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

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Abstract

Non-Fungible Tokens (NFTs) are digital certificates of ownership that can be attached to any virtual or physical asset. Recently, they have become increasingly popular, especially with the advent of metaverses, virtual spaces 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 and broader characteristics of the initiatives. This paper is a preliminary study to understand the value that organizations can attempt to provide through NFT initiatives. We examine 46 NFT initiatives from 42 companies by adopting an interpretive approach to provide a first overview. Based on our analysis, we discuss various elements on the design of NFT initiatives, and propose a research agenda.

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-interchangeable 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 NFTs initiatives 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, on which we focus in this paper.

Although blockchain and NFTs bring new opportunities, the launch of a NFT initiative, including the NFT and the physical or digital assets linked to it, is complex. Indeed, they come at a heavy cost, with particularly big challenges in the development of the information systems managing and/or interacting with the NFTs, and blockchain more generally (Amaral de Sousa et al., 2020). As the value organizations intend to provide to their customers via their NFT initiatives could play a key role in the design of these systems, it is particularly important to understand the different components of that value that will ultimately be perceived by users. The user perceived value is a key element in the success of NFT initiatives because of its considerable influence on information systems adoption behavior (Kujala and Väänänen-Vainio-Mattila, 2009).

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 a 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

As NFTs are new technologies, research on the topic is still limited. Most research on NFTs focus on the 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 initiatives specificities. Yet, from a marketing and information systems 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 represents a gap in the literature and 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.

In order to address this issue, we 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. 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, the activity sector of the issuing organizations as well as 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. After that, a discussion of the results is provided in Section 5. Section 6 describes the limitations of our research. Based on the discussion and limitations, we propose a further research agenda in Section 7. Finally, Section 8 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 Ether, 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

From a technical perspective, a NFT is 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). While the NFT itself is always digital, the underlying asset can be digital or physical. Examples include virtual clothing wearable in the metaverse, tickets to access to an event (online or in person), real estate buildings, real or digital cars, etc. A NFT initiative launched by an organization is therefore always composed of the NFT itself – the technical certificate – and a set of objects or services that go with it. In this study, as we focus on the user-perceived value, we investigate NFTs initiatives as a whole, considering that the value they can deliver does not only reside in the technical characteristics of NFTs but also in the products and/or services that are attached to the NFTs. We therefore refer to *NFT initiatives* as the development and launch of initiatives involving the use of NFTs. This vision is consistent with the “total” or “whole” product described by Levitt (1983) and McKenna (1985), who explain that to compete in the market, companies do not only offer a core product (NFTs in our case) but this core product augmented by side attributes and add-ons.

In the NonFungible Corporation Annual Report (2021), NFTs are divided into 5 segments: Art, Collectibles, Video Games, Metaverse, Utilities, and

¹<https://www.cointribune.com/en/columns/the-crypto-gaming-column/ubisofts-in-game-nfts-fail-making-only-400/> (accessed on 2022-09-22)

²<https://ethereum.org/fr/developers/docs/standards/tokens/erc-721/> (accessed on 2022-09-22)

³<http://erc721.org/> (accessed on 2022-09-22)

⁴<https://ethereum.org/en/developers/docs/standards/tokens/erc-1155/> (accessed on 2022-09-22)

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 financial diversification assets (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, research on the topic and in particular, on the value that NFTs can provide, 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 pieces of work 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, aligned with the issuing organization's goals.

Considering the importance to understand 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 information systems can deliver to their users (Kujala and Väänänen-Vainio-Mattila, 2009), further research is needed to better frame the value that organizations can offer to their (potential) customers with the help of NFTs.

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 typology proposed by Holbrook (1999) as a basis.

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, p.14). Among the various conceptualizations of value in marketing, Holbrook's approach (Holbrook, 1999) is considered by many researchers to be one of the most relevant (Leroi-Werelds, 2019; Marinov, 2019). Holbrook's framework, that 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 a holistic approach in his conceptualization. As there is limited knowledge and research on the value that NFTs can provide, adopting such an approach is particularly relevant for our objective to identify further research avenues.

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 is its goal. 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 Table 1).

Table 1: Adapted from Holbrook (1999, p.12)

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

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.

An object has an extrinsic value when it is valued not for itself but for what it can help achieve. Money usually has extrinsic value because it is valued not (only) for itself but mostly for what it can help to acquire or achieve. On the other hand, an object has an intrinsic value when it serves no other purpose. A beautiful drawing can be purchased for itself without serving any other purpose.

An object has an 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 a 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.

Due to the many technological novelties and new business practices since the creation of the original Holbrook framework, researchers highlighted the need to adapt the framework to reflect these advances (Leroi-Werelds, 2019) and propose new names and scope for the Holbrook original cases (Gallarza et al., 2017; Leroi-Werelds, 2019) with respect to the axis definition and the advances in today's society. In line with this, we propose in section 4 some adaptation of the framework to better suit NFTs characteristics.

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 help the latter. Investigating the differences (if any) with initiatives launched by individuals constitutes a lead for further research. In addition, we excluded initiatives that do not imply the creation of a NFT, such as NFT marketplaces. The final sample includes 46 NFT initiatives from 42 different organizations. In our collection and selection process, we did not follow a systematic procedure, which is a limitation in our study, as further discussed in section 6.

To categorize and analyze the selected initiatives, we first gathered, for each of them, the name of the originating organization, its sector of activities, a short description of the initiative, the category of NFT (based on the classification proposed by NonFungible Corporation Annual Report (2021), previously described in Section 1), whether an offline counterpart exists as well as the data sources and optional comments regarding the initiative. While most of these descriptive elements are quite objective, at the heart of our analysis lies an interpretive approach (Kleins and Myers, 1999) on the types of values that each initiative can provide, using Holbrook's framework. For this part, each of the authors separately reasoned about this question, and documented, for each value in the framework, whether, according to him/her the initiative could provide this kind of value and how, with a short explanation. After that, several rounds of concertation were organized so as to discuss the consolidation of the results, and resolving differences. The dataset, the objective characteristics of initiatives and the details of the analysis after majority consensus among the authors are available online (Pirnay et al., 2022).

The fact that the values identified are based on the researchers' points of view is an important limitation when it comes to evaluating the value perceived by customers. Indeed, it would be more relevant to involve a broader range of actual users, so as to draw more conclusive and representative results, as discussed in the limitations of the study. However, we believe that the proposed preliminary analysis can help identify opportunities for further research.

4. Results

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%) operates in the luxury industry, while the other 20 organizations (48%) target the general public.

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%) as presented in Figure 1.

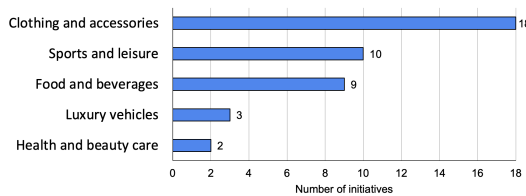


Figure 1. NFT initiatives sector distribution

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" (see Figure 2).

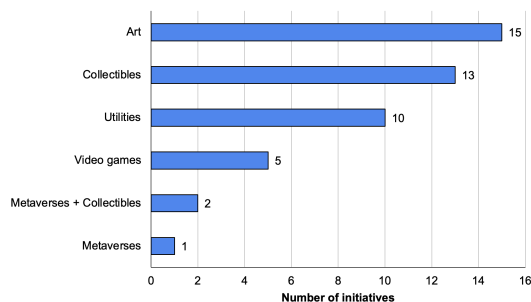


Figure 2. NFT initiatives classification

4.2 NFT customer value classification

In what follows, we classify and analyze our sample of NFT initiatives according to Holbrook's

eight value types, originally named efficiency, excellence, play, aesthetics, status, esteem, ethics, and spirituality. Consistently with recent work on value (Leroi-Werelds, 2019; Gallarza et al., 2017), we also propose some adaptations of the names of the value types to better match NFTs characteristics.

Efficiency refers to the self-oriented, extrinsic, and active value type. In a NFT world, it could refer to the "consumables" i.e., NFTs whose holders can access an event or receive various prizes/products. They hold value when used to obtain something else. The possibilities for gifts that a customer can receive thanks to a NFT are numerous. A first category of gifts are 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 done 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-Garros.

Excellence refers to the self-oriented, extrinsic, and reactive value type. When a customer buys a 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, as explained in the original Holbrook (1999) definition, excellence is a possibility of what can be obtained if the customer consumes or uses the object. In the case of NFTs, if the customer decides to sell the NFT, only then (s)he will get its money value. Before selling the NFT, this one carries excellence value, the potentiality of monetary benefits. Because of the inherent rarity and uniqueness of a NFT, most initiatives have "Excellence" value. In addition, 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 thus rename the "excellence" value as "speculations".

Play refers to the self-oriented, intrinsic, and active value type. While it might be trivial for some NFTs initiatives that are 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 NFTs in a given

collection, a sort of hunt, a game, is created that consists of finding the remaining NFTs. From this point of view, the acquisition of a 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 their VIP status 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 a 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" (Morris 1999, p.23). 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 a 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 2.

Table 2. Adaptation of Holbrook perceived value framework to NFTs

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

Observing the distribution of the initiatives in the several types of value is also of interest. Figure 3 summarizes our classification of NFT initiatives along the Holbrook framework.

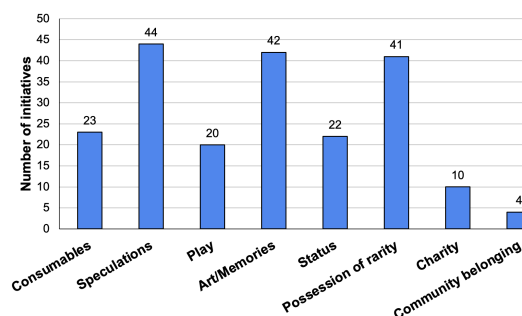


Figure 3. Distribution of the NFT initiatives among the framework's values

The three most frequently represented values, as we have renamed them in Table 2, are "speculations", "art and memories" and "possession of rarity". This suggests that NFTs are still mainly considered as prestigious financial investments in artworks. Further research could investigate if some inherent characteristics of NFTs, such as being non-interchangeable, can explain this distribution. 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 a 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 linked to extrinsic value types. 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 may 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.

As shown in Figure 4, we find that the vast majority of initiatives offer many different types of value. However, very few initiatives combine more than 6 types of value. While we cannot provide an indication of what the ideal number and what combinations are the most interesting, these could constitute further research opportunities.

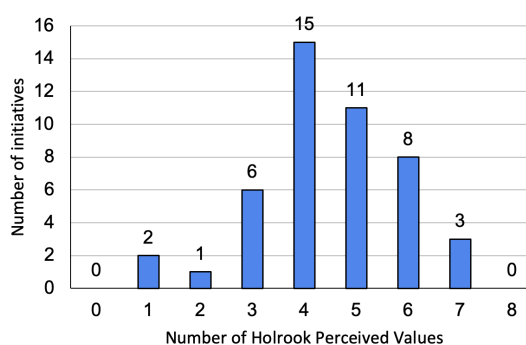


Figure 4. Distribution of the number of perceived values per NFT initiatives

5. Discussion

Throughout the value analysis presented in the previous section, we have made a number of observations that are worth discussing and may lead to further research directions. We structure the discussion around the 8 types of values considered in the adapted framework.

Starting with **Consumables**, we observe that the NFTs are mostly vouchers that allow the obtention of digital or physical gifts. In many cases, the gift is tied to the organization issuing it. If between the purchase and the usage of the voucher, the organization goes bankrupt or the event is canceled, the NFT has no more consumable value. Therefore, although the platform used to manage the vouchers/tickets is decentralized, the ability to realize the value is highly centralized, as it lies in the hands of the issuing organization.

Next, for the **Speculations** value, we observe that many NFT initiatives, directly or indirectly, carry some speculation value. This is not surprising as NFT are per nature unique assets. Similarly, Bouraga (2021) indicates a correlation between the supply of NFTs issued and the success of the initiative.

Looking at the **Play** value type, we notice that the platform on which the NFTs run plays a critical role. This is indeed the platform that allows the NFT users to play games. When NFTs are per nature decentralized, this study highlights that the platforms are often linked to a single organization (ex. NBA).

Concerning the **Art/Memories** value type, it is interesting to notice that many analyzed initiatives use a digital piece of art to deliver this value. However, those creations can mainly be accessible and shared with everyone thanks to a simple screenshot. This questions the viability of NFT initiatives aiming only at delivering Art/Memories type of value. A solution might come from platforms such as metaverse or virtual worlds that allow the display of NFTs. If the NFT is a digital piece of art that can only be seen through metaverses, then the relevance of an “art only” NFT initiative is reinforced.

The **Status** and **Possession of Rarity** values come from the ability of others to acknowledge one’s possessions. Once again, the platform built on top of NFTs plays a critical role, especially for digital art. Without a dedicated platform, NFTs are merely records in a database proving ownership. They are not very visible and it is hard to show to others our possessions.

For the **Charity** value, the initiatives of our sample propose to use the funds raised through the sale of the issued NFTs for charity and good causes.

In most cases, the fundraising is done only through the initial sale of the NFT. An interesting possibility to investigate is the extension of the fundraising beyond initial sale. The Ethereum Improvement Proposal EIP-2981⁵ proposes a standard for NFTs with royalties, in which a percentage of each sale (beyond the initial one) is sent to a specific receiver. With such a standard, each resale of the NFT will provide royalties to the charity, further increasing the charity value at the same time.

Concerning **Community Belonging** value type, no initiatives in our sample mentioned the ideas traditionally attached to blockchain: decentralization and independence. It could be interesting to investigate from the user point of view if these ideas are important and if they might somehow create a “NFT community” feeling.

We also believe that, despite the community belonging value a NFT can create, it is important to remain consistent with the brand positioning. For instance, using a blockchain relying on the Proof-of-Work algorithm consensus, which is consuming a lot of energy, is not consistent with a brand that wants to embed ecological values.

6. Limitations

In this study, we have gathered information on a number of NFT initiatives and analyzed, among other things, the user perceived value they could potentially provide, following an interpretive approach. 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, as we did not follow a systematic procedure for the collection. 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, NFTs or sectors.

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. A broader set of actual users should also be involved in the evaluation of the initiatives.

7. Research agenda

Additionally to the research direction mentioned in the previous discussion, this section presents a research agenda of five research avenues.

7.1 Extended, more systematic analysis

Our paper presents a preliminary study analyzing organizations' NFT initiatives. Generalization of our conclusions is limited based on the data collection conducted in this article. We propose to expand our study using a more rigorous methodology to generalize our findings. For example, a more systematic research methodology could allow exploration of the sectors missing from this article, or deep dive in a specific sector. NFTs can also have an impact in other sectors than those analyzed in this article, such as education (see, for instance, Zao and Si, 2021 or Onete et al., 2022), healthcare (see Musamih, 2022) or real-estate (see Moringiello, 2022) among others. Another possible extension to this research is to analyze the NFT initiatives offered by individuals, which were not discussed in the present paper.

7.2 Analysis of the (mis-)alignment between the intended and perceived value

We also advocate that further research may involve NFTs holders to investigate the value they actually derive from the initiatives and survey organizations that issue NFTs to highlight the types of value they actually intend to deliver. This would help organizations to design NFT initiatives that are well aligned with their value delivery and capture strategies. 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 actually intended to deliver. Analyzing the extent to which the two are aligned is crucial as failed NFT initiatives can damage corporate reputations. Another aspect worthy of investigation is the value co-creation (Leclercq et al, 2016). What about NFTs co-created by the customers with the issuing organization ?

⁵ <https://eips.ethereum.org/EIPS/eip-2981> (accessed on 2022-09-22)

7.3 Importance of the ecosystem around the NFT initiatives

As mentioned in the result and discussion section, the value that NFTs can provide is often dependent on platforms built on top of them. This suggests that these platforms and their socio-technical aspects are important to consider when designing NFT initiatives. The decentralized character of blockchain and NFTs enables new initiatives to plug into existing ecosystems or communities. It also implies that new ecosystems or communities can be created and later on bring on new contributions and partners, reinforcing the overall value that a NFT initiative can provide.

From an information systems engineering perspective, especially as blockchain entails particularly complex challenges, it is important to think not only about the creation and management of the NFTs per se, but also on the integrations that are required with other systems present in the ecosystem.

7.4 Optimal design of NFTs initiatives

Despite the fact that our study is still preliminary, it already highlights the complexity and subtleties of the design of a compelling NFT initiative. Further research can investigate the optimal number and combinations of value types an organization wants to provide, which value types are the most interesting and, last but not least, how to provide a specific value type clearly and efficiently. For example, it could be interesting to investigate how the integration of some particular technologies such as augmented reality in NFTs initiatives can influence the different value types. The question of designing NFTs that provide particular value types is a meaningful avenue for further research.

8. 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.

9. 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*, 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)*, 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.
- Leclercq, T., Hammédi, W., & Poncin, I. (2016). Ten years of value cocreation: An integrative review. *Recherche et Applications en Marketing (English Edition)*, 31(3), 26-60.
- Leroi-Werelds, S. (2019). An update on customer value: state of the art, revised typology, and research agenda. *Journal of Service Management*.
- Levitt, Theodore (1983). *The Marketing Imagination*. Simon and Schuster. p. 78. ISBN 9780029190906.
- 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.
- McKenna, Regis (1985). *The Regis Touch*. Addison Wesley. p. 84. ISBN 0201139642.
- Moringiello, J. M., & Odinet, C. K. (2022). *Blockchain Real Estate and NFTs*. William & Mary Law Review, Forthcoming, U Iowa Legal Studies Research Paper, (2022-16).
- Morris, B. (1999). *Consumer value: A framework for analysis and research*.
- Musamih, A., Salah, K., Jayaraman, R., Yaqoob, I., Puthal, D., & Ellahham, S. (2022). *NFTs in Healthcare: Vision, Opportunities, and Challenges*. IEEE Consumer Electronics Magazine.
- 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.nansens.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>
- Onete, C. B., Năstase, I. A., Felea, M., & Dina, R. (2022) The Potential of Non-Fungible Tokens (NFTs) in Higher Education as Perceived by Romanian Students. In *BASIQ 2022 International Conference on New Trends in Sustainable Business and Consumption*
- Pirnay, Lhorie; Deventer, Claire; Amaral de Sousa, Victor (2022), "NFTs organizations initiatives table", *Mendeley Data*, V1, doi: 10.17632/d6437wdc4w.1
- 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 Haften-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.