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The Recording of Non-Fungible Tokens (NFTs) in Macroeconomic Statistics (DZ.10)

Digitalisation Task Team

Outcome of the Global Consultation on DZ.10 The Recording of Non-Fungible Tokens (NFTs) in Macroeconomic Statistics

1. The guidance note submitted to global consultation identifies three categories of Non-Fungible Tokens and makes recommendations for their classification in the SNA:
    a. NFTs that convey <u>no ownership rights and only allow for personal use</u> of another asset or product → to be recorded as recorded as consumption;
    b. NFTs that convey <u>limited ownership rights, beyond personal use</u> for another asset or product → to be recorded as assets (contracts, leases, and licenses) if the owner can derive some economic benefits from these rights (e.g., some form of royalties);
    c. NFTs that convey <u>full ownership rights</u> for another asset or product → should not be separately recorded if the associated asset or product has already been recorded.
2. In general, the 42 complete responses received during the global consultation were overwhelmingly supportive of the recommendations in the guidance note. However, a few remarks highlighted the need to clarify certain aspects, which has led to a few tweaks to the paper as described hereinafter.
3. Of those that responded to the question, 100 percent of respondents concurred with the proposed categorization of NFTs according to the rights they convey. Only three of the 42 responses raised concerns about the possible existence of NFTs that may fall into another category (although only one listed a specific example). These concerns did not require changing the classification and were addressed by further clarifying certain language and adding a specific example in one of the categories.
4. With respect to the above classification of the three categories of NFTs, 90 to 95 percent of respondents concurred with the note's recommendations. Five respondents have work planned on NFTs and eleven provided additional comments. Of the comments and suggestions offered by respondents, some were incorporated into the updated version of the note, or further addressed here.
5. Some respondents emphasized that the digital asset space is quickly evolving, and so this note may quickly become out of date. For example, "dynamic NFTs" use smart contracts to update their metadata when certain conditions are met, and we added footnote 8 to reference this type of NFT. However, the proposed categorization by the rights the NFT conveys should be forward-looking and cover any new NFT developments.
6. Some respondents noted that the legal status of NFTs, particularly NFTs that grant commercial rights, is unclear. We discuss these legal issues in footnote 10. If an NFT owner can no longer derive economic benefits from an NFT that grants some commercial rights, the NFT would no longer be an asset. Please see paragraph 26 for the relevant SNA passage.
7. One respondent pointed out that some NFTs may represent charitable donations or other transfers for a specific purpose. We added some text to address this specific type of NFT in paragraph 25.
8. One respondent asked for a more precise wording with regard to type 3, so this has been addressed in paragraph 36.
9. One respondent commented that some NFTs may be considered valuables at first purchase if they command a high price. In practice, depending on how the information is collected, some NFTs may be counted as valuables at first purchase. But as another respondent pointed out, the prices of these NFTs are very volatile, even for ones that command high prices at auction. Which NFTs will maintain their value over time, and thus truly act as valuables, is unclear. Please see updated text at the end of paragraph 23 to reflect these comments.

10. One respondent suggested that some type 2 NFTs may be considered a license to use an intellectual property product rather than a contract, lease, or license. We address this comment in paragraph 30, noting that the licenses referenced in SNA para. 10.100 are not necessarily unique and exclusive, which then cannot confer monopoly rights upon purchasers. If an NFT allows for use of an IP product like software, but not for the reproduction and sale of the intellectual property product, then this NFT should be considered a type 1 NFT.
11. Paragraph 31 further clarifies the reasoning underlying the recommendation that NFTs that confer limited ownership rights are best classified as contracts, leases or licenses.
12. Paragraph 32 was added to address concerns that new combinations of rights associated with NFTs could be developed in the future, e.g., NFTs that confer semi-exclusive ownership rights. As noted earlier, the digital asset space is constantly changing, and guidance may have to be revisited in the future.
13. One respondent noted that the GN does not address how blockchain transaction fees should be treated with regards to NFT creation and transfer. These transaction fees are the same as those charged for the transfer of fungible crypto assets, which are sufficiently covered in "F.18 The Recording of Fungible Crypto Assets in Macroeconomic Statistics." We added footnote 11 to clarify this issue.

Question to the AEG

1. Does the AEG endorse the guidance note as amended to incorporate feedback from the global consultation?

Digitalisation Task Team
Guidance note on
The Recording of Non-Fungible Tokens (NFTs) in Macroeconomic Statistics[1]

This guidance note (GN) discusses the recording of a specific type of crypto asset -- non-fungible tokens (NFTs) -- in macroeconomic statistics. The NFTs record the rights assigned to the NFT owner and are distinct from the associated asset or product. Accordingly, the classification of NFTs in national accounts should be based not on the characteristics of the associated asset or product but instead on the rights that are embedded in the NFT. The NFT could, based on the rights it conveys, be classified as consumption, as a type of asset, or as neither (assuming the associated asset or product is already recorded). NFTs that are assets could reasonably be classified as a type of non-produced nonfinancial asset, similar to contracts, licenses, and leases. The recognition and proper classification of NFTs is likely to lead to numerous measurement challenges because of limited source data.

INTRODUCTION

1. Crypto assets are digital representations of value that rely on cryptography and decentralized peer-to-peer architecture based on distributed ledger technology (DLT), which enables two parties to directly transact with each other without the need for trusted intermediaries. Because crypto assets have proliferated in recent years, as they may fulfil different roles in the economy, and as users want separate information on distinct types of crypto assets, developing a sufficiently granular classification of crypto assets is important for national and international accounts.

2. This GN is the latest of several efforts to address the treatment of crypto assets. The IMF and the OECD started to explore the measurement and taxonomy of crypto assets in 2018, mainly focusing on fungible crypto assets, i.e., those that are divisible and non-unique. Discussions took place at the meetings of the IMF Committee on Balance of Payments Statistics,[2] the OECD Working Party on Financial Statistics (WPFS),[3] and the Advisory Expert Group (AEG) on National Accounts, leading to interim guidance on the recording of these types of crypto assets in macroeconomic statistics and an IMF paper that was published in 2019.[4] The OECD further explored the issue and released updated proposals in 2020.[5]

3. A recent GN, "F.18 The Recording of Fungible Crypto Assets in Macroeconomic Statistics,"[6] included updated discussions on the recording of fungible types of crypto assets. This category includes

[1] Prepared by Allison Derrick and Robert Kornfeld (United States Bureau of Economic Analysis) and John Mitchell, Itai Walk and Jorrit Zwijnenburg (OECD).

[2] https://unstats.un.org/unsd/nationalaccount/aeg/2018/M12_3e_Cryptocurrencies_IMF.pdf

[3] https://unstats.un.org/unsd/nationalaccount/aeg/2018/M12_3e_Cryptocurrencies_OECD.pdf

[4] https://www.imf.org/external/pubs/ft/bop/2019/pdf/Clarification0422.pdf

[5] https://community.oecd.org/docs/DOC-176257

[6] https://unstats.un.org/unsd/nationalaccount/RAconsultation.asp?cID=30

crypto assets that are designed to act as a general medium of exchange, which can be with or without a corresponding liability. Those with a corresponding liability include those that are issued by a monetary authority (e.g., central bank digital currencies) or that are not issued by a monetary authority (e.g., stablecoins with a claim on the issuer). Crypto assets without a corresponding liability include those designed to act as a general medium of exchange (CAWLM, e.g., bitcoin) and those designed to act as a medium of exchange within a platform only (CAWLP). Other types of fungible crypto assets include security tokens, which can be debt security, equity, or derivative tokens.

4. As stated in GN F.18, there is consensus among the international statistical community that crypto assets with a corresponding liability should be recorded as financial assets, but no consensus has yet been reached on the recording of CAWLM and CAWLP. The GN presents a few recording options (focusing on financial, nonfinancial produced, and nonfinancial non-produced assets) for these crypto assets along with their pros and cons.

5. Because these issues were sufficiently complex for one GN and as these all concerned fungible types of crypto assets that are quite different from non-fungible tokens (NFTs), GN F.18 recommended that the classification of NFTs be addressed in a separate guidance note. This current GN addresses this need and provides guidance on the recording of NFTs.

BACKGROUND: WHAT ARE NFTs?

6. Non-fungible tokens (NFTs) are digital records hosted on a blockchain that are associated with a digital or physical asset or product, and which may serve a functional purpose. An NFT is distinct from the associated asset or product and should not necessarily be recorded in the same way. In this regard, the association may come in different forms dependent on the specific rights embedded in the NFT. These rights may range from full ownership rights with regard to the underlying asset or product, to being entitled to some future benefit streams regarding the asset or product, to only being entitled to personal use of the underlying asset or product. Like fungible crypto assets, an NFT is hosted on a blockchain and relies on DLT to record the creation and transfer of the NFT but differs in that it reflects rights with regard to a unique (or semi-unique[7]) digital or physical asset or product.

7. NFTs are relatively simple to create for those with the necessary coding skills, though many platforms that provide NFT marketplaces also offer services that assist potential issuers, usually for a small fee or free of charge. The figure below illustrates the information recorded in an NFT. Except for the current owner, the on-chain information cannot be changed once the NFT is issued.[8] In theory, a digital asset, product, or license agreement associated with an NFT can be stored on-chain, but usually the cost is too high and/or storage capacity is limited by the blockchain software. The off-chain information can be

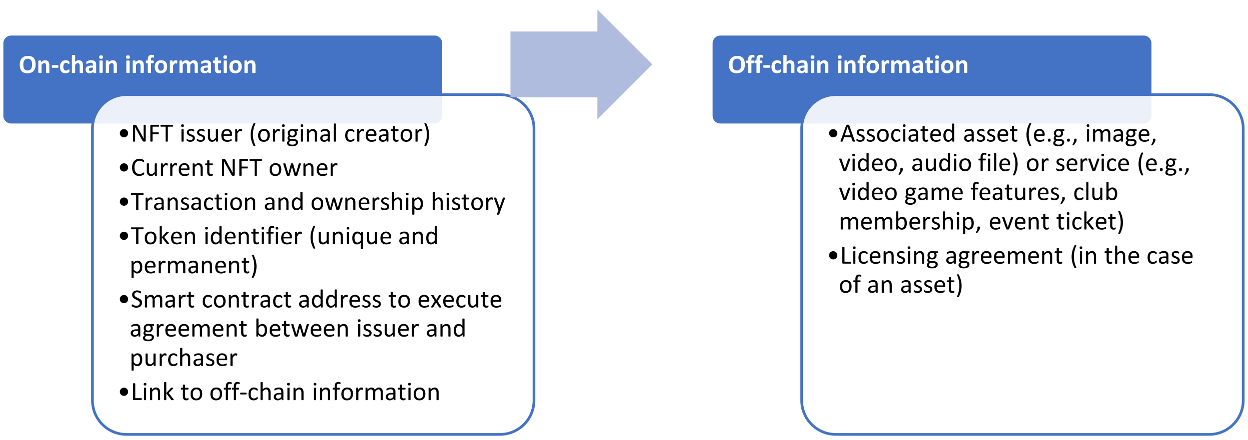
[7] Related to NFTs are semi-fungible tokens (SFTs), which are semi-interchangeable with each other. For example, at a Broadway play, a front-row seat may be interchangeable with the seat directly beside it in some cases, but not interchangeable with a seat in the back row. SFTs involve similar conceptual issues as NFTs and are not distinguished in this note.

[8] Dynamic NFT (dNFT) contain smart contracts that automatically update the metadata of the NFT when certain conditions are met. However, the smart contract that governs these updates cannot be altered.

altered or removed by the NFT issuer at any time,[9] dependent on the arrangement of the rights embedded in the NFT. This stresses the importance of carefully assessing the specific rights as laid down in the NFT in order to decide on their classification.[10]

8. NFTs and fungible crypto assets are traded in a similar fashion. Regardless of the licensing agreement attached to the NFT, the NFT owner has full control over the NFT itself and can sell it at any time for any price. The actual record of ownership is recorded on a blockchain, and transfers are finalized when a block is validated by the miners or validators on a blockchain network.[11] Ethereum and Solana are popular choices of blockchains for NFT issuers. Also, like other crypto assets, NFTs are most often traded on third-party platforms, which create a marketplace for buying and selling NFTs and execute trades on the blockchain for their customers. Because an NFT can only be traded for another crypto asset, an NFT buyer usually must pay with the crypto asset native to the blockchain the NFT is hosted on (e.g., Ether if the NFT is hosted on the Ethereum blockchain).

9. A special feature of NFTs is the ability for the issuer to collect a percentage of future sales. This is an optional feature that is possible with all NFTs through the embedded smart contract, and so must be determined when the NFT is issued.



[9] For example, the NFT collection Moonbirds originally advertised on its website that NFT holders “own the IP.” However, in August 2022, PROOF Collective, Moonbirds’ owner, changed to a Collective Commons license; now, the digital assets associated with Moonbird NFTs are in the public domain and NFT holders have no special rights. This change happened without notice or permission of NFT holders. See “A Survey of NFT Licenses: Facts and Fictions” by Galaxy Digital Research for more information.

[10] It is important to note that the legal status of NFT licensing agreements is uncertain in many jurisdictions, so even if rights are conveyed by an NFT, whether those rights will be protected by a court and whether the issuer has the standing to sell those rights is unclear. See an academic article on regulating smart contracts (Ferreira, 2021), an article on NFT intellectual property lawsuits (Geron, 2022), and a Forbes news article on smart contracts and the law (Herpy, 2022) for more information on this evolving topic.

[11] As in the transfer of fungible crypto assets, transaction fees are associated with the transfer of NFTs. The classification of these fees is covered in the recent GN, “F.18 The Recording of Fungible Crypto Assets in Macroeconomic Statistics.”

10. An expectation is that in the future most uses of distributed ledger technology will take the form of NFTs. For example, blockchain-based identity systems would require unique records similar to NFTs, as would blockchain-based medical records, supply chain logistics, and other records that need to be private and secure. These are all just new applications of DLT, and the underlying service already has a defined treatment in the SNA and BPM.

11. There are many types of NFTs, and new types are being developed as the digital asset space evolves. A forward-looking way to categorize NFTs that should cover any new developments is according to the rights conferred upon the NFT owner:

1. NFTs that convey *no* ownership rights and only allow for personal use of another asset or product
2. NFTs that convey *limited* ownership rights, beyond personal use for another asset or product
3. NFTs that convey *full* ownership rights for another asset or product

NFTs that convey no ownership rights and only allow for personal use of another asset or product

12. In many cases, owning an NFT confers only a limited personal use and display license to the associated asset or product. Instead, the owner of the associated asset or product, which may often be the issuer of the NFT, usually retains copyrights, intellectual property rights, or other commercial rights. Often the associated asset or product is a digital file that is hosted online, either in a centralized or decentralized location. This digital file can contain image, video, or audio files. Because the associated asset or product is often a digital file, NFT owners display the associated content online. For example, Twitter, Instagram, and Facebook are testing features that allow users to display online content associated with an NFT after verifying users' ownership.[12] These use and display rights are similar to those given to the purchaser of physical artwork. The purchaser of an NFT associated with digital artwork has the right to display the art, hold the NFT as an investment, and sell the NFT for a profit or loss in the future, while the artist retains all commercial and IP rights to the art.[13] Though owning these types of NFTs is not equivalent to owning the associated asset or product, they do arguably derive their value based on the characteristics of that asset or product, such as rarity and popularity, which vary in importance across individuals. In short, like other goods and services, certain NFTs of this type may appeal to some individuals and not others.

13. An example of NFTs that only convey limited personal use and display rights are the NFTs associated with "Moments" owned and created by National Basketball Association (NBA). The website's terms and conditions describe these Moments as being "comprised of a photograph of one or more NBA players, a video of one or more NBA players, and a set of statistics that are associated with one or more NBA players. Each Moment has a defined set of attributes – including scarcity – that help determine the

[12] https://www.coindesk.com/learn/nfts-on-instagram-how-to-show-off-your-digital-collectibles/

[13] Moringiello, Juliet M. and Odinet, Christopher K., The Property Law of Tokens (November 1, 2021). Florida Law Review (Forthcoming 2022), U Iowa Legal Studies Research Paper No. 2021-44, Widener Law Commonwealth Research Paper, Available at SSRN: https://ssrn.com/abstract=3928901

value of the Moment. […] The value of each Moment is inherently subjective in the same way the value of physical collectibles (e.g., an autographed poster) is inherently subjective. […] Some collectors might prefer to have a Moment featuring a certain NBA player, while another might prefer an equivalent Moment featuring a different NBA player. Each NBA player can have more than one Moment associated with them, and those Moments will each have different characteristics."[14] The NBA retains most of the rights associated with the content of the Moment, though the owner of the NFT associated with the Moment has the right to use, copy, and display the content on a personal basis, as well as sell the NFT to others. The most expensive NFT from this collection sold for $400,000 and was associated with the video clip of LeBron James' dunk in tribute to Kobe Bryant.

NFTs that convey limited ownership rights, beyond personal use for another asset or product

14. NFTs can grant rights to an associated asset or product beyond personal use. For example, NFTs from the World of Women collection grant the NFT owner some intellectual property rights and commercial rights to the associated digital artwork. However, the NFT owner must abide by a moral clause with regard to using and commercializing the artwork, while also being prohibited from substantially altering the artwork or copying special attributes of the artwork that serve as a mark of the original artist.[15] Otherwise, the NFT owner can reproduce the associated digital artwork for commercial purposes, such as printing the artwork on merchandise or using the artwork in the design of a webpage.

15. CryptoPunks are one of the first and most famous digital assets that have been used in NFT collections. A composite image of all 10,000 punks is hosted online.[16] The NFTs, which are traded on the Ethereum blockchain, reference a punk according to its position in the image. The punks are differentiated from each other based on certain characteristics, some of which are rarer than others, and punks with more rare characteristics are generally more valuable. One of the most expensive punks was sold for 8,000 ETH ($23.7 million) in February 2022. It was considered especially rare because it referenced one of the nine punks in the alien collection and one of 333 with a bandana. Currently, the license agreement issued by the CryptoPunks' owner, Yuga Labs, grants the NFT owner some commercial rights while retaining IP rights.[17]

NFTs that convey full ownership rights for another asset or product

16. NFTs can also be used to represent full ownership of an asset or product. In these cases, the NFT acts as a method of recording and verifying ownership, rather than acting as an independent asset

[14] https://nbatopshot.com/terms

[15] https://worldofwomen.art/about-us.html

[16] https://www.larvalabs.com/public/images/cryptopunks/punks.png

[17] The original creator of CryptoPunks, Larva Labs, granted NFT holders a license to use the associated punk on a personal basis. When Yuga Labs purchased the collection, they changed the license agreement to grant NFT holders some commercial rights. This example demonstrates 1) the associated asset's owner retains IP rights and 2) that NFT license agreements can and do change.

or product itself. For example, in February 2022, a house in Florida was sold via an NFT.[18] Other real estate properties have been sold through NFTs in similar ways.[19]

17. Growing in importance are NFTs that act as features in the metaverse,[20] virtual reality, and blockchain-based games. These features could be an avatar used in these online experiences. NFTs can also be traded in blockchain games and give the owner access to special characters, fashion, virtual weapons, and other in-game accessories. These online platforms confirm ownership of the NFT before the associated virtual object can be used to ensure exclusivity of the object. NFTs in online games also address the issue of inflation by limiting the number of each object. An example of this type are the Pokémon-like characters called Axies from the blockchain game Axie Infinity. In the metaverse, NFTs can also be issued to represent ownership of virtual real estate in platforms like Decentraland and The Sandbox. These NFTs can be considered as recording and authenticating the purchase of gaming or other audio-visual products.

18. NFTs can be used as a method of selling and confirming the purchase of other services, such as membership in social clubs or access to events. A notable example of this type of NFT social club is Friends with Benefits, which describes itself as “a group of Web 3-focused thinkers, builders, creators, and friends,” with more than 3,000 members. The club functions primarily online but sometimes hosts in-person events for members.

HOW SHOULD NFTs BE RECORDED?

19. As this overview shows, NFTs vary widely in the ownership rights they convey, and can be linked to a wide variety of associated digital and physical assets, goods and services. There is no single way to classify all of these diverse NFTs in the national accounts. In developing a classification for NFTs, it is important to distinguish between the NFT and the associated asset or product. The NFT is a digital recording of rights to an associated asset or product and is distinct from that associated asset or product. Accordingly, the classification of NFTs in national accounts should be based not on the characteristics of the associated asset or product but instead on the rights that are embedded in the NFT. The purchase of an NFT could, based on these rights, be classified as consumption, as a type of asset, or as neither (assuming the associated asset or product is already recorded).

20. The 2008 SNA (European Commission et al., 2009) already discusses the treatment of most assets or products associated with NFTs, such as physical artwork, housing, event tickets, and club memberships. The only exception would be digital artwork, but these could easily be incorporated into the definition of valuables as defined in the 2008 SNA.

[18] https://www.tampabay.com/news/real-estate/2022/02/04/this-tampa-bay-home-is-being-sold-as-an-nft/

[19] Tokenization was reportedly achieved by transferring ownership of the house to a limited liability corporation (LLC). The NFT represented ownership of the LLC, so the NFT owner indirectly purchased the house.

[20] The metaverse is a virtual space, accessed via the Internet, in which they can interact with a computer-generated environment and other users.

21. Whilst there can be numerous challenges in measuring the associated assets and products, particularly when it concerns digital assets or products, the main focus of this GN is the theoretical treatment of the NFTs, a new topic in national accounts. A brief review of definitions of assets and asset categories in the 2008 SNA is helpful for determining options for classifying NFTs. This is done for each of the three categories mentioned above.

1. Do NFTs meet the asset boundary?

22. As the 2008 SNA states, an asset (para. 10.8) "is a store of value representing a benefit or series of benefits accruing to the economic owner by holding or using the entity over a period of time." "The economic owner of entities … is the institutional unit entitled to claim the benefits associated with the use of the entity in question… by virtue of accepting the associated risks" (2008 SNA para. 10.5). By this definition, some NFTs may be classified as assets.

1. NFTs that convey no ownership rights and only allow for personal use of another asset or product

23. NFTs that do not entail any ownership beyond personal use will not qualify as an asset, i.e., these NFTs confer only rights to use or display the asset or product. These rights are similar to those conferred upon those that purchase other products. For example, the purchase of a luxury handbag allows the owner to use and display the bag on a personal basis, as well as sell it to others for a profit, but not to make copies of the bag for sale to others. In some cases, the asset may have already been placed in the public domain, and so the token confers no special rights upon the owner. Though the NFT owner can resell the NFT, it may not be considered an asset; it would constitute second-hand trade in the same way that a person can resell clothes or books, etc. This type of NFT is therefore not considered an SNA asset because they are not used in production and/or they do not generally represent a reliable store of value. This will only change if the NFT becomes a valuable, which may happen if the NFT has enough exclusivity, authenticity, or other features to give it sufficient market value relative to similar assets without these features. But this is no different from any other (physical) consumer goods that may turn into valuables over time (e.g., stamps) for which a defined treatment already exists (2008 SNA para. 12.16). In rare cases, some NFTs may meet the definition of a valuable at first sale, especially when they command a high price at auction in expectation the value would increase even more, implying they may be purchased as a store of value. However, the price of many NFTs is volatile and they may not actually act as a store of value over time, even if they command a high price at first sale.

24. NFTs that only grant personal use and display rights may be recorded as consumption. For example, if the NFT grants personal use and display rights to a piece of digital artwork, the purchase of the NFT may be recorded as the purchase of artwork. The exact classification of each NFT purchase depends upon the associated asset or product, which likely has an existing category in the SNA. Classifying these NFT purchases as consumption also assumes they are produced – more on this below.

25. NFTs can also be used to provide proof of a donation to a charitable cause, for example specifying how the donation is going to be used (e.g., planting trees or agreeing not to fell any trees on a specific piece of land for a specific period of time)[21]. In this case, the NFT does not provide any ownership right on an asset or product, but just specifies proof of the donation. The purchase of the NFT should then

[21] NFTree – Offset your CO2 with non-fungible tokens

be recorded as a transfer in cash (2008 SNA para. 8.42), in line with other donations to charitable causes, with the NFT only being a kind of a receipt for the donation with a description of how the funds are going to be used.

2. NFTs that convey limited ownership rights, beyond personal use for another asset or product

26. NFTs that transfer rights beyond personal use (e.g., rental leases or commercial rights) may constitute an asset to the NFT owner when "its use can create some form of monopoly profits for its owner. When it is no longer protected or becomes outdated by later developments, it ceases to be an asset" (2008 SNA para. 10.98). Thus, NFTs that convey partial rights to works of art or video clips may be an asset if the owner can derive economic benefits from these rights (e.g., some form of royalties).

3. NFTs that convey full ownership rights for another asset or product

27. NFTs that provide full ownership rights and are inseparable from the associated asset or product are merely a record of ownership of the associated asset or the product (an event ticket or membership). Assuming the associated assets or products have already been counted (e.g., as valuables, house, or consumption), there is no need to also record the NFT. By analogy, a household balance sheet should not value the deed for the house as equal to the value of the house, because the value of the house is presumably already recorded on the balance sheet. Assets that can be associated with NFTs already have established treatments in the SNA. For NFTs that record the purchase of a service, the Classification of Individual Consumption According to Purpose (COICOP 2018)[22] has consumption categories that are a good fit for these associated services, such as subscription to audio-visual content, streaming services and rentals of audio-visual content (para. 08.3.9.2); rental of game software and subscription to online games (para. 09.4.3.1); recreational and sporting services (para. 09.4.6); or services provided by cinemas, theatres and concert venues (para. 09.6.1).

2. What type of assets are NFTs that grant limited commercial rights?

28. The next decision is how to classify NFTs that grant limited commercial rights. Some NFTs may seem similar to valuables. Valuables are "produced goods of considerable value that are not used primarily for purposes of production or consumption but are held as stores of value over time. Valuables are expected to appreciate or at least not to decline in real value, nor to deteriorate over time under normal conditions" (2008 SNA para. 10.13). This value is often derived from artistic and/or sentimental reasons and they include "precious metals and stones, antiques and other art objects and other valuables. However, not all items that may be described by one of these titles should necessarily be included as a valuable in the balance sheet of the owner. The intent of the heading is to capture those items that are often regarded as alternative forms of investment" (2008 SNA para. 10.149). NFTs that convey limited commercial rights to works of art, video clips and images, music, and other artistic works seem in some ways similar in definition to valuables in the SNA.

29. However, the classification of some NFTs as valuables introduces several problems. It is important to recall the distinction between the NFT and the associated asset. If the NFT is merely a record of ownership of the valuable (similar to owning a house and the deed for the house), then the NFT should not be counted as an asset because the associated asset should already be counted on balance

[22] https://unstats.un.org/unsd/class/revisions/coicop_revision.asp

sheets. For that reason, NFTs providing full ownership rights are not regarded as assets themselves (see previous section).

30. Furthermore, the owner of the NFT that confers limited rights to the associated asset does not actually own the asset, so it would make no sense to regard the NFT itself as a valuable. These NFTs have some similarities to a license to use a copy of an intellectual property product (2008 SNA para. 10.100), such as a license to use certain software. The creator of the NFT is deriving value from a piece of intellectual property, without selling the intellectual property itself. However, as the name suggests, NFTs are unique and therefore, unlike copies of other intellectual property products, the ability to gain commercial benefits from its use is limited to its single owner.

31. This unique nature permitting only one user, along with the fact that the associated asset is still owned by someone else, results in this type of NFT representing more a permit to undertake specific commercial activities rather than a license to use a copy. As such, NFTs that grant limited commercial rights seem most similar to the SNA category of contracts, leases and licenses because they record specific rights conveyed to the NFT owner. The 2008 SNA treats contracts, leases, and licenses as assets under two conditions (para. 10.186). First, the terms specify a price for the use of an asset or provision of a service that differs from the price that would prevail in the absence of the contract, lease or license. Second, one party to the contract must be able legally and practically to realize this price difference. The 2008 SNA recognizes four types of these assets, of which, permits to undertake specific activities (para. 10.192) appear the most appropriate for the commercial arrangement facilitated by these types of NFTs.

32. The business models involving the production and selling of NFTs are consistently evolving. This reflects the changing nature of consumer demand, technological possibilities as well as legal restrictions. Therefore, in the future, new NFTs offering different rights and commercial options most likely will be developed that may not fit this classification. Of the three types of NFTs presented in this paper, NFTs that provide limited commercial rights are the type most subject to change and likely will require reconsideration in the future to ensure that the classification is still appropriate.

OPTIONS FOR RECORDING NFTs?

33. As this discussion suggests, the correct classification of an NFT differs for different types of NFTs, and ultimately depends on the (ownership) rights conveyed by the NFT. As these types of NFTs fit into existing classifications, no changes to the SNA are recommended. NFTs may be usefully divided into three broad categories based on their ownership rights:

- 1: NFTs that convey *no* ownership rights and only allow for personal use of another asset or product
- 2: NFTs that convey *limited* ownership rights, beyond personal use for another asset or product
- 3: NFTs that convey *full* ownership rights for another asset or product

1. NFTs that convey no ownership rights and only allow for personal use of another asset or product

34. For the first type of NFT that only allows for personal use of another product or asset (usually a digital valuable), the classification of the NFT depends on the rights embedded in the NFT, and some

judgment is required. Some of these NFTs may be recorded as consumption. If, over time, an NFT gains more features of a valuable, it may transform into a valuable through methods already established in the SNA.

2. NFTs that convey limited ownership rights, beyond personal use for another asset or product

35. The second type of NFT conveys some commercial or other rights beyond personal use for another asset or product (e.g., rental leases, commercial rights to use IP product) and should be recorded as a non-produced nonfinancial asset, distinct from the associated asset or product. Specifically, these NFTs should be recorded as contracts, licenses, or leases.

3. NFTs that convey full ownership rights for another asset or product

36. The third type of NFT conveys *full* ownership rights for an associated asset (e.g., real estate, digital valuables, other property) or product. These NFTs are essentially inseparable from the asset or product and are simply a digital recording of ownership. So, if one is already recording the purchase of the associated asset or product, the NFT needs not be recorded as a separate purchase in the national accounts. By analogy, a household balance sheet should not record a deed to a house and the house itself as two equally valued assets; the deed merely records the ownership of the house.[23] Similarly, NFTs that simply record consumption of goods and services (an event ticket, a membership) need not be recorded in addition to the consumption of these services.

MEASUREMENT CHALLENGES

37. While this GN has focused on theoretical issues concerning the classification of NFTs, the recognition and classification of NFTs will also lead to several measurement challenges. One needs detailed information on the rights conveyed by NFTs, and the spending to purchase NFTs, separate from the purchases of the associated assets or products. These comprehensive data may be difficult to obtain. Although this GN makes a distinction between the recording of NFTs and the associated assets, many of these associated assets – especially physical artwork and digital objects – may be poorly measured or entirely missing from national accounts. In many cases, the NFTs may be used as the only available source of data on these associated assets. Given these measurement challenges, it may be difficult to produce estimates of consumption of NFTs, acquisitions less disposals of both NFTs and the associated produced assets, price changes and net asset stocks. This GN seeks to provide a starting point for addressing these difficult topics.

38. Fortunately, some useful information on NFTs is already available. Currently, only a few websites host the majority of the transactions and may be able to provide information on the range of rights conveyed by the NFTs.[24] In deciding how to record and measure NFTs, statistical agencies will

[23] Even when an NFT seems to influence the value of the associated digital asset, it still should not be recorded as a separate asset. For example, an NFT may be more effective at establishing, conveying, and verifying ownership than the previous method. As a result, the presence and recognition of NFTs may make people willing to pay more for the associated asset. In this case, however, the NFT is still merely a recording of ownership of the associated asset.

[24] See, for example, see this list of popular NFT marketplaces as well as NFT collections like Bored Ape Yacht Club and Robotos.

need to weigh the benefits and costs of producing these measures against other priorities. Many of the challenges that exist for measuring NFTs are similar to those challenges for measuring other crypto assets. Please see the GN F.18 "The Recording of Fungible Crypto Assets in Macroeconomic Statistics" for detailed more information and recommendations for collecting data on crypto assets, which this GN endorses.

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