

RESEARCH OUTPUTS / RÉSULTATS DE RECHERCHE

Providing Customer Value through Non-Fungible Tokens

Pirnay, Lhorie; DEVENTER, Claire; Amaral de Sousa, Victor

Published in:

Proceedings of the 56th Annual Hawaii International Conference on System Sciences, HICSS 2023

Publication date:

2023

[Link to publication](#)

Citation for pulished version (HARVARD):

Pirnay, L, DEVENTER, C & Amaral de Sousa, V 2023, Providing Customer Value through Non-Fungible Tokens: A Preliminary Study. in TX Bui (ed.), *Proceedings of the 56th Annual Hawaii International Conference on System Sciences, HICSS 2023*. Proceedings of the Annual Hawaii International Conference on System Sciences, vol. 2023-January, IEEE Computer Society, pp. 4543-4552, 56th Annual Hawaii International Conference on System Sciences, HICSS 2023, Virtual, Online, United States, 3/01/23. <<https://hdl.handle.net/10125/103185>>

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal ?

Take down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Providing Customer Value through Non-Fungible Tokens: A Preliminary Study

Lhorie PIRNAY^a, Claire DEVENTER^a and Victor AMARAL DE SOUSA^{a,b}

^aNaDI, Namur Digital Institute, University of Namur, Belgium

^bResearch Center for Information Systems (LIRIS), KU Leuven, Belgium

Abstract

Non-Fungible Tokens (NFTs) are digital certificates of ownership that can be attached to any virtual or physical item. Recently, they have become increasingly popular, especially with the advent of metaverses, virtual spaces that are shared and accessible online. Many organizations are launching NFT initiatives for a variety of reasons including retaining customers, developing new revenue streams, or demonstrating that they are keeping up with the latest technological advances. When organizations launch NFT initiatives, they attempt to provide value to NFT users in various ways, depending on the NFT characteristics. This paper is a preliminary study to understand the value offered by organizations and perceived by NFT users. We examine 46 NFT initiatives from 42 companies to determine what value can be provided to users of NFTs. The goal is to provide a basis for further analysis on the values of NFTs and to support the design of Information Systems embedding NFTs.

Keywords: Non-Fungible Tokens (NFTs), perceived value, Blockchain, smart contracts, ERC-721

1. Introduction

Non-Fungible Tokens (NFTs) are virtual tokens that represent certificates of authenticity for unique and non-exchangeable digital assets that may or may not be linked to a physical counterpart. Relying on blockchain, NFTs benefit from the features of this technology, such as proof of ownership and traceability of the underlying assets, as well as various ways to manage them (e.g., buy, sell, use for different purposes) without relying on trusted third parties. Recently, many individuals, organizations, and corporations started NFT projects across a wide range

of industries and sectors, including but not limited to (virtual) real estate (Dowling, 2022b), certificates of various kinds, luxury goods and clothing (Joy et al., 2022), consumable goods, digital art (Whitaker 2019; Franceschet et al., 2021; Kugler, 2021), event ticketing (Regner et al., 2019) entertainment and catering.

A recent report by Grand View Research (2021) states that the market for NFTs is estimated to be \$20.44 billion in 2022, with a compound annual growth rate of 33.9% from 2022 to 2030, making it an increasingly interesting playground for organizations.

Although NFTs and blockchain technology offer a variety of new opportunities for organizations, NFT initiatives rely on information technologies, thereby requiring a range of activities and efforts related to information systems (ISs) and software engineering. The development of solutions that rely on blockchain technology (including NFTs) presents a number of challenges in addition to traditional information systems engineering. These include the steep learning curve behind such technologies, their immutable nature that makes it difficult or practically impossible to update faulty smart contracts or to modify/remove data once it is stored on the blockchain, and the lack of people with the necessary skills and knowledge (Amaral de Sousa et al., 2020). While it is important from a general perspective to ensure that information systems actually deliver value to various stakeholders is key, it is even more important for blockchain-based initiatives given the challenges and costs involved.

Value-based information systems engineering (Kujala and Väänänen-Vainio-Mattila, 2009) comprises a set of tools and methods that aim to make value considerations explicit throughout the development process to increase the likelihood that the system's goals will be achieved, which includes delivering the intended value to the stakeholders involved (Kujala and Väänänen-Vainio-Mattila, 2009). While the question of the value that an IS can bring depends on the point of view of the adopted

stakeholder, the value perceived by users is considered as one of the key elements because of its considerable influence on IS adoption behavior (Kujala and Väänänen-Vainio-Mattila, 2009). In the context of this research, we define users as the people or organizations receiving, buying, selling, trading, holding and otherwise using NFTs.

Considering this, from an ISs engineering perspective, it is critical to clarify the value that organizations intend to provide to their customers through NFT initiatives in order to develop and implement them accordingly. It will also help identify the NFT (and more broadly, the related systems') features that are the most important to consider in the design, development and evaluation process.

While a number of NFT projects seem to assume that NFTs necessarily deliver value to their users, this hypothesis has not been evaluated. Moreover, the failure of certain NFT initiatives suggests that the creation of an NFT in itself does not necessarily create perceived value. As Nansen (2022) shows, one-third of NFTs created are not profitable because they fail to capture user interest. A good example of this is the failed launch of Ubisoft's NFT. Amongst the 2250 created Ubisoft NFTs, only 15 were sold because the company failed to provide the right type of value to its community.¹

Most research on NFTs has been examined from a technical, legal, or economic perspective (Fairfield, 2021; Wang et al., 2021; and Bao and Roubaud, 2022). The few existing papers on the value of NFTs focused on the financial value and did not integrate other existing types of value such as hedonic, social or altruistic values, lacking a crucial viewpoint on the NFT specificities. Yet, from a marketing and ISs engineering perspective, while the financial value is certainly of importance, the value perceived by the users is a multi-faceted construct that includes a broader set of dimensions that are not covered in existing work.

The foregoing demonstrates the need for more in-depth research on the perceived value of NFTs created by organizations and how these organizations can manage their NFT development strategy with the goal of maximizing the value perceived by users. Therefore, we aim to extend existing NFT research by adopting the experiential perspective of customer perceived value in Holbrook (1999). We apply and adapt the original Holbrook framework to the specific case of NFTs. Our proposed framework provides

guidance for organizations to design value-delivering NFT initiatives, as well as a basis for further research on the perceived value of NFT buyers. To this end, we collected and analyzed a sample of 46 NFT initiatives led by organizations. We provide an overview of the categories of identified NFTs, of the activity sector of the issuing organizations as well as of the potential value that users or customers could perceive from them. The proposed analysis serves as a basis to identify opportunities to leverage NFTs to provide value, and to identify further research directions in this area.

After introducing our conceptual background and related work in Section 2, we describe the methodology used to collect and analyze NFT initiatives in Section 3. We then present our observations and show their implications in Section 4. Section 5 describes the limitations of our research, as well as avenues for further research. Finally, Section 6 concludes the paper.

2. Background and Related Work

2.1 Blockchain and Non-Fungible Tokens

Blockchain technology, developed in 2008 (Nakamoto, 2008), has increasingly been a source of technological innovation since then. This technology allows the decentralized management of assets in the form of tokens and has enabled the creation of numerous virtual currencies, such as Bitcoin or Ethereum, to name the most famous. In January 2018, William Entriken, Dieter Shirley, Jacob Evans, and Nastassia Sachs formalized a new standard, Ethereum Request for Comments 721 (ERC-721), which describes how to create non-fungible or 'one-of-a-kind' tokens on the Ethereum blockchain². ERC-721 provides the ability to manage, own, or trade NFTs³ on Ethereum and other blockchain platforms. Since then, other standards have emerged such as ERC-1155 for multi-tokens management.⁴

A NFT is thus defined as a "unit of data stored on a blockchain that certifies a digital asset to be unique and therefore not interchangeable, while offering a unique digital certificate of ownership for the NFT" (Evans 2019). Specifically, NFTs can take many forms in the eyes of their users: virtual clothing worn in the metaverse, tickets to access an event, digital counterpart of physical goods, etc. In this study, we

¹ <https://www.cointribune.com/en/columns/the-crypto-gaming-column/ubisofts-in-game-nfts-fail-making-only-400/>

² <https://ethereum.org/fr/developers/docs/standards/tokens/erc-721/>

³ <http://erc721.org/>

⁴ <https://ethereum.org/en/developers/docs/standards/tokens/erc-1155/>

define an NFT initiative as both the creation and launch of an NFT and the set of benefits that the NFT can provide to its users. In the NonFungible Corporation Annual Report (2021), NFTs are divided into 5 segments: Art, Collectibles, Video Games, Metaverse, Utilities, and Miscellaneous. Although NFTs were originally created on the Ethereum blockchain, they were quickly implemented on other blockchains for monetary reasons (Lounge, 2020) and these tokens can be used for marketing purposes (Chohan, 2021), fraud prevention and secondary market control (Regner et al., 2019), and as a financial diversification asset (Aharon and Demir, 2021), among others.

Due to the recent nature of NFTs and although these tokens are of great interest to both the scientific community and organizations, scientific research on the topic is still limited. The current literature focuses mainly on the financial aspects of NFTs, analyzing market shares and trading activities (Nadini, 2021), speculation (Sako, 2021; Wilson, 2021; Dowling, 2022b), financial returns (Aharon and Demir 2021), and market interactions (Ante, 2021; Dowling, 2022a; Dowling 2022b). Another important strand of literature addresses the technical aspects and characteristics of NFTs (Evans 2019), including their challenges (Wang 2021). Finally, other works highlight the impact of NFTs (Whitaker 2019; van Haften-Schick and Whitaker, 2021) or the opportunities (Wang 2021) in various fields such as art, gaming industry, virtual events, digital collectibles, and metaverse.

2.2 Value of NFTs

A widely accepted view on NFTs is that their main characteristic - scarcity - makes them extremely valuable assets (Chohan, 2021). The fact that NFTs are unique and that blockchain can help prove their uniqueness and ownership is also a key determinant of NFT users' perceived value (Dowling, 2022a). However, uniqueness alone does not guarantee popularity or success, as highlighted by the number of NFTs collection failures (Nansens, 2022).

As concluded in a correlation analysis between the popularity of NFT initiatives and their characteristics (Bouraga, 2021), the total supply of NFTs and the number of NFT holders appear as important considerations and are positively correlated with the success of the analyzed initiatives. The number of features that are provided beyond standards used for the underlying smart contracts (e.g. ERC-721 and ERC-1155) appears however as a less important success predictor. In order to have a broad range of users interested in receiving, buying, selling, holding

and trading NFTs, it is critical to deliver value to those users, through the designed initiatives, and in alignment with the issuing organization's goals.

Considering the importance of the value that NFTs can deliver to their users in order to ensure the success of NFT initiatives, and various dimensions composing the value that IS can deliver to their users (Kujala and Väänänen-Vainio-Mattila, 2009), further research is needed to better frame the value that NFTs can offer to (potential) users.

In order to address this issue, to conceptualize the value that NFT initiatives can offer to their users, we adopt a marketing perspective and use the value topology proposed by Holbrook (1999).

2.3 Perceived Value and Holbrook's typology

Creating customer value is at the heart of the marketing discipline definition (AMA, 2022). Indeed, a primary concern of marketers is to create and deliver superior value to achieve competitive advantage (Woodruff, 1997). A widely accepted definition of value is "the consumer's overall assessment of the utility of a product based on perceptions of what is received and what he is given." (Zeithaml, 1988). Among the various conceptualizations of value in marketing, Holbrook's (1999) approach is considered by many researchers to be one of the most attractive (Leroi-Werelds, 2019; Marinov, 2019). Holbrook, who is considered a "paradigm" in value research (Gallarza et. al, 2017), aimed to provide a "systematic and integrated approach" to conceptualizing value (Holbrook 1999, p. 3) by combining theories from different disciplines and adopting an holistic approach in his conceptualization. As such a holistic approach is considered to be valuable for organizations to design information systems delivering value, we believe that Holbrook's framework is particularly relevant for the present study.

According to Holbrook's definition, customer perceived value results from the interaction between a subject and an object (Holbrook, 1999). In other words, the value perceived by a customer depends on how that customer responds to the product/service and what the customer's goal is. To characterize the different types of value a customer may perceive, Holbrook created a typology along three main axes: self-oriented versus other-oriented, extrinsic versus intrinsic, and active versus reactive (see Figure 1).

| | | | |
|-----------------------|-----------------|-------------------|---------------------|
| | | Extrinsic | Intrinsic |
| Self-Oriented | Active | <i>Efficency</i> | <i>Play</i> |
| | Reactive | <i>Excellence</i> | <i>Aesthetics</i> |
| Other-Oriented | Active | <i>Status</i> | <i>Ethics</i> |
| | Reactive | <i>Esteem</i> | <i>Spirituality</i> |

Figure 1: Adapted from Holbrook (1999)

A perceived value is self-oriented when a customer aims to obtain value for himself and when he does not care about the reaction of others. For example, if a customer thinks a flower is beautiful, it has self-oriented value regardless of whether others think the flower is ugly. In contrast, a value is considered other-oriented when a customer perceives a value based only on the reactions of others. For example, if I buy a very expensive painting just to show my wealth, the value I perceive from the painting results from the admiration of others, it depends on others.

An object has extrinsic value when it is valued not for itself but for what it can help achieve. For example, money usually has extrinsic value because it is valued not for itself but for all the goods it can help to acquire. On the other hand, an object has intrinsic value when it serves no other purpose. A beautiful drawing, for example, can be purchased for itself without serving any other purpose.

An object has active value if the value results from the customer's use of the object. This means that the customer must voluntarily act on the object. For example, the value of a game arises only when the customer is playing. In contrast, an object has reactive value when the value does not require the customer to do anything. For example, a stock market investment has reactive value as long as the customer does not decide to sell it, a piece of art has reactive value because its very presence makes it beautiful.

3. Methodology

In order to analyze the potential value that NFT initiatives could provide to their users, we adopted a multiple case study research method (Robert, 2003). Considering the limited scientific literature on NFT initiatives in light of their recent character, we selected case studies and gathered data on them mostly from gray literature. Secondary data were collected from three main sources: (i) announcements of initiatives by

organizations retrieved through the Google search engine, (ii) NFT marketplaces such as opensea.io, and (iii) press articles about NFT initiatives retrieved through Google News. To build our final sample, we chose to exclude NFTs initiatives launched by individuals and only consider organization initiatives, as we aim to provide guidelines for organizations. In addition, we excluded initiatives that do not imply the creation of an NFT, such as NFT marketplaces. The final sample includes 46 NFT initiatives from 42 different organizations.

We adopted an interpretive approach (Kleins and Myers, 1999) to analyze the NFT initiatives across the sample of case studies. To ensure the reliability of our analysis, NFTs initiatives were analyzed by the three authors independently with rounds of concertation for managing and resolving differences. For each initiative, we collected the name of the organization, the industrial sector of activities of the organization, a short description of the initiative, the category of NFT (based on the classification proposed by NonFungible Corporation Annual Report (2021), as described in Section 1), whether an offline counterpart exists as well as the data sources and optional comments regarding the initiative. In addition to that, each of the authors proposed, based on his/her interpretation and attempting to be as broad as possible, a set of values (defined in Holbrook's typology) that each initiative can provide.

While this research methodology does not allow to draw definitive conclusions on the values that NFT initiatives can deliver, it provides a good basis for further studies, as discussed in Section 5.

4. Results

In this section, we describe our analysis of the case studies with Holbrook's lens on the NFT value. For transparency, the full dataset and analysis are accessible online.

4.1 Description of sample of NFT initiatives

In this subsection, we describe our sample of 46 organizations' NFT initiatives. First, the analysis of sectors of activity shows that slightly more than half of the sample (22 organizations, 52%) operate in the luxury industry, while the other 20 organizations (48%) target the general public (Figure 2).

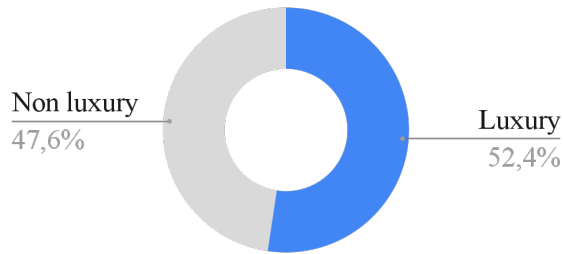


Figure 2. Proportion of luxury organizations

The most represented sectors were "Clothing and accessories" (43%), followed by "Sport and leisure" (24%), "Food and beverages" (21%), "Luxury cars" (7%) and "Health and beauty care" (5%) (Figure 3).

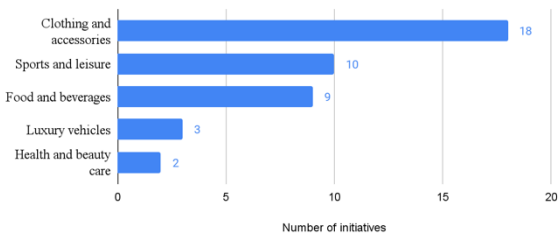


Figure 3. NFT initiatives sector distribution

Regarding NFT types, according to the classification of the NonFungible Corporation Annual Report (2021), 15 initiatives (33%) of our sample were "Art", 13 (28%) were "Collectibles", 10 (22%) were "Utilities", 5 (11%) were "Video Games", 2 (4%) were package containing NFTs from "Collectibles" and from "Metaverses" and 1 (2%) was only "Metaverses".

4.2 NFT Consumer Value Classification

In what follows, we classify and analyze our sample of NFT initiatives according to Holbrook's eight value types: efficiency, excellence, play, aesthetics, status, esteem, ethics, and spirituality.

Efficiency refers to the self-oriented, extrinsic, and active value type. In an NFT world, it could refer to the "*consumables*" i.e., NFTs whose holders can access an event or receive various prizes/products. They have value when used to obtain something else. The possibilities for gifts that a customer can receive thanks to an NFT are numerous. A first category of gifts is access to exclusive events, such as Guerlain granting its NFT holders access to the Vallée de la Millière. Second, the gifts may be highly personalized customer services, as in the case of Prada, Cartier or

LVMH. In addition, they could be VIP status or benefits during an event (faster entry, food and beverage vouchers, free merchandise) as at Coachella. It could also be physical goods, like the Lamborghini sculpture or the Coca Cola special edition refrigerator. In addition, NFTs can grant access to other NFTs, as in the case of Burger King, which allows owners of the three NFTs in its collection to purchase a fourth NFT, or priority in the purchase of other NFTs or tickets for real life events, as with Roland Garos.

Excellence refers to the self-oriented, extrinsic, and reactive value type. When a customer buys an NFT as a money placement, the "excellence" part of that NFT value is the price it has in the market. Until the customer sells the NFT, it remains a reactive, self-oriented extrinsic value type, a possibility of what can be obtained if the customer decides to sell it. Because of the inherent rarity and uniqueness of an NFT, most initiatives have "Excellence" value. In addition, some companies such as Prada, Cartier, or LVMH use NFTs as proof of authenticity or, like Alfa Romeo, as proof of quality. In this case, the customer buys the NFT as reinsurance for the value of the physical goods. We could therefore call the "excellence" values "*speculations*".

Play refers to the self-oriented, intrinsic, and active value type. While it might be trivial for some NFTs to be games or contain one, such as the Punks Comics book or Sorare's virtual soccer game, for some organizations the "play" value type is in the collection of NFTs themselves. For example, when a customer tries to own all the different NFTs in a given collection, a hunt, a game, is created that consists of finding the remaining NFTs. From this point of view, the acquisition of an NFT in a collection has a "play" value. In addition, some NFTs offer surprises, such as Gucci's crystal ball, where the customer does not know what the NFT is until after the purchase. Some virtual clothing NFTs also offer the ability to visualize the item in augmented reality, so customers can have fun trying it on virtually.

Aesthetics is also quite straightforward to translate in the NFT world, as it refers to the beauty of art, the self-oriented, intrinsic, and reactive value type. While many NFTs in the Art category carry "Aesthetics" value simply because of their beauty, some NFTs also enable customers to remember good memories, such as the NBA's "Top Moments," where the NFT shows some of the best moments from the league's games. We could therefore rename the Aesthetics category to "*Art / Memories*" for the specific case of NFTs.

Status or "impression management" refers to something that helps the customer make a good impression on others or be admired. It is the extrinsic

and active type of value directed toward others. The appropriate NFTs can be expensive clothing or accessories that we can display in the metaverse. Some initiatives also provide other ways for customers to show their possessions to others, such as the NBA user profile, where you can show all your NFTs to the community. When NFTs grant exclusive access to events, customers can explain the event to others and brag about the VIP status they received as a result.

On the other hand, esteem is the other-oriented, extrinsic and reactive value type. Holbrook describes this value type as the value that materialistic people can derive from highly desirable possessions. NFTs inherently have this characteristic of uniqueness, but some of them, such as those designed by famous influencers or designers like Balenciaga or Gucci, are designed to trigger this particular value type in the eyes of the customers. In an NFT world, "esteem" type of value is best represented as "*possession of rarity*".

Ethics is the other-oriented, intrinsic and active value type. It refers to the fact that a customer wants to positively influence the lives of others by doing a good deed. In the world of NFTs, this is often emphasized by companies in the form of charity donations where all the benefits of the NFTs sales are donated to *charity*.

Finally, spirituality is the other-oriented, intrinsic and reactive value type. A customer experiences a "spirituality" type of value when he or she can lose the sense of self. According to Holbrook's definition, it "involves a mystical disappearance of the self- other dichotomy in a manner that seems to merge the self with the Other". While the Other could be some God or Cosmic Force, in today's society it tends to take the form of a community with shared ideals. For example, Tomorrowland music festival aims to create a sense of belonging to a community of peace through music, and a customer might experience spirituality value while feeling they are closer to that ideal thanks to the festival. In an NFT world, it could refer to *belonging to a special community* by owning the NFT, such as the NBA community, the soccer community, or Coachella family.

On the basis of these observations, we propose to rename the types of value proposed by Holbrook with terms that are relevant for NFTs, as shown in Table 1.

| | | <i>Extrinsic</i> | <i>Intrinsic</i> |
|-----------------------|-----------------|----------------------|---------------------|
| <i>Self-Oriented</i> | <i>Active</i> | Consumables | Play |
| | <i>Reactive</i> | Speculations | Art / Memories |
| <i>Other-Oriented</i> | <i>Active</i> | Status | Charity |
| | <i>Reactive</i> | Possession of rarity | Community belonging |

Table 1. Adaptation of Holbrook perceived value framework to NFTs

Observing the distribution of the initiatives in the several types of value is also of interest. Table 2 summarizes our classification of NFT initiatives along the Holbrook framework.

| | | <i>Extrinsic</i> | <i>Intrinsic</i> |
|-----------------------|-----------------|--|---|
| <i>Self-Oriented</i> | <i>Active</i> | [1]; [3]; [8]; [9]; [10]; [11]; [12]; [13]; [14]; [15]; [19]; [20]; [23]; [27]; [29]; [30]; [31]; [37]; [38]; [42]; [43]; [44]; [45] | [1]; [8]; [10]; [11]; [12]; [13]; [15]; [19]; [20]; [23]; [24]; [25]; [31]; [34]; [35]; [36]; [37]; [40]; [44] |
| | <i>Reactive</i> | [1]; [2]; [3]; [5]; [6]; [7]; [8]; [9]; [10]; [11]; [12]; [13]; [14]; [15]; [16]; [17]; [18]; [19]; [20]; [21]; [22]; [23]; [24]; [25]; [26]; [27]; [28]; [29]; [30]; [31]; [32]; [33]; [34]; [35]; [36]; [37]; [38]; [39]; [40]; [41]; [42]; [43]; [44]; [45] | [1]; [3]; [4]; [6]; [7]; [8]; [9]; [10]; [11]; [12]; [13]; [14]; [15]; [16]; [17]; [18]; [19]; [20]; [21]; [22]; [23]; [24]; [25]; [26]; [27]; [28]; [29]; [30]; [31]; [32]; [33]; [34]; [35]; [36]; [37]; [39]; [40]; [41]; [42]; [43]; [44]; [45]; [46] |
| <i>Other-Oriented</i> | <i>Active</i> | [1]; [4]; [7]; [11]; [12]; [13]; [14]; [17]; [19]; [20]; [23]; [24]; [27]; [29]; [30]; [34]; [36]; [38]; [42]; [43]; [44]; [45] | [14]; [16]; [21]; [22]; [23]; [26]; [27]; [28]; [40]; [41] |
| | <i>Reactive</i> | [1]; [3]; [4]; [5]; [6]; [7]; [11]; [12]; [13]; [14]; [15]; [16]; [17]; [18]; [19]; [20]; [21]; [22]; [23]; [24]; [25]; [26]; [27]; [28]; [29]; [30]; [31]; [32]; [33]; [34]; [35]; [36]; [37]; [38]; [39]; [40]; [41]; [42]; [43]; [44]; [45] | [10]; [19]; [20]; [45] |

Legend: [1] Adidas, [2] Alfa Romeo, [3] Balenciaga (1), [4] Balenciaga (2), [5] Breitling, [6] Budweiser, [7] Burberry, [8] Burger King, [9] Clinique, [10] Coachella (1), [11] Coachella (2), [12] Coachella (3), [13] Coachella (4), [14] Coca-Cola, [15] Décathlon, [16] DKNY, [17] Dolce & Gabbana, [18] Dom Pérignon, [19] Football Clubs licensing Football Player Cards with SoRare, [20] Formula 1, [21] Givenchy (1), [22] Givenchy (2), [23] Grammys, [24] Gucci, [25] Gucci x SuperPlastic, [26] Guerlain (1), [27] Guerlain (2), [28] Havaianas, [29] Hennessy, [30] Lamborghini, [31] Louis Vuitton, [32] Marvel, [33] McDonald's, [34] NBA (1), [35] NBA (2), [36] Nike, [37] One to one Monaco (salon professionnel), [38] OTB Group, Prada Group, LVMH and Cartier (Richemont Group), Mercedes Benz, [39] Pepsi, [40] Quick, [41] Rayban, [42] Robert Mondavi (US Winery), [43] Roland Garros (1), [44] Roland Garros (2), [45] SuperBowl, [46] Ubisoft. *All references are cited in the dataset accessible online*⁵.

⁵ Pirnay, Lhorie; Deventer, Claire; Amaral de Sousa, Victor (2022), "NFTs organizations initiatives table", Mendeley Data, V1, doi: 10.17632/d6437wdc4w.1

Table 2. Classification of NFT initiatives features in Holbrook perceived value framework

The three most frequently represented values, as we have renamed them in Table 1, are "speculations", "art and memories" and "possession of rarity". This suggests that NFTs are still mainly considered as prestigious financial investments in artworks. These three value types are reactive, indicating that they require less effort to integrate the NFT into a broader interactive IT ecosystem such as a game, forum, or app than the NFTs providing active types of value. As it can be seen from the table, the value of an NFT is reactive in most cases. However, this could also indicate that NFT technology is still in its infancy and that there is still room for organizations to innovate and propose these types of integrations. The success of the NBA's Top Moments collection or the startup Sorare could be partly due to their ability to add more value with this part of interactivity.

We also observe that NFTs are most often valued for extrinsic reasons. This could mean that NFTs are still seen as a means rather than an end in themselves. NFTs alone may not be sufficient in the eyes of their users. While their high value on the market is the most common form of extrinsic value in our sample (speculations and possession of rarities), companies can gain a competitive advantage by offering gifts and benefits (consumables) or means to appear more active (status). On the other hand, organizations can differentiate themselves by investing in the intrinsic part of the value of NFTs, which is less of a focus. By adding more interactive and entertaining features, such as AR visualizations, or by focusing on creating a community with fair and ethical values that could be sustained through the exchange of NFTs. This suggestion should however be further investigated. Indeed, previous works suggested that the number of features of NFTs beyond basic features was not correlated with their popularity (Bouraga, 2021).

As shown in Figure 4, we find that the vast majority of initiatives offer many different types of value. However, very few initiatives manage to combine more than 6 types of value, suggesting that a trade-off should be made between developing value aspects of the NFT initiative and maintaining its consistency and relevance.

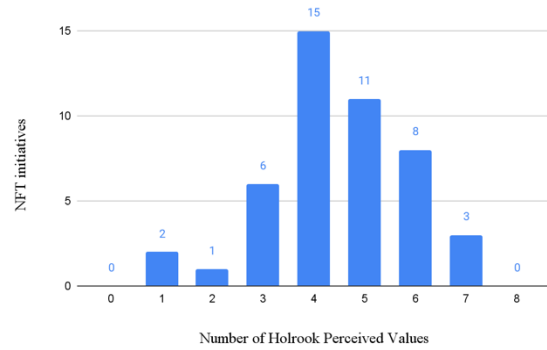


Figure 4. Distribution of the number of perceived values per NFT initiatives

5. Limitations and further research

In this study, we have gathered information on a number of NFT initiatives and analyzed, among other things, the value they could potentially provide. Although this preliminary value analysis can be used as a basis for further research directions, some associated limitations are worth mentioning.

A first limitation concerns the sample of NFT initiatives analyzed. The sample is not guaranteed to be representative of all NFT initiatives led by organizations. Therefore, we cannot generalize our findings with respect to the distribution of NFT initiatives across the identified categories and sectors. Further research could apply a more systematic approach to capture NFT initiatives in a more representative manner, or instead focus on specific categories or NFTs or sectors in their analysis.

A second limitation lies in the method used to analyze the NFT values. To describe how each NFT initiative could (potentially) provide value to its users, we relied on the subjective perceptions of the authors of the paper and discussions among them, trying to reach agreement and be as complete as possible. As a result, we cannot conclude that particular NFT initiatives actually provide the kinds of benefits described to their users. Because we have not interacted with the organizations that issued the NFTs we analyzed, we cannot assert that the types of value identified in our analysis are those that the issuing organizations intend to deliver. However, we believe that our analysis can serve as a basis for organizations to identify potential ideas on how they can use NFTs to provide specific types of value to their customers. We also advocate that further research involves the actual holders of NFTs to understand the value they derive from them and the actual organizations that issue the NFTs in question to understand the type of value they intend to deliver. Analyzing the extent to

which the two are aligned and how the value provided relates to the characteristics of NFTs and blockchain platforms are promising further areas of research that can help organizations develop successful and value-providing NFT initiatives.

Next, in our study, we took the point of view of the users of NFT initiatives and analyzed the value they can potentially derive from them. We analyze the question from the point of view of the spending organizations to see what kind of value they can get from NFT initiatives. This would help organizations design NFT initiatives that are well aligned with their value delivery and capture strategies.

As mentioned earlier, failed NFT initiatives can damage corporate reputations. In this context, another possible research direction would be to assess the risks associated with NFT initiatives and guidelines to mitigate them. While the research presented in this paper does not focus on the risks, it can provide initial insights to avoid the risk of creating NFTs that do not add value to the targeted users.

Last but not least, it is important to remember that NFT initiatives, although they may have physical or "offline" counterparts, are essentially digital initiatives that rely on information systems. Therefore, exploring the relationships between different components in information systems that incorporate NFT and blockchain platforms, and how they are integrated to provide an overall experience and value to users, is an interesting further research direction.

6. Conclusions

This study is one of the first attempts to analyze the value of NFT from the user's perspective, by incorporating multiple dimensions of this value, unlike previous work seldom incorporating other values than the financial one.

By analyzing a set of 46 NFT initiatives launched by organizations with a marketing perspective on the concept of *value*, we were able to propose a preliminary version of an adapted value framework based on Holbrook (1999) for NFT initiatives that includes eight types: *consumables*, *speculations*, *play*, *art and memories*, *status*, *possessions of rarity*, *charity* and *community belonging*. While NFT initiatives are identified by industry experts as an important trend to pursue, this study provides a common foundation for further research on NFT users' perceived value and value-driven design of NFT and of information systems involving NFTs. It also suggests avenues for further research in this NFT area, as detailed in the previous section.

7. References

- Aharon, D. Y., & Demir, E. (2021). NFTs and asset class spillovers: Lessons from the period around the COVID-19 pandemic. *Finance Research Letters*, 102515.
- Amaral de Sousa, V., Burnay, C., & Snoeck, M. (2020, June). B-MERODE: a model-driven engineering and artifact-centric approach to generate blockchain-based information systems. In *International Conference on Advanced Information Systems Engineering* (pp. 117-133). Springer, Cham.
- American Marketing Association (AMA) (2022). Definition of Marketing. Available at <https://www.ama.org/AboutAMA/Pages/Definition-of-Marketing.aspx>
- Ante, L. (2021). The non-fungible token (NFT) market and its relationship with Bitcoin and Ethereum. Available at SSRN 3861106.
- Bao, H., & Roubaud, D. (2022). Non-Fungible Token: A Systematic Review and Research Agenda. *Journal of Risk and Financial Management*, 15(5), 215.
- Bouraga, S. (2021, September). On the popularity of non-fungible tokens: Preliminary results. In *2021 3rd Conference on Blockchain Research & Applications for Innovative Networks and Services (BRAINS)* (pp. 49-50). IEEE.
- Chohan, U. W. (2021). Non-fungible tokens: Blockchains, scarcity, and value. *Critical Blockchain Research Initiative (CBRI) Working Papers*.
- Dowling, M. (2022a). Is non-fungible token pricing driven by cryptocurrencies?. *Finance Research Letters*, 44, 102097.
- Dowling, M. (2022b). Fertile LAND: Pricing non-fungible tokens. *Finance Research Letters*, 44, 102096.
- Evans, T. M. (2019). Cryptokitties, cryptography, and copyright. *AIPLA QJ*, 47, 219.
- Fairfield, J. (2021). Tokenized: The law of non-fungible tokens and unique digital property. *Indiana Law Journal*, Forthcoming.
- Franceschet, M., Colavizza, G., Smith, T. A., Finucane, B., Ostachowski, M. L., Scalet, S., & Hernandez, S. (2021). Crypto art: A decentralized view. *Leonardo*, 54(4), 402-405.
- Gallarza, M. G., Arteaga, F., Del Chiappa, G., Gil-Saura, I., & Holbrook, M. B. (2017). A multidimensional service-value scale based on Holbrook's typology of customer value: Bridging the gap between the concept and its measurement. *Journal of Service Management*.
- Grand View Research (2021). Non-fungible Token Market Size, Share & Trends Analysis Report By Type (Physical Asset, Digital Asset), By Application (Collectibles, Art, Gaming), By End Use, By Region, And Segment Forecasts, 2022 - 2030. Retrieved from: <https://www.grandviewresearch.com/industry-analysis/non-fungible-token-market-report>
- Holbrook, M. B. (1999). *Consumer value. A Framework for Analysis and Research*; Routledge: London, UK.
- Joy, A., Zhu, Y., Peña, C., & Brouard, M. (2022). Digital future of luxury brands: Metaverse, digital fashion, and non-fungible tokens. *Strategic Change*, 31(3), 337-343.

Kleins, H.K. & Myers, M.D. 1999, "A Set of Principles for Conducting and Evaluating Interpretive Field Studies in Information Systems", *MIS Quarterly*, vol. 23, no. 1

Kugler, L. (2021). Non-fungible tokens and the future of art. *Communications of the ACM*, 64(9), 19-20.

Kujala, S., & Väänänen-Vainio-Mattila, K. (2009). Value of information systems and products: Understanding the users' perspective and values. *Journal of Information Technology Theory and Application (JITTA)*, 9(4), 4.

Leroi-Werelds, S. (2019). An update on customer value: state of the art, revised typology, and research agenda. *Journal of Service Management*.

Lounge, T. W. (2020) Choosing the right blockchain for your NFT. Medium.

<https://medium.com/phantasticphantasma/choosing-the-right-blockchain-for-your-nft-d1df2bebae91> (Accessed 12 June 2022).

Marinov, M. A. (Ed.). (2019). *Value in Marketing: Retrospective and Perspective Stance*. Routledge.

Nadini, M., Alessandretti, L., Di Giacinto, F., Martino, M., Aiello, L. M., & Baronchelli, A. (2021). Mapping the NFT revolution: market trends, trade networks, and visual features. *Scientific reports*, 11(1), 1-11.

Nakamoto, S. (2008). Bitcoin: A peer-to-peer electronic cash system. *Decentralized Business Review*, 21260.

Nansens (2022). NFT Minting Behavior: What does the data teach us about the market? Retrieved from:

<https://www.nansen.ai/research/nft-minting-behavior-data>

NonFungible Corporation (2021) Yearly Report of 2021. Available online at <https://nonfungible.com/reports/2021/en/yearly-nft-market-report>

Regner, F., Urbach, N., & Schweizer, A. (2019). NFTs in practice—non-fungible tokens as core component of a blockchain-based event ticketing application.

Robert, K. Y. (2003). *Case study research: design and methods*. Sage Publications, Inc ISBN 0, 761(92553), 8.

Sako, K., Matsuo, S. I., & Meier, S. (2021, March). Fairness in ERC token markets: A case study of CryptoKitties. In *International Conference on Financial Cryptography and Data Security* (pp. 595-610). Springer, Berlin, Heidelberg.

van Haaften-Schick, L., & Whitaker, A. (2021). From the artist's contract to the blockchain ledger: New forms of artists' funding using equity and resale royalties. Available at SSRN 3842210.

Wang, Q., Li, R., Wang, Q., & Chen, S. (2021). Non-fungible token (NFT): Overview, evaluation, opportunities and challenges. *arXiv preprint arXiv:2105.07447*.

Whitaker, A. (2019). Art and blockchain: A primer, history, and taxonomy of blockchain use cases in the arts. *Artivate*, 8(2), 21-46.

Wilson, K. B., Karg, A., & Ghaderi, H. (2021). Prospecting non-fungible tokens in the digital economy: Stakeholders and ecosystem, risk and opportunity. *Business Horizons*.

Woodruff, R. B. (1997). Customer value: the next source for competitive advantage. *Journal of the academy of marketing science*, 25(2), 139-153.

Zeithaml, V. A. (1988). Consumer perceptions of price, quality, and value: a means-end model and synthesis of evidence. *Journal of marketing*, 52(3), 2-22.