-based games should use the generation already exposed to Web2, which is more crypto-savvy. Recent studies showed that in 2021 approximately 95% of teenagers (13-17 years) played traditional video games (90% for 18-24; 77% for 25-34),²⁴ showing the huge potential of NFT gaming.

Development of new revenue streams and improvement of customer retention

Creating a secondary market promotes a new revenue stream for game developers and content creators since royalties can be coded into digital assets. An additional financial incentive is created by introducing royalties, making NFT-based gaming more attractive for developers. Animoca Brands’ Chief Executive Officer mentioned that in-game items are “different when ownership is involved, [because] it becomes an investment”.

1.3 Sports

Overview

FIGURE 11 NFT timeline in the sports industry

Sports

NFT use had a quick pick up and has been consistently growing since 2021



Source: Medium; Bisontrails; Forbes; CNBC; Ethereum

Existing use cases

Digital collectables and royalties: Sports brands and athletes use NFTs to create and sell digital collectables of memorable and iconic moments, usually tying them to other exclusive benefits.

- **NBA Top Shot** is an online game where users can collect and trade memorable NBA highlight cards, promoting a sense of community, nostalgia and enjoyment. Powered by Dapper Labs, Top Shot has reached over \$1 billion in sales volume, consolidating it as one of the most economically impactful NFT collections ever.²⁵

Customer engagement: NFTs are being used by clubs to increase customer engagement and develop fan communities through unique experiences and rewards.

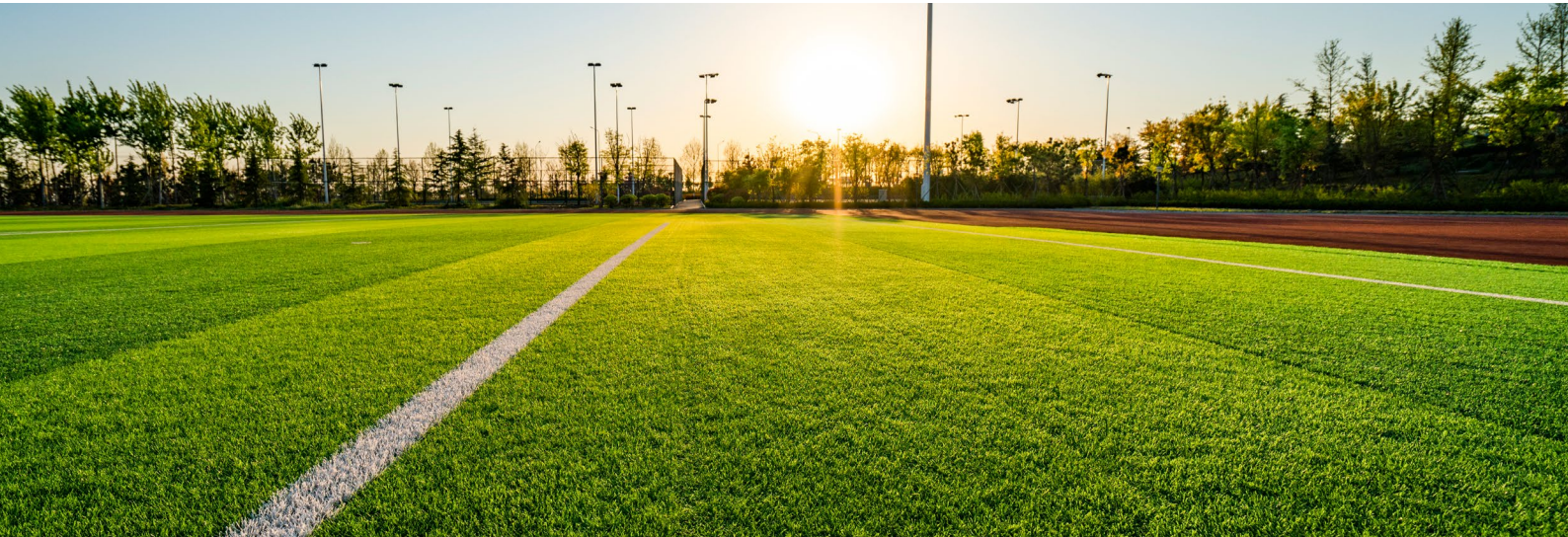
- **Socios.com** is a mobile app that connects fans with their favourite teams through blockchain. Token holders can vote on club-specific decisions (e.g. crest changes, kit designs, event preferences, etc.), get access to unique rewards (e.g. NFTs) and trade them in the app marketplace or secondary marketplaces.²⁶ Relevant partnerships include NBA franchises or LaLiga.^{27,28}
- **Australian Open 2022** became the first major sports event to use NFTs to capture real-time moments by linking NFTs to the court (divided into 6,776 virtual pitches).²⁹ Real game-defining shots in one of those plots gave the NFT more value and granted unique rewards. The drop was sold in a few minutes, obtaining direct sales of \$750,000.³⁰

Gaming experiences: Sports NFTs are being integrated into gaming and metaverse experiences, usually combined with a range of other use cases and utilities (collectables, loyalty, gaming utility, etc.):

- **Sorare** is a fantasy sports game incorporating NFT-based collectables to represent real-life players. In-game NFTs represent real-life athletes and can be bought, sold, traded and collected. With the player cards, users can

create teams to compete in tournaments. Sorare has reached over \$635 million³¹ in sales and is a reference in the industry for keeping a stable fanbase despite market downturns.

- **LaLiga Land** is a virtual reality theme park with multiple leisure activities for football and Web3 lovers. The space is based on gamification, the sale of NFTs and information about the clubs and players who play in LaLiga.³²



Lessons learned

Native companies have driven the first NFT wave in the industry

NFT studios and blockchain companies have partnered with sports brands to monetize their IP, with the typical agreement being a fixed amount and a shared revenue structure after a certain threshold. “We were approached by a big number of native studios to launch projects together, who offered a high fixed initial amount and shared profits to exploit our IP”, explains an interviewed industry expert. In most cases, this has benefited both parties and helped sports brands avoid the complexity of NFTs and compensate for the lack of internal knowledge.

The industry is shifting from short-term monetization to long-term value add

NFTs have proven as a new revenue stream by allowing to monetize IP in new innovative ways. Moreover, they are useful for generating additional customer engagement through unique experiences, games and community creation. Indeed, “NFTs can become a new source of revenue for clubs, giving value to the historical database of digital assets,” explains the Director of Research at FC Barcelona. Nonetheless, main industry players are starting to design long-term strategies to go beyond NFT collectables. The main pillars supporting this transition include focusing on customer value add, sustainable revenue-generating initiatives and new ways of engagement through NFTs. The Virtual

Economy and Web3 Director of Mediapro highlights the importance of going beyond the short-term mindset, as “companies seek to build a strong, sustainable and growing IP. However, current use cases have focused only on bringing short-term money instead of thinking long term”.

Having a solid GTM strategy and a smooth user experience is critical to executing a successful drop

NFT projects should inform a broader engagement plan and not be isolated and disconnected from the overall company strategy. It is crucial to start with a small group of superfans, building an initial community via key communication channels such as Discord. By working closely with this core group initially and refining the NFT value proposition, projects optimize their impact and increase chances of success. This strategy is paramount for connecting with fans in innovative ways in a space where they are already engaged.

It is critical to create a smooth and safe customer experience through easy access (e.g. wallets development, payments with fiat, etc.), especially considering that superfans are not necessarily crypto-natives. Many NFT launches to date have delivered inconsistent experiences, poor user interface (UI)/user experience (UX) and exacerbated the fragmentation in fan engagement. Successful brands simplify their approach by avoiding complex jargon and establishing white-labelled marketplaces. They have effectively communicated the benefits of their NFTs, recognizing that fans’ geographic diversity necessitates a blend of both physical and digital experiences.

“ NFT projects should inform a broader engagement plan and not be isolated and disconnected from the overall company strategy.

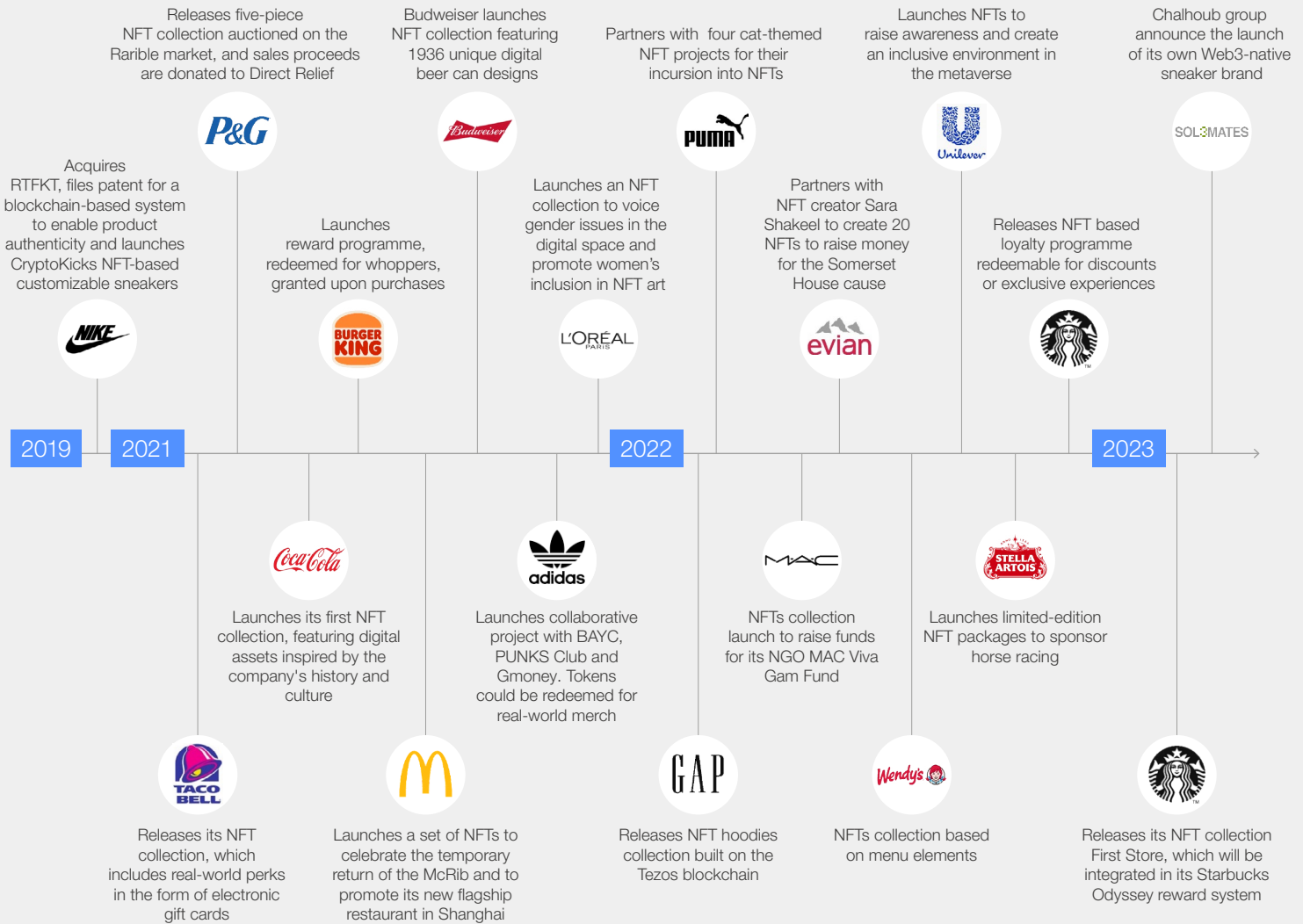
1.4 Consumer packaged goods (CPG)

Overview

FIGURE 12 NFT timeline in the CPG industry

Consumer goods

The fashion industry pioneered the NFT wave, while food and beverages are runners-up with increasing presence in the NFT arena



Source: Moonblock; Bolt; The Verge

Existing use cases

Loyalty: NFTs build engagement and loyalty programmes by offering clients exclusive benefits or unique shopping experiences (e.g. discounts, early access to products).

- **Starbucks** released Odyssey, an NFT-based loyalty programme on Polygon, redeemable for discounts or exclusive experiences. Customers can engage with interactive

activities, “Journeys” and earn collectable NFTs, “Journey Stamps”, by completing trivia challenges about the company or through purchases.³³ Additionally, unlike traditional loyalty programmes, customers can monetize their loyalty by trading their NFTs on the open marketplace.³⁴ This programme, which launched in late 2022 and remains in its beta phase, started with a modest pilot and currently has a substantial waiting list. In April 2023, Starbucks announced the release of the “First Store” NFT collection within the Odyssey rewards system.



\$93 million
 Nike's royalties on secondary markets (September 2022)

Physical collectables: Brands use “phygitals” as a new revenue source and customer engagement leveraging the connection of physical and digital products.

- **Nike** is a leading company in Web3 and NFTs, using the acquisition of RTFKT and launching NFT platforms such as Swoosh. The platform focuses on engaging its fan community. It facilitates the joint creation of “the future of Nike”, provides access to virtual events, allows for the purchasing of digital wearables and offers real-world benefits.³⁵
- **Adidas** is also quite active in the NFT ecosystem, with over 51,000 NFT transactions from October 2022 to April 2023 and raising approximately \$11 million through its NFT campaigns.³⁶ Adidas launched the NFTs line “Into the Metaverse”, collaborating with renowned NFT projects – e.g. Bored Ape Yacht Club (BAYC), CryptoPunks and GMoney. Token holders were granted access to exclusive real-world merch, such as the iconic yellow tracksuit or the GMoney orange beanie.

Royalties: NFTs backed by strong CPG brands can generate extra revenue for companies via royalties in secondary markets.

- **Nike** ranked first among consolidated brands with secondary NFT transactions. Until September 2022, it had approximately \$93

million in royalties. Nike allowed for secondary trading in its NFT projects, implementing different royalty fees. The CloneX collection had a 5% fee and collected around \$40 million; with the 10% fee on MNLTH NFTs, Nike raised over \$24 million.³⁷

Digital collectables: Reputable retail brands that present in Web3 are releasing digital collectables, including branded wearables – NFTs – for avatars.³⁸

- **Coca-Cola** partnered with avatar developer Tafi to auction off a loot box (mystery bundle of virtual items) on OpenSea, filled with four collectable NFTs. The box included a Coca-Cola branded SMEG retro refrigerator to be physically delivered to the winner as well as a cherry-coloured jacket that could be worn in the virtual world Decentraland.³⁹

Sourcing traceability: can be used to prove origin warranties, such as “ECO” certificates and traceability along the supply chain.

- **Birra Peroni**, a member of the Asahi Group, has introduced a supply chain solution that uses NFTs to enhance product traceability and manage inventory across an expanded supply chain. This solution improves traceability at low costs by allowing NFT representations of transferable assets and inventories.⁴⁰

Lessons learned

NFTs should have a clear value add for the consumer

As users choose to share their data, brands can tailor rewards to each customer, improving their experience and leading to higher value engagement compared to traditional sponsored content or advertising. NFTs can offer exclusive benefits and experiences to customers, such as access to limited-edition products or VIP events. This creates a sense of exclusivity and status, which can be shared and celebrated among the brand's community.

GTM strategy and definition are key to promoting a community-first Web3 strategy

A sound GTM strategy for NFTs involves defining, deploying and building an engaged community. Some observed best practices include starting with small communities of superfans and expanding to broader audiences while adding a gamification component to boost customer engagement (e.g. Starbucks has gamified its loyalty programme, engaging customers in a rewarding journey of unlocking benefits as tasks are completed).

Brands can use NFT phygitals to improve their customer segmentation

Phygitals – NFTs linked to physical products – allow consumers to immerse themselves in new brand experiences. Several fashion brands involved in Web3 activities released NFTs that could be redeemed for physical products.⁴¹

Loyalty programmes can benefit from NFTs

NFTs are increasingly used in loyalty reward programmes, where smart contracts can incentivize customer engagement in a more creative and personalized manner. With NFTs, brands can offer unique and valuable digital assets exclusive to loyal customers. Starbucks' Odyssey loyalty programme allows each customer to have their own unique experience in its corporate-branded open-world game.⁴² According to Vassilis Tziokas, an expert in global web3 strategy, "Web3 makes loyalty programmes automatically smarter and programmable. The added value [for the customer] is that they are programmable assets upon which you can build new experiences".





- LVMH, Prada Group and Cartier, within others, created the **Aura Blockchain Consortium** in collaboration with Microsoft and ConsenSys.⁴⁵ The blockchain aims to enable brands to create NFTs that hold the product’s information: from the extraction of the raw materials and manufacturing procedures to transport and logistics data.⁴⁶

Royalties – new revenue sources through secondary markets: increase revenues in the Web3 space through royalties in the fast-growing secondary luxury market.

- **Ba&sh** partnered with Reflaunt⁴⁷ to offer an online reselling service. Within a customer’s online account, users choose items to list for sale from their past purchase history (and add a description, pictures and the price) on different marketplaces simultaneously. By listing an item, an NFT-based identity certificate from Arianee is generated. After completing the transaction, the NFT is transferred to the new owner’s wallet.

Loyalty – customer engagement: NFTs can represent and reward customers’ loyalty. Customers can earn these NFTs through purchases and redeem them for experiences or unique digital items.

- **Louis Vuitton** released its game “Louis the Game”, within which 30 NFTs were embedded, and 10 were designed in collaboration with the popular digital artist Beeple. The brand later launched a profile picture (PFP) NFT collection depicting its game mascot, only available to users who played the game.⁴⁸

Digital collectables: Luxury products are digitalized and sold as NFTs allowing buyers to own unique digital versions, which can be used in virtual spaces (metaverse, gaming, avatars, etc.), strengthening their identity.

- **Prada** partnered with **Adidas** in the “Adidas: Prada, Re-Source” project to launch an NFT that featured “user-generated and creator-owned art”.⁴⁹ The digital artist Zach Lieberman created a unique NFT by combining the 3,000 community-sourced artworks compiled.
- **Gucci** auctioned via the prestigious auction house Christie’s its first video NFT “Aria”, selling for \$25,000. The brand opened its own store, “VAULT”, in The Sandbox metaverse. Drop access was restricted (e.g. mint pass needed to access the “10KFTxGucci” drop).⁵⁰

Physical collectables: Brands can create digital copies of physical products. Their perceived value lies in the NFT’s exclusivity and the customer’s engagement with the brand. **LVMH** has launched several phygital projects through different brands.

- **Rimowa**, LVMH’s luggage brand, partnered with RTFKT to co-create a collection of 888 NFTs. Each of these gives access to a physical case. The project, which contained four different rarity levels, raised \$3.3 million, including \$500,000 in royalties.⁵¹

“ NFTs can support brands to improve products’ traceability along the supply chain and enhance environmental, social and governance considerations.

Lessons learned

A key feature of NFTs in luxury is the ability to certify products’ ownership and authenticity

With a unique digital identity for each product, brands can verify its authenticity and provide a transparent record of its ownership and transaction history. Illicit trade, amounting to over \$460 billion in 2019, poses a global threat, with luxury items being highly susceptible to being counterfeited in the EU.⁵² Brands like Aura and Arianee are incorporating authentication features into their platforms, allowing customers to access proof of authenticity and ownership for the items they purchase.

NFTs can support brands to improve products’ traceability along the supply chain and enhance environmental, social and governance (ESG) considerations

Information from along the supply chain can be stored in NFTs associated with the product, including data from sourcing, processing, packaging,

distribution and consumption. Also, ESG efforts can be enhanced by tracking disposability. Scibetta, Head of Business Development at Everledger, claimed that consumers “want to know more about the product they are buying, where it comes from and whether the manufacturing process was ethical”.⁵³

NFTs enhance customer engagement

Brands encourage customer engagement using limited-edition digital collectables, phygicals and exclusive access to events or products. Limited-edition NFTs can preserve the scarcity and desirability of the luxury brand’s value proposition by guaranteeing a limited number of items within a series. NFTs can support customer relationship management (CRM) by providing information on product portfolios and client preferences. In this sense, the Head of Business Development at Polygon believes that “NFTs are a useful way for user acquisition and to replace cookies in terms of acquiring data and delivering brand experiences at scale”. Finally, NFTs can attract new customers (e.g. NFT enthusiasts) to join the traditional luxury clientele.



My advice would be to use NFTs as an investment in customer engagement and retention that will pay off by increasing customer lifetime value in the long run. When done the other way around, focusing first on short-term monetization puts customer trust and the long-term relationship at risk.

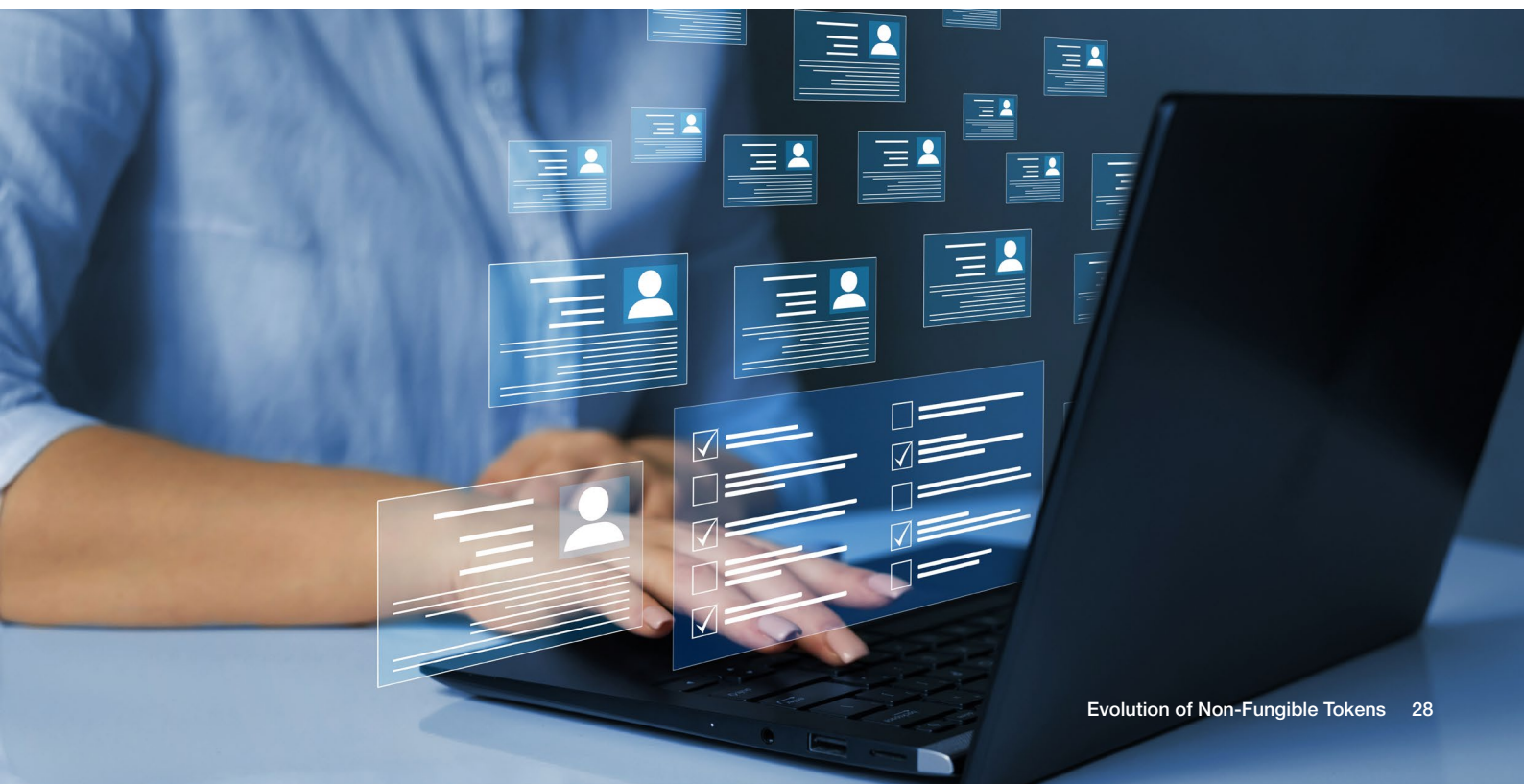
Diego Dias, Head, Growth Partnerships and Sponsorships, Solana.

NFTs open the opportunity for brands to capture value in the fast-growing secondary luxury market

The secondary luxury market grew 65% from 2017 to 2021 compared to the 12% grown by the first-hand market. Through NFTs, luxury brands can establish royalties as a new source of revenue in the Web3 space.⁵⁴

Partnerships with crypto-native incumbents legitimize luxury brands’ NFT forays

Luxury brands collaborate with renowned digital artists to reinforce the brand’s disruptive image. Gucci has done several successful collaborations (e.g. its partnership with Superplastic, the creator of animated synthetic celebrities, Yuga Labs), which have helped legitimize Gucci’s projects in the metaverse.



1.6 Media

Overview

FIGURE 14 NFT timeline in the media industry

Media

NFT use had a slow pick up but has been consistently growing since 2021



Source: Medium; NFT Tech; NFT Now; Decrypt

Existing use cases

Digital collectables – event memorabilia:

create and sell limited edition digital assets related to popular movies, TV shows, or live events. Collections generate a new revenue stream for the creators and a stronger engagement and sense of community for fans.

- **Warner Bros** launched a series of collectables from its most popular franchises (e.g. Space Jam, Looney Tunes). They partnered with Eluvio to release 11,000 NFTs of The Lord of the Rings franchises in their own marketplace, Movieverse.⁵⁵

- **Time magazine** released in partnership with the NFT marketplace SuperRare, a series of NFTs that included some of their most iconic magazine covers. The auction amounted to approximately \$400,000.⁵⁶

Loyalty – fan community engagement: NFTs can be used to engage and reward fan communities by creating exclusive NFTs related to fan-favourite characters, scenes, artists, songs or movies. This can be achieved by developing phyticals or NFT-based membership programmes and access passes.

- **NBCUniversal** launched an NFT game in partnership with Aptos blockchain to publicize the latest Nicolas Cage film.⁵⁷ As a reward, fans entered a digital raffle to win digital collectables.

- In 2022, Netflix ventured into NFTs by launching a minigame on OpenSea for the Stranger Things release, where solving riddles earned participants NFTs. They also launched the NFT Scavenger Hunt for the third season of “Love, Death and Robots”.⁵⁸

Royalties – funding and ownership models:

NFT integration enables new ownership and funding models for the artists through tokenizing their work. Artists can fund their work by selling these newly created digital assets, and fans can acquire digital ownership.

- **Royal** is a marketplace founded by Justin Blau (artist 3LAU) and Justin Ross (Opendoor) where users can own a piece of a song or an album’s streaming rights and collect a portion of royalties as the music plays on digital platforms. Additional funding (\$55 million) came from Coinbase Ventures and fellow musicians.⁵⁹
- **Time magazine** released a collection of artworks from TIMEPieces artists inspired by the spirit of the Ukrainian people. The funds raised on primary and secondary sales were used towards supporting humanitarian and relief efforts for Ukraine.



Lessons learned

NFTs can deliver stronger customer engagement through more connected fan experiences

Companies are using NFTs to engage with their customer base and use fans’ emotional connection with their favourite artists, television or movie characters. NBCUniversal’s Vice-President of Strategy and Operations, Innovation, Advertising Strategy stated they “wanted to create meaningful NFTs based on our IP properties, to create a smart dialogue with the community and a direct connection with the fans”. The emotional connection drives the development of new products (e.g. collectables) or specific content (e.g. special editions) powered using NFTs.

NFTs could challenge traditional funding and ownership models in the future

The development of marketplaces allowing direct interaction between artists and fans might pose a challenge for incumbent companies.

Using blockchain technology, artists can fund their work by selling tokens, which are portions of digital assets created by them. Fans, on the other hand, can support their artists and earn money through the royalties acquired. Although still in the early stages and subject to additional intellectual property rights and regulatory clearance clarifications, marketplaces could become strong players in the industry.

Small-scale pilots have been launched to test use cases and define the real needs of customers

Media players are developing pilots across different businesses to understand the real potential value of NFTs. Some NFT projects by media industry leaders, such as “Vault by CNN”, were launched and shut down in around a year; others are still testing specific NFT uses. Industry experts explain that despite the efforts, projects have registered low endorsements overall due to the lack of value linked to the NFT. As Spotify’s Head of Economics explained, “The big lesson learned is that NFTs need to bring clear value to be mass adopted”.

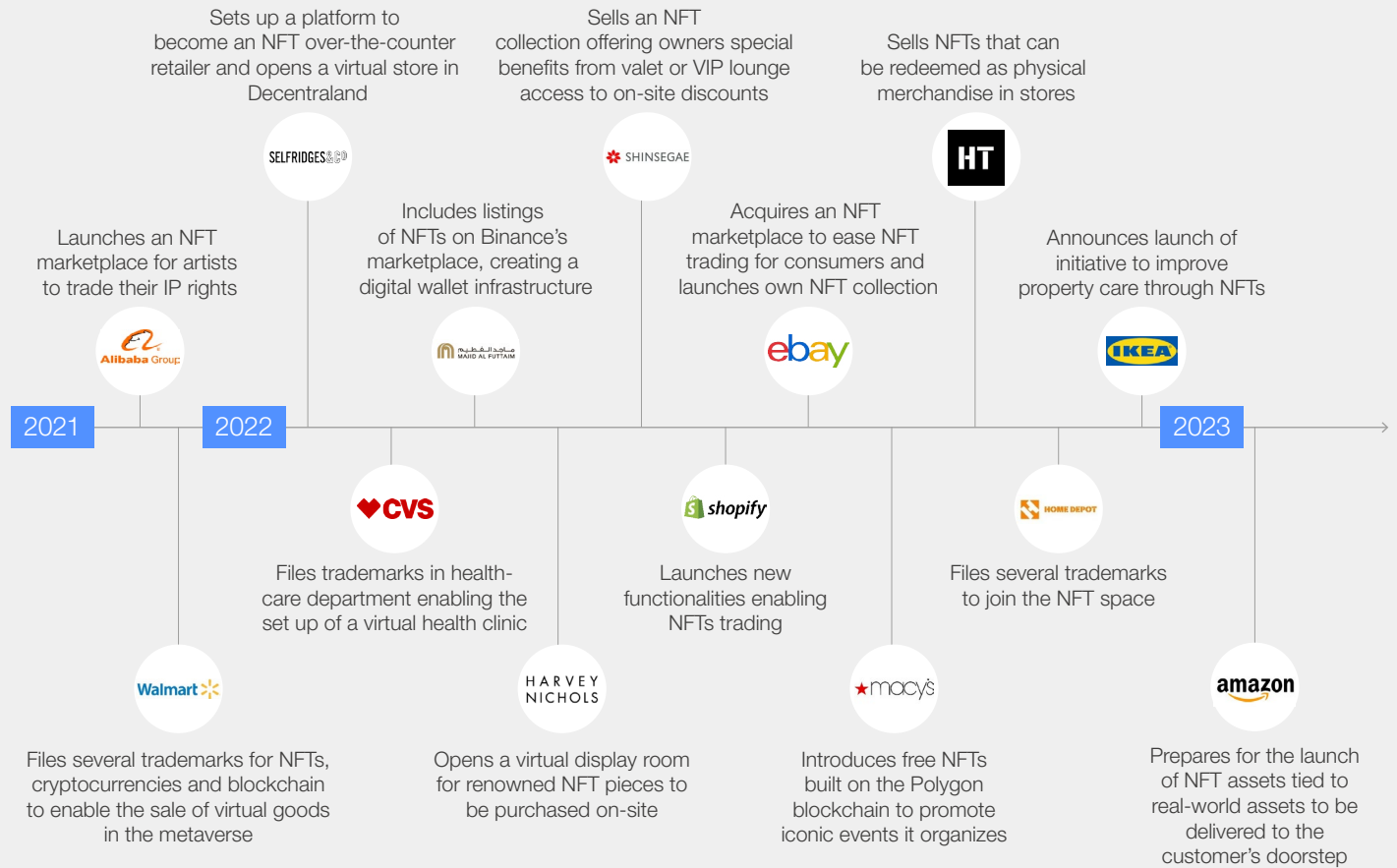
1.7 Retail

Overview

FIGURE 15 NFT timeline in the retail industry

Retail

The retail industry has been a late NFT adopter compared to other industries, although more and more incumbent players are exploring this technology space



Source: CSA retail

Existing use cases

Loyalty – customer engagement: NFTs are used to boost customer engagement by offering limited-edition products, exclusive benefits or unique shopping experiences (e.g. discounts, early access to product launches), and loyalty initiatives.

- **Shinsegae** issued 10,000 NFTs (sold on OpenSea on the Klaytn public blockchain) and, depending on the NFT's ranking, granted exclusive benefits such as VIP access, valet services or in-store discounts.⁶⁰

Physical collectables – Phygitals as new revenue sources: Retailers are using NFTs' trading popularity to launch their own collectables and

create revenue sources by promoting phygitals, which are digital versions of physical products that grant access to additional content or benefits related to the product.

- **Chalhoub Group**, from the Middle East, unveiled the launch of its Web3-native sneaker brand SOL3MATES. According to Chalhoub's president of strategy, it will be the element "that brings the physical and the digital together, and that links the sneaker community with the Web3 community in an original way".⁶¹ Through NFT purchases, customers can acquire limited-edition sneakers, access the SOL3MATES community and experience exclusive membership benefits (e.g. preferred pricing, early access, free merchandise and access).

“ Through NFTs, retailers can have a 360° view of their customers by adding traditional CRM customer information to new Web3 insights.

Digital collectables: NFTs can increase the retailer’s customer reach (e.g. attracting new customers enthusiastic about NFTs) while raising brand awareness and showcasing to customers that the retailer is leading innovation and adapting to changing market trends.

- **Macy’s** launched NFTs through OpenSea or Sweet.io⁶² to promote its Thanksgiving parade and Fourth of July fireworks events to increase brand awareness and raise funds for a non-governmental organization (NGO). In addition, owners of a phygital t-shirt could redeem it for a physical one.⁶³

Lessons learned

A 360° view of the customer may allow retailers to have a differentiated engagement and offering

Through NFTs, retailers can have a 360° view of their customers by adding traditional CRM customer information to new Web3 insights (e.g. number and type of NFTs, amount of crypto, proof of attendance, etc.). Additionally, a 360° view could potentially allow for better-targeted marketing strategies and thus help reduce marketing costs. According to the Head of Business Development at Polygon, customer engagement will advancements significantly “once users let brands know what they are doing with their products: proof of attendance protocol will be very useful to gain a 360° view on the customer”.

Successful launch of an NFT relies on a sound GTM strategy

Interviewed industry experts agree that a successful NFT launch for retailers relies on a well-defined GTM strategy. This includes, among others, deciding on the NFTs’ disposability and whether to allow for secondary trading, defining NFTs’ added value content for clients, determining a proper story and

rationale around the NFT’s purpose, and selecting the right test audience and phasing strategy.

There are multiple approaches to NFT disposability

According to Polygon’s Business Development Manager, “the psychology of earning an NFT is more memorable than aping into something and hoping it goes up in value”. By offering customers the opportunity to freely redeem an NFT they have earned through certain interactions with the brand, retailers can create more loyal fans who will remain customers for the longer term.

NFT-based rewards may have a positive cash-flow impact on retailers

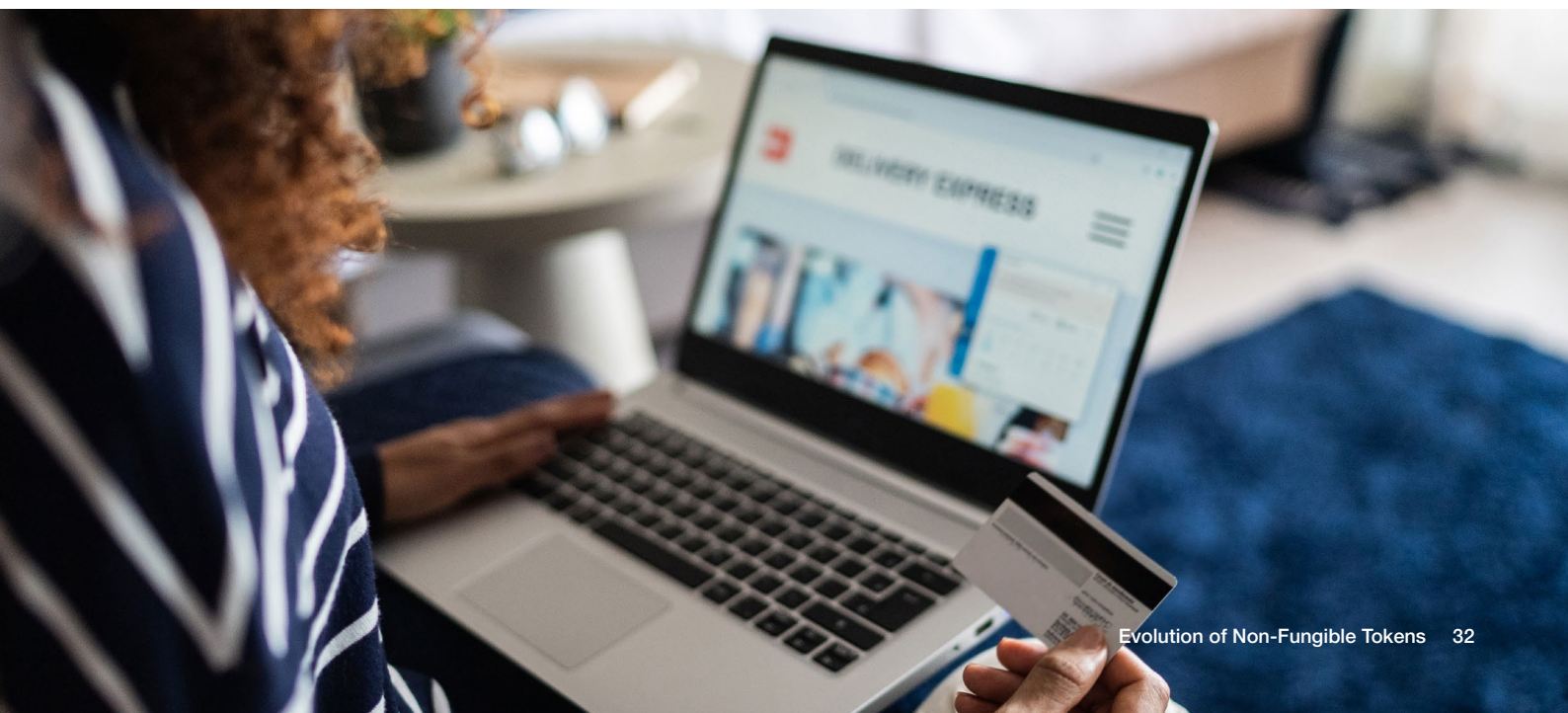
NFT-based rewards may have an advantage over traditional rebates. Whereas the latter requires the retailer to make an upfront payment, granting NFTs would decrease the need for an initial cash outflow.

Better to start with small pilots to learn and pay attention to market momentum for NFT releases

Majid Al Futtaim (MAF) realized that starting with pilots and small use cases before deploying NFTs on a larger scale and selecting the right momentum to launch the collection is key to ensuring a successful impact. According to MAF, “timing the launch appropriately is just as crucial as defining the content, purpose and target audience of the NFTs to leverage the momentum”.

NFTs can boost customer engagement and new communication channels with users

NFTs offer a powerful means for retailers to segment their customer base and effectively target different users based on their specific shopping behaviours. Industry experts believe that NFTs can generate a sense of belonging among customers. Given the exhaustion of some communication channels, NFTs provide a fresh and new way for retailers to engage with their audience.



1.8 Ticketing

Overview

FIGURE 16 NFT timeline in the ticketing industry

Ticketing

NFTs were introduced in ticketing for access to media and sports events, but new use cases are still under development



Source: Medium; Coinbase

Existing use cases

Ticketing – develop NFT ticketing as a broader experience for the fan or customer

- **Replacement of traditional ticketing** introducing NFTs. Blockchain-based tickets can include basic information on the customer, such as name, details on the event and other relevant information. Additionally, NFTs enhance the ticketing experience by making the process more transparent and protected from fraud and ticket scalping.
- **Ticketmaster** minted approximately 15 million digital collectables for access to events, including NFL games in Flow blockchain and Polygon.⁶⁴

- **Coinbase** developed NFT-based merchandising for the Governors Ball Music Festival in New York that allowed users a free and exclusive NFT, which granted them VIP access.⁶⁵
- **NFT ticketing allows the inclusion of new functionalities**, transforming tickets into collectables, digital merchandising or rewards. By enhancing the customer digital experience, NFT ticketing broadens the fan community reach, creating a new form of community-driven marketing.
- Many **events** (e.g. Nxt Museum⁶⁶) now offer proof of attendance protocol, which is an NFT that proves participation at the event and is linked to exclusive benefits.



“ NFT ticketing allows event organizers to create limited-edition and collectable tickets with exclusive benefits sold at a premium price.

- Coachella launched its own marketplace in partnership with NTX and supported by Solana blockchain.⁶⁷ The NFT tickets included digital assets such as photos, visual artwork or audio and access to lifetime passes to the festival.

Royalties – new revenue streams

- Earnings through royalties in a controlled secondary market can be achieved through NFTs. Companies can assure traceability and eliminate ticket duplication, limiting scams and fraud in the industry. In addition, because programmable NFTs can have built-in rules for merchandise, content, etc., the organizer can enable NFT tickets to include profit percentages for future resale or creative content on secondary markets.
- Ticketing companies, such as GET Protocol, are developing new ways of funding events where the ticketer or creator can fund the event ahead of time. This model is a decentralized form of crowdfunding that allows fans to have voting rights (e.g. the venue or the date) or the ability to decide on the prices for the regular tickets and make a profit in case of reselling.⁶⁸

Lessons learned

Security concerns can be tackled by the introduction of NFTs

The nature of the blockchain allows NFT tickets to provide increased security with high traceability

and transparency since it creates a unique digital asset stored on the blockchain. Ticket ownership, including customized information (e.g. purchaser's name, event details), is recorded on the blockchain, eliminating the possibility of duplication, counterfeiting or fraud. Additionally, NFT-based tickets can rely on smart contracts to regulate their functioning and transactions. With smart contracts, tickets can be programmed to automatically include or stop certain actions, such as transferring ownership or including royalties.

NFTs allow for greater and safer liquidity for tickets

NFT tickets, verified and transferable via blockchain, offer increased liquidity for resale in the secondary market. Blockchain permits rules on accessibility and transferability to be included in the ticket, which provides a secure and flexible approach to the purchase and resale of event tickets.

The introduction of NFTs can create new revenue streams for several stakeholders

NFT ticketing allows event organizers to create limited-edition and collectable tickets with exclusive benefits sold at a premium price. Additionally, NFT tickets can include royalties for the event organizers or the content creators, bringing a new source of revenue from the sales on the secondary market. Without blockchain technology, event organizers cannot control or benefit from the secondary market sales, often leading to abusive prices or duplication and counterfeiting. Introducing NFTs will reduce price volatility since ticket prices can be capped and controlled.

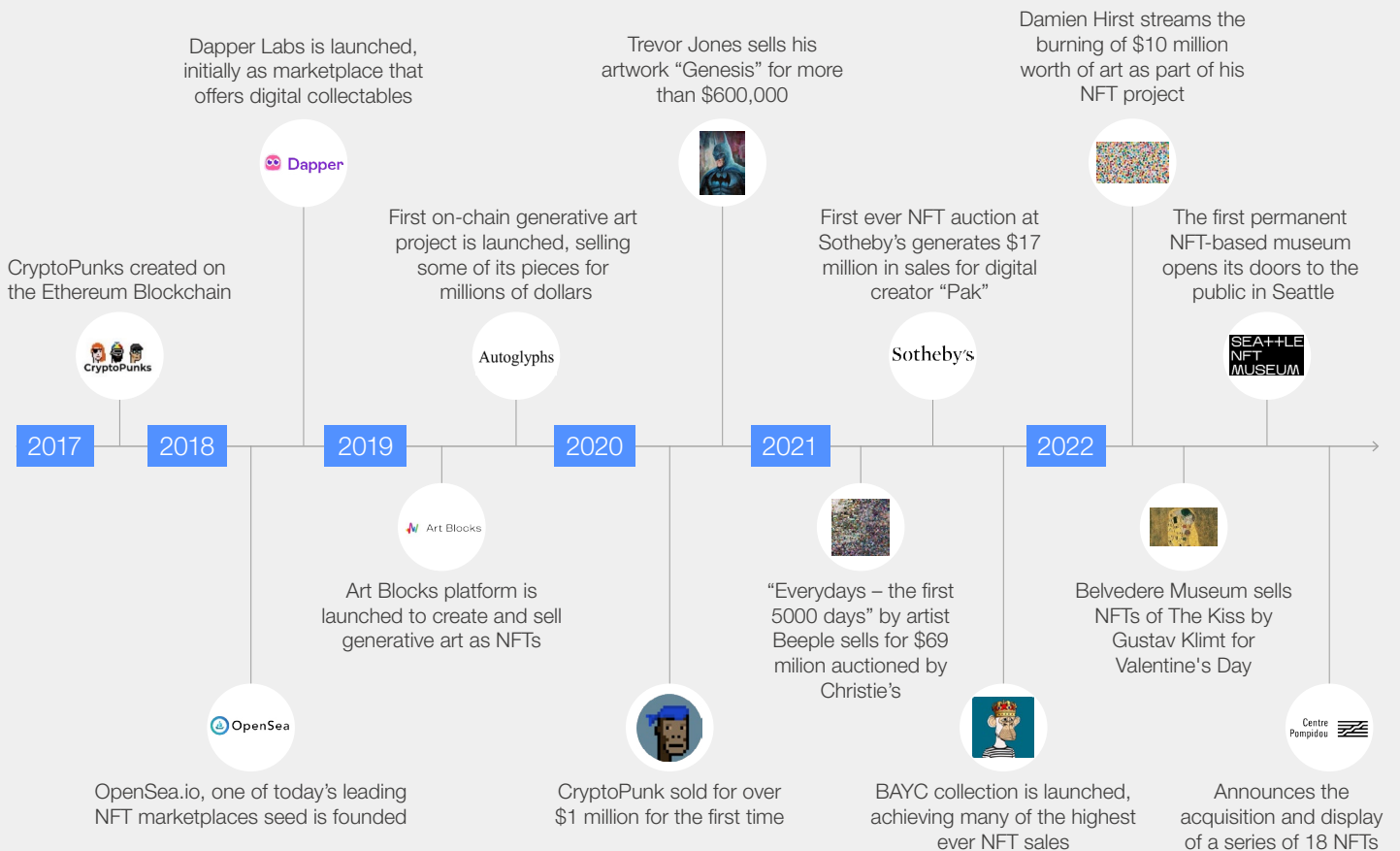
1.9 Art and collectables

Overview

FIGURE 17 NFT timeline in the arts and collectables industry

Art

NFTs first gained attention in 2017, experiencing a major boom since 2021



Source: Medium; Bisontrails; CNBC; Ethereum

Existing use cases

Native art, digital collectables and royalties:

creative visual assets or collections with an artistic expression. Ownership of these assets can also serve as a signal for wealth, culture or community membership. This can include:

- PFPs: projects featuring avatar artwork that are commonly used as profile pictures on social media and often represent membership:
 - [CryptoPunks](#) are a collection of 10,000 unique pixel art characters created by Larva Labs. They are considered one of the earliest examples of NFTs. The value of CryptoPunks boosted in 2020, and some of the rarest ones have sold for millions of dollars, making them a cultural phenomenon, a status symbol and an exclusive community.

- [Bored Ape Yacht Club](#) (BAYC) is a collection of 10,000 unique digital apes created by the Bored Ape team. BAYC is a members-only community of NFT collectors who own a Bored Ape NFT. Membership grants access to exclusive events, merchandise, games and other benefits.
- One-on-one art: single or tiered edition pieces of digital art enabling fractional ownership.
 - **Beeple** is a digital artist and designer who has gained mainstream recognition for his digital art creations. Beeple sold a digital artwork titled "Everydays: The First 5,000 Days" at a Christie's auction for a record-breaking \$69 million, one of the most expensive price tags attached to any artwork to date.⁶⁹

- **The Belvedere Museum** in Vienna fractionalized the digitized image of Gustav Klimt's "The Kiss" into a one-off drop of 10,000 NFTs that were put up for sale for around \$2,000. In the first months, they sold approximately 2,415, totalling about \$5 million.⁷⁰
- Digital art display: can become a new source of revenue for art exhibitions and museums.
- **Centre Pompidou**, Europe's largest modern art museum, is showcasing many digital works, including CryptoPunks or Autoglyphs, as part of its first exhibition focused on NFTs.⁷¹

Physical collectables: NFTs can create digital twins of physical artworks.

- [Trevor Jones](#), a prominent digital artist, blended art and technology by creating QR-code oil paintings even before NFTs became popular. Some digital twins in the form of NFTs of his artwork have sold for millions.
- **Damien Hirst**, the UK's richest living artist, created 10,000 paintings and sold them with their corresponding NFT for \$2,000 each as part of "The Currency Project". Owners had to choose between keeping the physical artwork or the NFT, with only one option allowed. Half of the physical pieces were destroyed as a result of the experiment.⁷²



Lessons learned

Success is strongly tied to building an engaged and loyal community

Successful NFT art and collectables projects have shown that promoting a strong, engaged community around the artist and the project both pre- and post-launch is key. Projects that have used traditional spaces like social media or influencers to create a community have outperformed isolated projects. As stated by the Head of Crypto at Visa, "Most of the successful use cases come from unknown creators or crypto-native companies as they understand the communities and their motivations". Moreover, collectors increasingly expect utility and member benefits, including merch or access to future drops.

Artists and museums can use NFTs to monetize their already-owned IP

Physical collectables in art take the form of NFTs linked to physical artwork, allowing artists and users to prove authenticity and enhance traceability. Long-term game vision and ensuring product-community fit before digitalizing real-world art are key to success. NBCUniversal's Vice-President of Strategy and Operations, Innovation, Advertising Strategy commented on the importance of creating intangible value beyond the artwork itself: "You have to create the meaning, the scarcity, the why and not just the art behind the NFTs. It has to be meaningful for the fans".

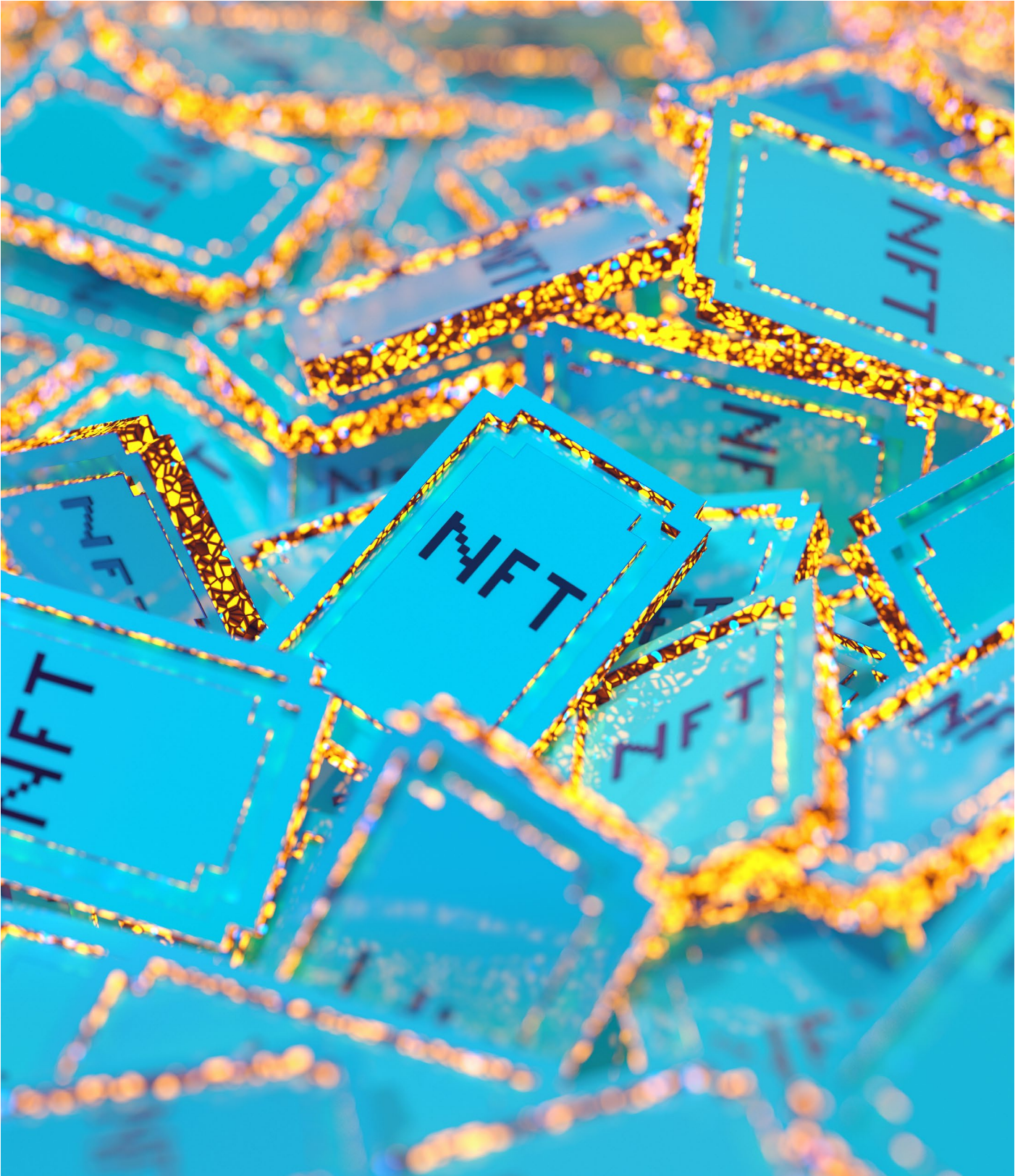
NFTs can help to enhance a digital creators' economy without intermediaries

The development of NFT standards and the creation of marketplaces has changed how digital art is exchanged, creating a bridge between artist and their audience and increasing the visibility of digital artists. Artists can connect seamlessly with their fans regardless of physical location, strengthening the artist-collector bond.

2

Future of NFTs

Eight critical factors, unveiled through interviews, encompass macroeconomics, technology and successful strategies for broad NFT adoption.



Key pillars for NFT development and mass adoption

TABLE 2 NFT journey

Pillar	Current status (●)	NFT development thermometer	Requirement for broad adoption (○)
1 Regulatory and legal clarity <ul style="list-style-type: none"> - Lack of regulatory frameworks around NFTs for different use cases - Missing overall NFT taxonomy - Uneven maturity across geographies 		No regulation Fully regulated 	<ul style="list-style-type: none"> - Clear regulatory framework tailored to each NFT use case (e.g. KYC, AML, IP rights, law enforcement across regions, etc.), including more regulated marketplaces - Accepted NFT taxonomy
2 Development of web3 ecosystem <ul style="list-style-type: none"> - Uneven development of web3 space and limited institutional adoption. Initial progress has slowed down, impacting NFTs (institutional and private investment, talent intake, etc.) 		No development Fully developed 	<ul style="list-style-type: none"> - Broad customer knowledge and adoption of basic web3 functionalities <ul style="list-style-type: none"> - Companies understanding of technology possibilities and value-added - Users mass education on web3 subjects and adoption of wallets, cryptocurrencies, stablecoins, etc.
3 Macroeconomic and business environment <ul style="list-style-type: none"> - Current macroeconomic environment is leading companies to reprioritize efforts to their core business, and alternative competing priorities (e.g. AI) are increasingly arising 		Bearish Bullish 	<ul style="list-style-type: none"> - Enough market momentum to scale while avoiding bubbles that damage the ecosystem's reputation - Healthy macroeconomic environment that supports corporate investments in Web 3.0
4 Interoperability <ul style="list-style-type: none"> - Limited brand interoperability for the majority of use cases beyond collectables - Limited interoperability between blockchains 		No interoperability Full interoperability 	<ul style="list-style-type: none"> - Existence of some interoperability ecosystems is critical to generate value added to some use cases - Common technical standards developed to unlock interoperability value add
5 User experience (wallet and ID) <ul style="list-style-type: none"> - Complex and poor UX, causing high friction in customer adoption <ul style="list-style-type: none"> - Complex wallet experience (UX, UI, long customer journeys, etc.) - Low security and privacy mechanisms in main ledgers 		High friction No friction 	<ul style="list-style-type: none"> - Smooth customer experience led by wallet improvement and evolution of digital IDs - Increased privacy protocols at different levers (transactions, identity, etc.)
6 Technology development <ul style="list-style-type: none"> - Difficulty for main chains to combine affordable costs, high scalability and security/decentralization all at the same time 		No development Fully developed 	<ul style="list-style-type: none"> - High-capacity networks allowing mass operations at an affordable price with strong security and reliability
7 Track-record of success <ul style="list-style-type: none"> - Majority of noticeable cases are led by digital collectables; other use cases are still small PoC or test and learn - Missing KPIs in most existing use cases to prove sizable and real NFTs competitive advantages vs Web 2.0 		No track Complete track 	<ul style="list-style-type: none"> - Noticeable success stories that go beyond small PoCs - Measurable advantages and KPIs (LTV increase, CaC reduction, etc.) of using NFTs vs alternatives that motivate corporations to deploy NFTs
8 IP holders adopting NFTs <ul style="list-style-type: none"> - Companies with strong brand and popular IP concerned on how to adopt NFTs on a large scale 		No adoption Fully adopted 	<ul style="list-style-type: none"> - Strong brands and popular IP using NFTs to boost new audiences and better engage and reach with their existing fan communities

○ Current status of pillar development ○ Required status for development

Source: Bain & Company



2.1 Regulatory and legal clarity

Current status: Different countries are beginning to create regulatory frameworks for digital assets in the emerging Web3 environment. However, efforts are still at a very early stage, and the industry still lacks a common taxonomy to cover the different NFT use cases and frameworks. Industry experts unanimously agree that the regulation of the ecosystem plays an important role in the development of NFTs. There is general thought among NFT players that the regulation of the underlying asset should also drive the regulation of the linked NFT.

More broadly, in Web3, there have been some uneven attempts to regulate the space. The United Kingdom's government has expressed its desire to become a global hub for digital assets. As a result, a regulatory task force has been formed to speed up the process and improve legislative maturity at a larger scale.⁷³ For the United States, there is existing regulation with narrow scope that, given the legal nature of the country, is fragmented across different states. Congress has several legislative projects in the pipeline, with increased collaboration expected between federal and state regulators.⁷⁴ For the European Union, a regulatory framework was recently codified for crypto assets (MiCA) but excluded NFTs from the scope definition.⁷⁵ Moreover, given the legal nature of the European Union, member states are free to regulate beyond the existing framework, which can lead to differences in application.⁷⁶

In Asia, countries are developing regulatory frameworks at different paces. China initially put pressure on some digital assets by banning

crypto exchanges but has now endorsed the China Digital Asset Exchange and its central bank digital currency, e-CNY. Additionally, Hong Kong is expected to be developed into a hub for Web3 and digital assets.⁷⁷ In Japan, regulators have recently decided to enforce stricter AML measures to trace cryptocurrency exchanges, while the South Korean government requires official reports of cryptocurrency holding.⁷⁸ In United Arab Emirates, the Central Bank (CBUAE) started regulating cryptocurrencies in 2017, requiring all transactions with digital assets to be conducted through authorized exchanges and compliant with AML regulations. Moreover, the CBUAE recently shared guidelines for financial institutions to follow while working with virtual asset companies, including NFTs.⁷⁹ Given its federal regime, each emirate can independently regulate specific topics not covered or partially covered by federal law. In this sense, Dubai developed the Virtual Asset Law and the Virtual Asset Regulatory Authority (VARA), intending to provide legal definitions for digital assets. VARA also established a licensing regime and laid out a penalty regime. Finally, India taxes NFTs as virtual digital assets, introducing a flat rate for the income from its sale.

Additionally, NFTs are often transacted globally, which can complicate the determination of applicable jurisdiction's laws, the resolution of cross-border disputes and the enforcement of legal obligations. Enforcing legal and regulatory frameworks will require strong international collaboration, agreement on legal principles and joint efforts to develop technical ability and legal precedents.⁸⁰

“ NFTs are often transacted globally, which can complicate the determination of applicable jurisdiction's laws, the resolution of cross-border disputes and the enforcement of legal obligations.

Minimum status for mass adoption: To ensure mass adoption, an NFT taxonomy tailored to the nature of each use case and a regulated legal framework for basic security and protection needs to be established. International guidelines and agreements among countries are also necessary to ensure enforcement since legal uncertainty discourages traditional customers and investors from developing NFT projects. Companies will be potentially disincentivized if proper regulation is not enforced. As stated by the Global Head of Digital Public Policy at Santander, “As regulated entities, we do not want to be involved in NFT marketplaces where we cannot enforce fraud detection or AML mechanisms”. The following are some of the topics that regulation should cover to promote mass adoption:

- Intellectual property rights
- NFTs regulatory classification (utility, securities, etc.)

- KYC and AML enforcement on marketplaces
- Customer protection
- Data privacy
- Accounting and taxation

However, excessively detailed regulations could be counterproductive given the rapidly evolving nature of NFTs, which could eventually become a hurdle for its development. The regulatory framework must be agile to support innovation but not be over-prescriptive. Companies should feel encouraged to experiment with these new technology spaces while having clear regulatory guidance. Ultimately, a balanced regulation development will be critical to allow mass adoption because, as the Head of Content at Casper Labs explains, “emerging technologies tend to struggle with mainstream adoption because of legislation constraints”.

2.2 Development of Web3 ecosystem

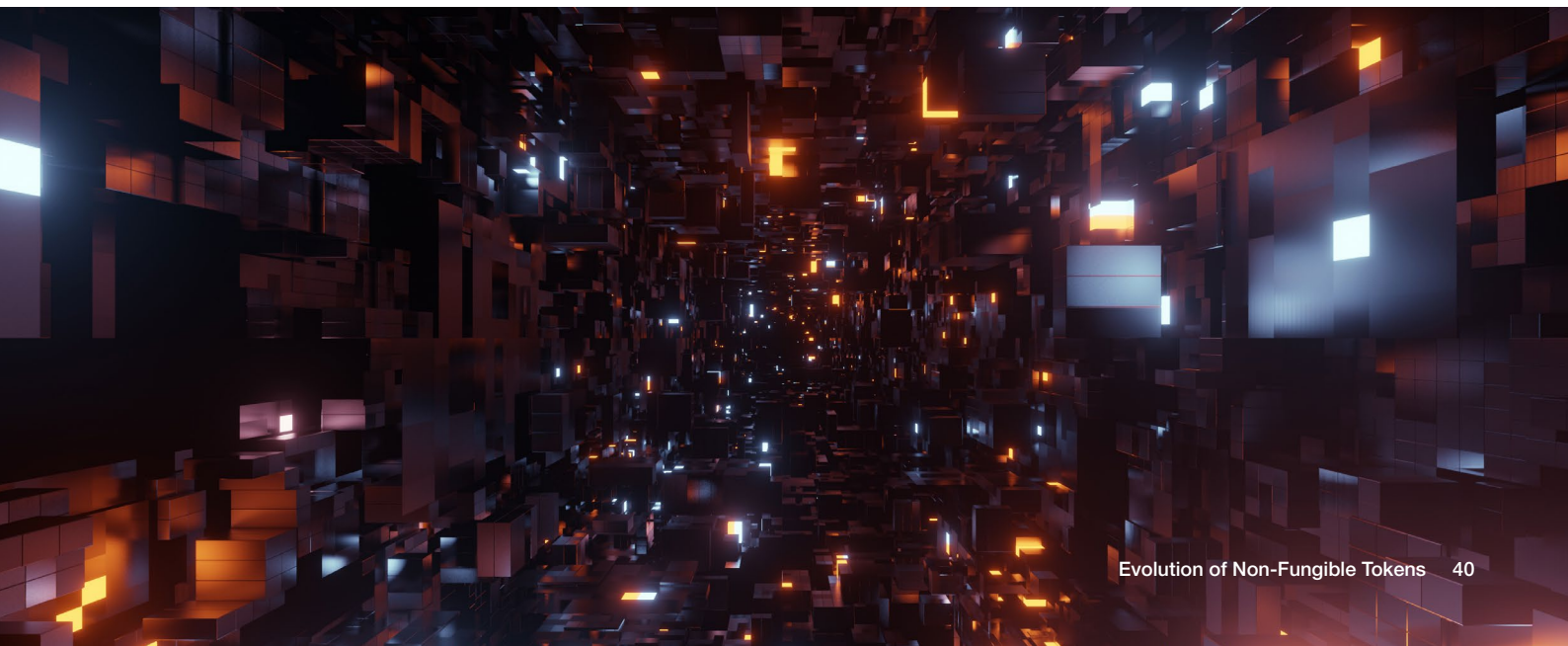
“ Industry experts acknowledge that intermediation will be paramount to accelerate mass adoption, safeguarding access to opportunities for the general public.

Current status: NFTs are intrinsically tied to the broader Web3 ecosystem development. Web3 products and services development is uneven across industries, with some use cases like tokenization of financial instruments getting more traction and support. The overall development of Web3 also supports users’ education and knowledge, which helps unlock NFTs’ potential (blockchains, cryptocurrencies, wallets, etc.). Although NFTs and crypto are different assets, Web3 ecosystem development has recently slowed in response to recent negative cryptocurrency events like FTX or Terra, definitively impacting NFTs.

Minimum status for mass adoption: Web3 is still in the early stages and needs further development to reach a broad audience. NFT mass adoption will be supported by customer education and the adoption of general Web3 elements and functionalities. Through a better understanding

of underlying NFTs, users and companies could better recognize the benefits of NFT use cases. This knowledge empowers users to take part in the NFT space actively and confidently, making informed decisions that align with their best interests and goals. Moreover, investment from private and public bodies in the broader Web3 space (e.g. governments adopting digital identity) will be a key enabler for mass adoption. Additionally, industry experts acknowledge that intermediation will be paramount to accelerate mass adoption, safeguarding access to opportunities for the general public.

According to an interviewed industry expert, the general public values safety granted by solid, regulated and trustworthy intermediaries when dealing with financial issues. Mainstream retail customers will not necessarily perceive decentralization and disintermediation as value-added services.



2.3 | Macroeconomic and business environment

Current status: Current adverse macroeconomic environment is making companies re-prioritize their efforts and investments into more core businesses to the detriment of exploring new ways of growth through NFTs and other digital assets. Moreover, rising competing priorities – for example, artificial intelligence (AI) – consume critical resources that constrain the resources funnel. As the Vice-President of Product at Circle explains, “while some companies are shifting their interest to AI as the next big thing, NFTs and the crypto ecosystem will continue to develop steadily”. NFTs require long-term investment for most use cases, and, as a result, many initiatives across industries might be postponed. Additionally, market momentum and timing play a significant role in the decision process for companies adopting blockchain technology as they create visibility and increase media attention.

Minimum status for mass adoption: A stable and healthy macroeconomic environment is needed for strong customer adoption to enable the required corporate investments. Stabilizing crypto and other digital assets markets can create a more secure environment, a clearer legal framework, and enhance the attention of interested customers, avoiding speculators. Moreover, there needs to be enough market traction and momentum to attract investors while avoiding the hype that leads to the creation of bubbles that damage NFTs’ reputation: “NFT tech has tremendous potential, which, to date, has been used at best as a distraction from that potential”, states an interviewed industry expert.



2.4 | Interoperability

Current status: Interoperability is critical for many use cases as it allows broader utility of NFTs and the development of new economics and secondary markets. Currently, NFTs interoperability is quite limited except for collectables and art. Many players are trying to develop interoperability standards, though these attempts are still in their early stages and on a very small scale. Vassilis Tziokas, a global Web3 strategy expert, suggests that “for the metaverse and Web3 to succeed, interoperability will be key. We are still very early in that journey, and it will require an open mindset and alignment from all players involved”.

Minimum status for mass adoption: To encourage NFT adoption, interoperability standards and protocols should be developed to enable NFTs to operate across different blockchain networks

and platforms (e.g. games). This will allow NFTs to be easily traded, accessed and used in various spaces, expanding their reach and utility. Incentive schemes will need to be developed to encourage collaboration between players. Animoca Brands’ Chief Executive Officer explains, “Incentives for collaboration such as royalties will play a big role in overcoming interoperability issues”.

Technology is one of the key elements for building interoperability for NFTs. However, the main challenge will likely not be technological or infrastructural but the requirement of building consensus and alignment across players from different industries with diverse interests to cooperate. This will require at-scale collaboration, defining a clear business rationale and building a differentiated value proposition for customers.

2.5 User experience

“ With multi-factor authentication or joint control measures, wallets can bolster security and mitigate risks associated with asset ownership and transactions.

Current status: NFT user experience is complex, causing high friction in the customer journey and preventing user adoption beyond initial enthusiasts and crypto-savvy communities. According to the Head of Strategy and Web3 at Google Cloud, “The customer should only see the top layer of the NFTs: use and access should be very intuitive for them”. Customer experience for most NFT use cases is driven by the wallet experience, which is complex and unfamiliar to the mainstream audience.

Usually, it entails poor UX and UI or payments in various cryptocurrencies, depending on the ledger. Additionally, wallets and blockchains generally face some privacy and security mechanisms that are yet to be solved. In this regard, the Head of Web3 in EMEA at Amazon Web Services (AWS) believes that “solving last-mile digital payments’ friction would accelerate the adoption and additional use cases of NFTs beyond just loyalty programmes”.

Minimum status for mass adoption: Smooth customer experience is paramount to allow mass adoption, led by wallet improvements (e.g. simple login with email/phone, payments with fiat,

integration with Web2 platforms, etc.) and the evolution of digital IDs. “The wallet is the entrance point for all users and right now is a very unfamiliar experience for the mainstream audience”, argues the Chief Metaverse Officer of Telefonica. For better accessibility (e.g. avoiding technical jargon) and less friction, straightforward language and effective communication should be implemented. Furthermore, experts emphasize the importance of easing Web3 entry by effectively communicating and informing users through traditional Web2 channels. This intermediate stage, which could be named “Web2.5”, can help bridge the gap and open the gate to a broader non-crypto-savvy audience.

Additionally, improving security and privacy measures in wallets and transactions is instrumental in encouraging trust among NFT adopters. With multi-factor authentication or joint control measures, wallets can bolster security and mitigate risks associated with asset ownership and transactions. Moreover, ensuring privacy mechanisms at different levels (ledger, transaction, identity, etc.) is essential for both customers’ and companies’ adoption.

2.6 Technology development

Current status: Main chains struggle to combine affordable costs, high transaction capacity, security and decentralization simultaneously since underlying blockchain technology needs to mature overall in terms of throughput, latency and security. Current solutions struggle to handle and work with many users and activities without network congestion. Nonetheless, scaling solutions, like layer two protocols or modularity, have achieved multiple advantages (with some trade-offs) regarding costs or capacity. However, the current state of development is not yet equipped to handle the volume of transactions and activities that widespread adoption would demand. Nonetheless, it is important to remember that “we should not see NFTs as the product themselves, but rather a great technology to create meaningful products on top”, as explained by the Web3 Product Manager of Telefonica.

Minimum status for mass adoption: Achieving the technological milestone of high-capacity networks at an affordable price with strong security and reliability is necessary to achieve mass adoption. Moreover, ensuring the availability and longevity of the off-chain data is crucial for the integrity and future usability of NFTs. Implementing reliable and decentralized storage solutions, along with addressing potential data loss or link rot issues, is important to preserve the value and authenticity of NFTs over time. Other infrastructure developments will determine NFTs’ adoption rate, such as creating alternative models to complete public on-chain data, as companies and users might be reluctant to share sensitive information given security concerns. Finally, the entire industry would benefit from adopting open standards to streamline the aforementioned underlying infrastructure.

2.7 Track record of success

Current status: Most noticeable use cases across industries show development in digital collectables, while other use cases are still small proof of concepts or tests and learn examples. As the Blockchain and Web3 Solutions Product Manager at Telefonica mentioned, “current use case scale is small, so there is uncertainty on results and key performance indicators (KPIs) scalability”, which leads to reduced visibility of the potential advantages of implementing NFTs. The limited history of successful, long-term NFT campaigns in established companies may deter potential corporate investors in NFTs.

Minimum status for mass adoption: The emergence of large-scale success stories will undoubtedly boost companies’ confidence, encouraging them to move beyond small proof-of-

concept experiments with NFTs. These success stories need to be backed up by performance metrics that indicate the potential returns, reducing the perceived risk of investing in NFTs. KPIs can encompass various aspects, including engagement rates, reduction of customer acquisition costs, increase in customer lifetime value, community growth, upselling/cross-selling or market adoption. The concrete evidence of achievements made through NFTs will serve as a strong signal to encourage others to delve into the space. In this regard, the development of analytics tools is key, and “metrics such as the number of ecosystems, exchange frequency and velocity can be used to measure success in the NFT space”, mentions the Chief Technology Officer, Blockchain, Crypto and Digital Currencies at PayPal.

2.8 IP and brand holders adopting NFTs

Current status: Companies with a strong brand and popular IP have started developing pilots and small-scale projects but have yet to commit to meaningful and valuable developments. Sports, media and CPG industries have launched digital collectables projects with their popular IP but sometimes with limited reach and without clear, sustainable benefits for the community. Industry players understand that creating real value for the community is key to NFT success and discourages speculators. In this regard, FC Barcelona’s Director of Research emphasizes the importance of attracting the right profiles: “We want to stay focused on our fans and on bringing them real value; that is our mission and why we will always avoid speculation”. Brand and IP holders are very interested in developing NFTs since they can supply new revenues and extend the lifetime of existing

products (e.g. entertainment houses, sports clubs/leagues and art owners).

Minimum status for mass adoption: It’s crucial for companies with strong IP, a recognized brand and extensive fan communities to launch NFTs, as this will propel widespread adoption. However, these companies should have clear strategies in place for digital assets, define value-added experiences for the customer – across geographies and not only tied to physical events – and acknowledge the implications of NFT technologies (e.g. companies license IP with clear delimitations in time, geographical areas, etc.). Finally, it is essential to establish new IP regulations that outline the permissible actions for each participant in the value chain concerning the use of rights in NFTs.

“ It’s crucial for companies with strong IP, a recognized brand and extensive fan communities to launch NFTs, as this will propel widespread adoption.



Conclusion

NFTs represent one of the numerous innovative applications that have emerged from the Web3 ecosystem in recent years. NFTs can serve to build community engagement, increase ownership and enable new forms of fundraising, and have the potential to revolutionize the way companies interact with their customers. However, NFTs are very incipient and will need time and broader development for mass adoption.

As with any new product, companies should create a sound GTM strategy before launching NFT campaigns. Many of the unsuccessful projects assessed in this paper lacked proper strategy and coherent, aligned value add for the end user. The question of “What does success look like for our NFT launch?” has not yet been adequately addressed by many companies.

NFT adoption varies across industries, with luxury, sports, ticketing, retail, and art sectors pioneering and spearheading the launch of NFT projects.

After the hype of past years, more companies across industries are experimenting and testing NFTs, moving away from speculators and focusing on adding real value for customers.

Yet the journey ahead has uncertainties, starting with a regulatory framework yet to be developed across jurisdictions to clarify what companies can and cannot do. In addition, customer experience is one of the main pain points for mass adoption since current wallets and the overall Web3 ecosystem are still quite complex for the broader audience.

With the creation of this report, the World Economic Forum and Bain & Company hope to bring transparency not only to NFT ecosystem stakeholders but also to a broader audience looking to benefit and learn about this use of blockchain technology. Learning from early adopters’ experiences can help predict the future trajectory of NFTs, though substantial hurdles and unknowns still need to be addressed.

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Endnotes

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