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Non-fungible token-enabled entrepreneurship: A conceptual framework

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ABSTRACT

Non-fungible tokens (NFTs) have taken the world by storm. Initially started as an art/game experiment, the NFT has given rise to a new form of entrepreneurship in the virtual world with massive opportunities and affordances. However, research into the entrepreneurial aspect of NFTs and the role of agency in the process is limited. In this article, I examine the concept of *NFT-enabled Entrepreneurship (or NFTE)*. I first identify the main characteristics of NFTs, then define NFTE and discuss the related assumptions, and finally propose a conceptual framework for NFTE and investigate its enablers. I conclude by proposing NFTE as a novel domain of entrepreneurship theory and practice with extensive new research opportunities, and the plausibility of using NFT as an alternative mode of knowledge production in which scholars become "NFT creators."

1. Introduction

Web 3.0[1] is upon us and includes blockchain, decentralized apps, cryptocurrencies, and the metaverse. *Non-fungible tokens* (or NFTs) are the newest arrivals in Web 3.0 and have recently made the headlines. NFT is a new heavyweight in the global economy with a value of more than US$40 billion in 2021 (Versprille, 2022). An NFT is a digital representation of an asset that is written in a "smart contract" (i.e., a string of codes recorded in a decentralized ledger in the blockchain) and tradeable using digital cryptocurrencies (e.g., Ether, Solana, and Tezos). NFT technology enables the *ownership* of *unique* artefacts (e.g., an image, animation, photo, avatar, video clip, and song) that are *authenticated* by and *traceable* in the blockchain and can be *exchanged* to realize economic and non-economic (e.g., social, cultural, and religious) goals in virtual markets. In this article, I define NFTs as *a system to claim, represent, store, and move value* (i.e., within virtual worlds) using smart codes. The characteristics of NFTs are shown in Table 1.

NFTs emerged from the crypto arts (Franceschet et al., 2021) and the gaming community (Serada et al., 2021) and can be regarded as a technological renaissance in the art world and a transformative opportunity for artists and other creators (a digital painting NFT was sold for a record US$69 million; New York Times, 2021). In a few short years, NFT has evolved beyond solely artistic use,

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[1] No single definition of Web 3.0 has been established. Some scholars regard it as a "multi-device, multi-channel, and multi-directional" web, the "Internet of Things," "big data" (Kreps and Kimppa, 2015), or "semantic web technologies with graph-based, open data" (Hendler, 2009). I follow a growing consensus that defines Web 3.0 as a "decentralized web" in which users take ownership of their own data and take part in executing and verifying transactions with smart contracts within a blockchain (Bambacht and Pouwelse, 2022; Voshmgir, 2020). As blockchain is closely connected to crypto currency (as a first use case of blockchain) and the metaverse (as major metaverses, such as SandBox and Decentraland, are built on blockchain), they all play a part in NFT and combine in Web 3.0. In contrast, Web 2.0 is a "read and write" web where users have no control of their data because user data resides in the hand of centralized platforms. Web 1.0 is a "write only" web (Krepps & Kimppa, 2015; Voshmgir, 2020), which was the first version of the Internet.

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Table 1
The characteristics of non-fungible tokens (NFTs).

Characteristic	Meaning	Process	Example
Uniqueness	• An NFT has no identical match in terms of its attributes (e.g., shape, content, number, name, and address) (Nadini et al., 2021).	• Each NFT "minted" (recorded in a "smart contract") on blockchain-enabled marketplaces is identified as a unique object.	• An NFT of the first SMS ever sent that read "Merry Christmas" (link). • *Bored Ape Yacht Club* NFT is a collection of 10,000 unique virtual apes (link to OpenSea).
Non-interchangeability	• An NFT is not and cannot be directly exchanged with other artefacts after being minted as an NFT (Guadamuz, 2021; Wang et al., 2021).	• An artefact listed as an NFT will have a "smart code" that identifies it and differentiates it from other artefacts.	• Each punk in *Cyber Punks* (link) is not interchangeable with other punks or with a virtual jacket NFT by *Dolce & Gabbana* (link) or a virtual shoe NFT by *Nike* (link).
Authenticity	• The data of each NFT are irreversible and unalterable once an NFT is minted (Guadamuz, 2021; Wang et al., 2021).	• Authentication occurs when a creator mints an NFT in an NFT marketplace, after which the NFT is given a *token ID*, *wallet address*, and *a smart contract code.*	An example of authenticated NFT (link): • token ID: 40,913 • wallet address: 0xc6b0562605D35eE710138402B878ffe6F2E23807 • smart contract address: 0x2a46f2ffd99e19a89476e2f62270e0a35bbf0756
Scarcity	• Given its unique character, each NFT is scarce and is the only one that exists in the blockchain. • Scarcity carries a higher market value (Serada et al., 2021).	• A creator can decide to create and release a "one of one" NFT or a collection or edition of NFTs with a particular theme. • Generative technologies allow the mass production of unique NFTs.	• *Dolce Gabbana's* "The Glass Suit" is a one of one NFT (link); and *Macallan* cask whisky NFT is a one of one NFT (link). • *Crypto Kitties* NFT is a collection of over two million kitties (link).
Resaleability	• Each NFT can be continuously sold and resold in the secondary market, creating additional income for its creator (Guadamuz, 2021; Mastropietro, 2021).	• During the minting process, one can set the percentage royalty for the NFT. • Royalty payment is automated by blockchain and directly transferred to a creator's wallet.	• OpenSea NFT marketplace allows up to 10% royalty (link). • Nifty Gateway allows up to 50% royalty (link).
Collectability	• NFT is a system to collect objects in virtual mode, to gain economic value (e.g., as investment) or non-economic value (e.g., fun, social status, and religious reasons) (Serada et al., 2021).	• After having a wallet and account in an NFT marketplace (e.g., OpenSea and Objkt), anyone can buy and collect NFTs and resell them at any time.	• "Hey Jude" Notes written by Paul McCartney (link). • *Crypto Punks*, a collection of 10,000 items, are collected by 3400 owners (link). • NFT-enabled conference event ticket called *BlockDown Croatia 2022* (link).

such as providing *access* (e.g., tickets), *coupons* (e.g., discount coupons), *identification* (e.g., certificates), *property* (e.g., conferring physical ownership), *loans* (e.g., as collateral), *donations* (e.g., in charity auctions), to tradeable items (e.g., weapons and skins in games). The scope and purposes of NFTs are now extremely diverse, and they have a wide range of *affordances* (Leonardi, 2011; Majchrzak and Markus, 2013), from sports, songs, films, sneakers, handbags, whiskeys, and books to virtual objects in the metaverse. Any valuable physical object can have its NFT "virtual twin." NFTs offer four main types of affordances: virtual assets (e.g., virtual arts and games); hybrid assets (e.g., virtual tickets and music albums with a physical presence); as a physical/virtual interface (e.g., sneakers and watches with a virtual presence); and as a metaverse asset (e.g., a weapon, skin, or land within the metaverse), as illustrated in Fig. 1.

NFTs have emerged through the decentralizing power of the blockchain and represent a new technology that can potentially disrupt entrepreneurship in the physical world and in Web 2.0. NFT is an *external enabler* of entrepreneurship (Davidsson, 2015; Davidsson et al., 2020) and encourages creative and imaginative individuals and groups (Alvarez et al., 2013; Kier and McMullen, 2020) to pursue new forms of entrepreneurial action that both leverage and transform NFT. I refer to this as *NFT-enabled entrepreneurship*[2] *(or NFTE)*. Like other digital technologies, NFTs are incomplete and perpetually in the making, i.e., their ontology is ambivalent (Garud et al., 2008; Kallinikos et al., 2013). They embrace the traits of adaptability, malleability, generativity, and fluidity. NFTE represents a new space to enact entrepreneurship in the virtual world (Chandra and Leenders, 2012) and is thus uncharted territory in which opportunities to observe, theorize, and advance entrepreneurship theory, practice, and policy are presented. Questions therefore arise, such as *What is NFTE? Can we explain its characteristics and conceptual foundations?* The emerging literature on NFT, which is currently dominated by practitioners, has not as yet addressed these questions.

Exploring the concept of NFTE is important for several reasons. First, it echoes the entrepreneurial disruption in the early days of the Internet. Previously unimaginable ventures (e.g., social media, fintech, apps, digital influencers, and cybercrime) prompted new academic discussions on areas such as Internet-enabled (Reuber and Fischer, 2011), social media (Gustafsson and Khan, 2017), gig (Burtch et al., 2018), and platform-based (Cutolo and Kenney, 2021) entrepreneurship. NFTs provide an ideal context in which to examine what entrepreneurs think, do, and feel and to assess their successes and failures in this rapidly changing technological realm. The practices, discourses, and dilemmas involved in NFTE can lead to new theories and questions and to new entrepreneurial methods and approaches. Second, NFTE, which epitomizes the "decentralized ownership" philosophy of the Web 3.0 culture, removes any

[2] By this term, I refer to a type of entrepreneurship that is *enabled* by NFT as a key driving force and distinguish it from other types of entrepreneurship that are not enabled by NFT. The latter covers entrepreneurial action and process that do not rely on or rely very little on technology in addition to those that rely on technology, including digital technologies, but where data and ownership are centralized in the hands of a few large organizations, which is the main characteristic of Web 2.0.


NFT as a virtual asset
Digital art
(1 of 1)
Cryptoart collectibles
(1 of 10,000)
BORED APE YACHT CLUB
Virtual game
(1 of 2 million)
NFT as a hybrid (physical/virtual) asset
Tickets, coupons, stamps, certificates
0006
Valuable assets with virtual twin
WORLD'S FIRST SMS SOLD AS NFT
Song albums, novels, articles
NFT YOURSELF
NFT as physical/virtual interface
Virtual cum physical fashion
Luxury items + virtual presence
Rare goods + virtual identification
NFT as metaverse asset
Companies' NFT assset in Decentraland
Charities, Int'l NGO's NFT assets in Cryptovoxel
anonymous

Fig. 1. A typology of NFT affordances.

entry barriers to participating in virtual entrepreneurship (Chandra and Leenders, 2012). Not only does doing business in the NFT space requires close to zero capital, but it also presents a global virtual market that gives ordinary people opportunities to create, experiment, and be discovered (Chandra and Coviello, 2010; Monaghan et al., 2020). Thus, NFTE has emancipatory and wealth-equalizing potential. Finally, NFTE can transform academic output (Baer and Shaw, 2017) and extend it beyond the publishing of papers. The artefacts (e.g., concepts and visual representations) produced can be tokenized as NFTs and can then carry (non)economic value.

2. Conceptualizing NFT-enabled entrepreneurship

A more formal definition of *NFT-enabled entrepreneurship (or NFTE)* is *entrepreneurial activities that leverage non-fungible token technologies as a key enabler*. This conceptualization highlights how NFTs, and more broadly Web 3.0, are disruptive technologies and *external enablers*. I focus on this form of enablement[3] (Davidsson et al., 2020; Davidsson, 2015) and its mechanisms and roles, and apply the theory of social construction (Alvarez and Barney, 2007) to present a framework for conceptualizing NFTE (see Fig. 2). In this framework, external enablers (i.e., technologies and communities) and entrepreneurial agency combine, and the result is an NFT-enabled entrepreneurial idea that leads to action. This enhances several mechanisms (e.g., generation, compression, and elimination) that shape artefacts, ventures, and institutions, which in turn inform the technologies, communities, and agency. This framework offers a perspective that future empirical research can follow.

The framework is based on three assumptions. First, NFT technologies and NFTE are *permeable* (Nambisan et al., 2019) and *incomplete* (Garud et al., 2008), i.e., they are fluid and constantly shifting in scope (i.e., sectoral, geographical, and temporal), function, process, outcome, and value, thus leading to unpredictability and opportunity. Second, the Web 3.0 technologies that support NFTE are *imbricated* (overlapping) (Leonardi, 2011) as their functions are intertwined, complementary, and sometimes competing. Finally, the notion of agency in NFTE is *distributed* and fluid (van Haaften-Schick and Whitaker, 2022) as NFT entrepreneurs[4] must dynamically co-create in communities through an "architecture of participation" (Majchrzak and Markus, 2013) to survive and grow.

2.1. Technological enablers of NFTE: token standards and web 3.0 infrastructure

Central to the emergence of NFTE is the rapid development of blockchain, cryptocurrencies, and other technologies that form the infrastructure of Web 3.0. The *non-fungible token standard* of ERC-721 by the Ethereum blockchain is the breakthrough that makes NFT possible (Bamakan et al., 2022). However, token standards are imperfect and constantly evolving. For example, ERC-1155 now enables creators to bundle[5] unlimited numbers of non-fungible and fungible (ERC-20) tokens in a single smart contract, which increases transaction speed and requires less storage space.

Web 3.0 infrastructure is required for NFTE to occur and includes blockchain-enabled *NFT platforms or marketplaces* (e.g., Open Sea, Refinable, and Nifty Gateway) that allow NFTs to be "minted" (i.e., recorded in a smart contract) for trading; complex mathematical puzzles for validating smart contracts for NFTs (i.e., NFT miners); *crypto wallets* for NFT transaction settlement (e.g., MetaMask.io); *peer-to-peer (P2P) cloud storage* for storing NFT files (e.g., InterPlanetary File System); and *analytics platforms* that track the performance of NFTs (e.g., DappRadar.com). Programming languages (e.g., Solidity, JavaScript, and Rust) are the technological backbone for developing smart contracts in the blockchain, and thus also support NFTs.

NFT technologies are perpetually evolving and represent an *imbrication* of material agencies (Leonardi, 2011), as they overlap and interlock like roof tiles to perform functions. Blockchains are constantly re-invented (e.g., from Ethereum's POW[6] to POS and Polkadot[7]) and are imbricated in NFT marketplaces (e.g., OpenSea uses Ethereum for layer 1 but adds Polygon and Solana as layer 2 to offer cheaper "gas fees" to creators).

2.2. Community enablers of NFTE: decentralization, gaming, and sharing

*Communities (*Kaczynski and Kominers, 2021), i.e., individuals and collectives who share a passion or interest (e.g., in games, technology, and arts), are central to NFTE as they commit resources to participating and supporting it. A key feature of an NFT community is a *decentralization ethos* (of data, services, and wealth), which is a philosophy first advocated by "geeks" in response to the 2008 global financial crisis (Faustino et al., 2022) and creative individuals who have contested the changing economic worth of their work as determined by intermediaries and Big Tech (Negus, 2019). *Gaming culture* is also a key feature of the NFT community, in which NFT is a symbol of ludic affordances (Serada et al., 2021) (e.g., Crypto Kitties, one of the earliest forms of "money game" NFTs).

Another key element of the NFT community is the *culture of sharing,* involving knowledge, reciprocity, support, and mutual learning (Dvoskin, 2022). This extends the "kindness of strangers" (Constant et al., 1996) mindset, as members help each other to ensure the success of their NFT ecosystem. The community also develops a *shared language* infused with technical jargon, which is not necessarily understood by outsiders (Christie's Education, 2021). Examples include the term "gas fee," which is the transaction fee to

[3] Davidsson et al. (2020) suggested that an external enabler is partial, and so agency can enhance entrepreneurship.

[4] I define an "NFT entrepreneur" as any individual, collective, or organization who creates and mints any artefacts—directly or indirectly—as NFTs.

[5] NFTs are thus in high demand in blockchain-based gaming applications such as Axie Infinity and Decentraland.

[6] POW stands for proof of work and POS for proof of stake. Both are consensus mechanisms in blockchain. POS reduces the time needed to mint NFTs, thus making it more efficient, and is also more eco-friendly, as it uses less energy in the mining process.

[7] Polkadot offers the cross-blockchain transfer of any type of asset or data, not just tokens. This interoperability function is not yet available in other blockchains.

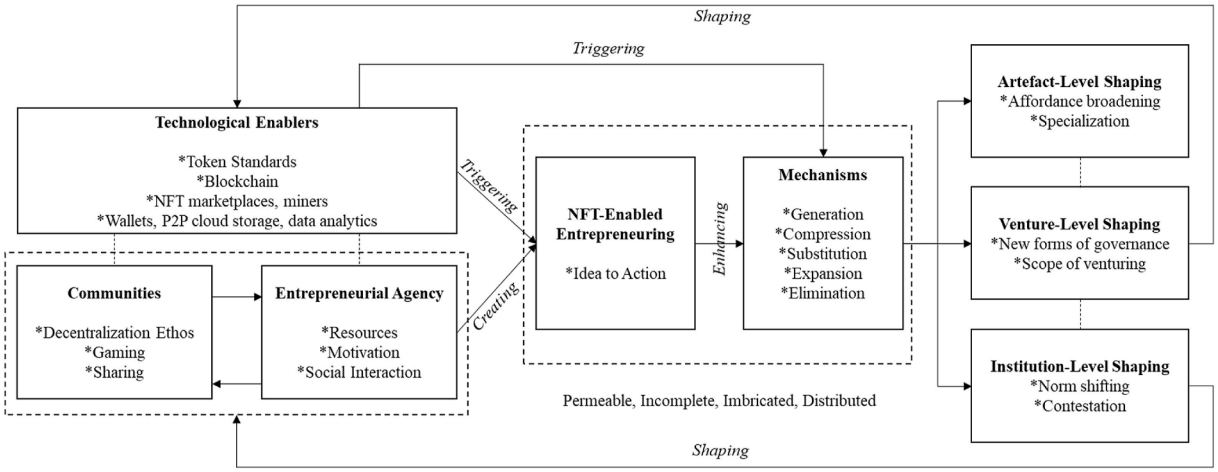

Fig. 2. A conceptual framework of NFT-Enabled entrepreneurship (NFTE).

"mint" or register an NFT; "air drop," which is giving away free NFTs to attract attention; and "floor price," which is the lowest price of an NFT. Another feature of the community is *anonymity* or the use of *pseudonyms* (NFT Culture, 2021), which originates in gaming culture, where people have the freedom to present their chosen identity.

Local to global NFT communities regularly meet on *chat platforms* (e.g., Discord or Twitter), and the chats help to socially construct and reinforce the culture and unite members across genres and platforms as part of a global village. Other key NFT community members include *event organizers* (e.g., NFT. NYC and Art Basel), *intermediaries* (e.g., Christie's and Sotheby's auction houses), and the media (e.g., New York Times, nftnow, and CoinDesk).

2.3. Entrepreneurial agency in NFTE

Technologies and communities as external enablers do not automatically lead to NFTE initiatives without agency. NFTE is a *social construction*[8] of agents and material agencies. The two key concepts of NFTE agency are *resources* and *social interaction*. NFT entrepreneurs are endowed with a unique combination of *resources*, including *knowledge* (Shane, 2000; e.g., blockchain, crypto, and metaverse knowledge[9]), *imaginativeness* (Kier and McMullen, 2020; in technical, social, philosophical, and linguistic terms), *passion* (Cardon et al., 2017; through crafting, coding, experimenting, and sharing), and *orientations and tendencies* (Covin and Lumpkin, 2011; e.g., risk taking, pioneership, pragmatism, social justice). *Intrinsic* and *extrinsic* motivations (Deci and Ryan, 2000; including fun, curiosity, social status, "flexing," rewards, and fear of missing out) are also important resources driving NFTE and thus lead to different levels of agency.

Agent resources are not static, but are perpetually shaped by an ecology of interactive ritual chains between entrepreneurial actors and material agencies (Collins, 2004; Garud and Giuliani, 2013). These *social interactions* create emotional energy that leads actors to take initiatives, and from receiving (positive or negative) feedback (Goss and Sadler-Smith, 2018) about their ideas, NFTE opportunities are ultimately created (Alvarez et al., 2013). Collective solidarity, ethos, beliefs, and identity are also developed in the NFT communities.

2.4. NFT-enabled entrepreneurship and mechanisms

The technology, community enablers, and entrepreneurial agency jointly trigger and create ideas for NFTE and help transform them into action. NFTE action and technological enablers then enhance and trigger the key mechanisms of *generation*, *compression*, *substitution*, *expansion*, and *elimination*, which are discussed below. Although these mechanisms are presented in NFTs, their creative and imaginative activation by entrepreneurs is critical to achieving good NFTE outcomes (e.g., more marketable or valuable NFTs).

2.4.1. Generation

NFTE enhances the *generation* mechanisms, or the creation of new opportunity models (Davidsson et al., 2020; Yoo et al., 2012), based on NFT technologies. In the *secondary opportunity*[10] model, an NFT entrepreneur will receive future royalties each time an NFT minted in a smart contract is bought and sold in a secondary market (van Haaften-Schick and Whitaker, 2022; Wolfson, 2021). This offers a guaranteed, spin-off income with few transaction costs (Williamson, 1989) (e.g., no fees to intermediaries nor any administration work). In the *generative opportunity* model, an unlimited number of unique NFTs can be engineered using generative[11] technology

[8] In this framework, I offer an integrated view of entrepreneurship that combines Davidsson's external enablement theory (Davidsson et al., 2020) with social construction (Alvarez and Barney, 2007; Karami and Read, 2021).

[9] For example, the seemingly simple process of "minting" an artefact as an NFT can be quite technical for lay people and requires a level of technical knowledge about blockchain and crypto.

[10] This differs from the "primary opportunity" model, which is the revenue gained from the first sale of an NFT (primary market).

[11] These are also known as "generative NFTs," which randomize different elements via a factorial design to create unique NFTs.

Fig. 3. A prototype poetry NFT: A collection of 8 poems on "discovering NFT".

(e.g., 10,000 ape NFTs in the Bored Ape Yacht Club). This allows an entrepreneur to sell more artefacts. In the *fractionalized opportunity* model, NFTs can be designed to be owned by multiple parties, thus increasing their affordability and market liquidity (e.g., a $1 Million ERC-721 NFT can be split up into 10,000 ERC-20[12] tokens at $100 each). This involves the concept of DeFi (*decentralized finance*) and DAO (*decentralized autonomous organization*), in which a group of people collectively own a high-value NFT (Ravi, 2021; Wang et al., 2019). The *bridging opportunity* model involves moving or transferring NFTs *across* blockchains (e.g., from Ethereum-to Solana-based NFT marketplaces), across metaverses (e.g., through an open metaverse), and across physical–virtual boundaries (see Fig. 1).

2.4.2. Compression

NFT technologies enable entrepreneurs to *compress the time* and *effort* required to "mint" (or record in a smart contract), launch, and market NFTs. The *high specificity* of the NFT technology (van Haaften-Schick and Whitaker, 2022) means that precise sets of inputs, transformations, and outputs are required, which can be *automated* with high precision and efficiency, thus avoiding fatal errors in contract making. This is important to the scaling up NFTs (e.g., creating 1000 concert ticket NFTs or a million song album NFTs in one go). The *relational* nature (van Haaften-Schick and Whitaker, 2022) of NFTs allows entrepreneurs to reduce the search and authentication costs (and thus the transaction costs) as all buyers, investors, creators, and NFTs under transaction can be easily identified in highly connected webs. Time and space compression also leads to NFTE successes and failures occurring in a relatively short time.

2.4.3. Substitution

Using NFT technologies, NFT entrepreneurs can "go directly" (peer-to-peer) to stakeholders and take a "do it yourself" (DIY) approach to pursuing entrepreneurial opportunities, which is in keeping with the Web 3.0 philosophy of decentralization. This substitution mechanism reduces or even removes intermediaries (e.g., agencies, publishers, and credit card companies), custodians (e.g., lawyers, accountants, and banks), gatekeepers (e.g., galleries and distributors), and centralized online platforms (e.g., streaming platforms) in favor of smart contracts (Negus, 2019), NFT marketplaces, wallets, miners, and file sharing services. Similarly, an NFT can be deleted[13] from the blockchain without the need for any third-party input. All the above can be viewed as "service substitution," as value is directly co-created with material agencies instead of traditional service providers.

2.4.4. Expansion

NFT marketplaces create *global virtual markets*, weaving together all of the NFT stakeholders—sellers, buyers, investors, engineers, creators, and organizers—in a single space. This constitutes NFTE supply, demand, and resource expansion (Davidsson et al., 2020). NFT marketplaces (e.g., OpenSea for arts, Audius for music, and Yellow Heart for ticket) make it easy for any opportunity-driven ventures to create and find global opportunities and to be discovered (Alvarez et al., 2013). These businesses thus become "*born virtual*" firms relatively quickly. More individuals will also become "*virtual entrepreneurs*" (Chandra and Leenders, 2012; Chandra and Coviello, 2010) as the entry barriers to creating NFTs are reduced. The low level of start-up capital required to create NFTs, generative software, user-friendly design software like Procreate or Blender, and communities' resources to support NFTs contribute to this. The belief that "everything that can be made virtual will be virtualized" in NFT suggests that the global economy will increasingly become more virtual.

[12] ERC-20 is an Ethereum blockchain standard for "fungible tokens." By breaking an NFT (created in ERC-721 token) into ERC-20 tokens, each token becomes tradeable and ownable as a smaller portion, like owning a portion of stocks of a company.

[13] This is done by dumping an NFT into a blockchain that has a zero address (e.g., 0x00000000000); a form of virtual rubbish bin.

2.4.5. Elimination

Opportunities can be created or destroyed to suit a particular goal. NFTE is a playful space in which opportunities can be *eliminated* to create new, more valuable opportunities. This is known as "burning," a strategy for manipulating scarcity and thus increasing the value of NFTs. Burning (McDowell, 2022) can be achieved by offering buyers the option to "swap" an original NFT for physical goods (e.g., NFT socks for real socks) or to choose either physical goods or a virtual NFT within a time limit, after which one of them will be burned. NFTs with progressive levels can be created, in which a basic NFT will be burned so buyers can get more advanced NFTs, or a rare object is destroyed and the NFT version retained, to eliminating unsold or problematic NFTs. The elimination mechanism in NFTE constantly offers new opportunities. Thus, NFTE is a highly dynamic form of entrepreneurship.

2.5. Shaping roles of NFTE

NFTE and the various mechanisms it enhances are influential at different levels. At the artefact level, imaginative NFT entrepreneurs constantly push the boundary by *broadening* NFT affordances (its use cases). This leads to *specialized* NFTs (e.g., arts, games, fashion, tickets, music, and the metaverse). As NFT technologies are continuously re-invented, further innovative NFTs have recently emerged (e.g., for bicycles, beers, loan collateralization, and charity auctions). At the venture level, NFTE shapes new forms of *governance*. One example is the emergence of the "decentralized autonomous organization" (DAO) model, which refers to a "company" without a CEO, managers, or employees, in which members contribute tokens to achieve the DAO's goals. This approach changes how an NFT venture is owned and operates, as it blurs the boundary between shareholders, executives, and employees. An individual can assume all three roles in a DAO. A more obvious example is "virtual NFT entrepreneurs" whose business scope is *global,* and in which the *individual* is the *venture*, because all transactions are conducted using smart contracts that represent the individual instead of using a traditional legal agreement that represents a firm. This attracts more individuals to join NFTE.

At the institution level, NFTE can shape *societal norms*. Such practices increase the social legitimacy of virtual goods (e.g., paintings, song albums, movies, tickets, fashion, and virtual certificates) in the economy, which helps de-mystify blockchain and destigmatize crypto as a form of asset, albeit virtual (McGregor, 2021). NFTE also changes how *copyright* is protected. The public perception of copyright is influenced by NFTs, as any valuable JPEG, PNG, or video files can carry economic value as an NFT. NFTE has also inevitably led to *contestation* among parties with varying interests. This can be in terms of culture (e.g., decentralization vs. centralization of data and wealth), practice (e.g., closed vs. open markets), or ethical values (e.g., economically beneficial vs. criminal NFTs). Finally, NFTE encourages the development of new *institutions* (e.g., token standards, payment standards, and smart contract standards), which in turn affect the technologies, communities, and agency.

3. Conclusion

NFTs represent a force with the potential to disrupt economies, culture, and society. Like any technological innovation, NFTs have enabled a new type of entrepreneurship, referred to here as *NFT-enabled entrepreneurship (NFTE)*. Although this form of entrepreneurship has developed rapidly and has the potential to be transformative, its nature and conceptual foundations remain under-researched. In this article, I identify the characteristics of NFT, define NFTE, and propose a framework through which its conceptual foundations and enablers can be revealed. This conceptualization also offers practical implications for entrepreneurs, particularly in terms of the mechanisms and affordances of NFT that they can deploy to capture and create value.

More research is needed to increase our understanding of this new field. I therefore suggest several future research directions. First, we still know very little about the nature of NFTs and the implications for entrepreneurship. As it evolves, NFTE will gain from more creative and playful conceptualizations ("let a thousand ideas bloom") that will further inform research. For example, NFTE can be explored from various theoretical perspectives, such as utopia–dystopia, ethics, crime, DAO, DeFi, gamification, sociomateriality, affordance, governance, activism, and charity. Any individual can start an NFT business without creating a firm or legal entity, a phenomenon in which "*the individual is the venture.*" This problematizes the meaning of "venture/venturing" in entrepreneurship and is thus an interesting future research agenda. Third, theory building is required to extend and enrich NFTE scholarship. Future research can use rich-and-thick cases, phenomenology, linguistic studies, and ethnography to explore NFTE processes, mechanisms, and performance drivers. The values, motivation, knowledge, and social interactions of those who become NFT entrepreneurs can be distinguished from those who do not. Examining opportunity creation and discovery, resourcefulness, business models, and community relations among successful and less-successful NFT ventures will also be of benefit.

Finally, NFT can be viewed as a new form of knowledge production, in which, through a playful approach, we can transform conventional scholarly output into NFTs. To demonstrate this, I crafted a prototype *poetry NFT*, which comprises eight short poems, following the 5-7-5 syllable method (Cheney, 2002). When combined, the poems capture the key insights of this conceptual paper. The collection of poems will later be minted in an NFT marketplace to stimulate conversations and trading[14] among collectors (see Fig. 3).

NFTs can have a positive impact on the economy and society. Thus, I call for more researchers to explore the exciting new field of NFTE and, more broadly, virtual entrepreneurship and to embrace the NFT culture.

[14] Creating a collection of NFTs is a commonly used marketing strategy. This enhances the market liquidity of the NFTs.

Author contributions

Yanto Chandra: All is the author's work, from Conceptualization, Data Curation, Investigation, Methodology, Writing, Editing, Reviewing, Methodology, Funding Acquisition, Validation, Software, to Project Administration. The NFTs are also the author's original work.

Conflict of interest declaration

The author declares that he has no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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