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Determinants of the purchase intention of non-fungible token collectibles

Marius Arved Fortagne [ORCID] | Bettina Lis

General Business Administration, University of Bayreuth, Bayreuth, Germany

Correspondence
Marius Arved Fortagne, General Business Administration, University of Bayreuth, Universitaetsstrasse 30, 95447 Bayreuth, Germany.
Email: marius.fortagne@uni-bayreuth.de

Abstract

Disrupting the concept of ownership in the digital space, non-fungible tokens (NFTs) have created unprecedented market opportunities and captivated millions of investors. Characterized by artificial scarcity and ensured authenticity, the technical implementation establishes novel parameters for digital ownership and collecting, underscoring a research gap where the determinants of consumer behavior are yet to be studied. This paper presents a research model based on the Stimulus-Organism-Response (SOR) model to investigate consumers' purchase intention of NFT-based collectibles (NFTC) for the first time. To develop our model, we identified distinctive NFTC features (functionality, scarcity, aesthetics, and price value) and blockchain characteristics (security and privacy) affecting the utilitarian and hedonic attitude towards NFTC and finally shape NFTC purchase intention. For empirical validation, we conducted an online survey among an NFT-interested target group (N = 356) and analyzed the results by structural equation modeling with SPSS Amos. Findings indicate that the utilitarian attitude toward NFTC is affected by perceived functionality and price value from the product side, and perceived blockchain security and privacy from the technology side. The hedonistic attitude toward NFTC is shaped by perceived functionality, scarcity, and aesthetics. Both attitudes, utilitarian and hedonistic, demonstrate a significant impact on purchase intention. A subsequent mediation analysis confirms that NFTC and blockchain characteristics have an indirect effect on purchase intention. In the under-investigated interface of blockchain technology, digital ownership, and consumer behavior, this work enriches the digital ownership discourse by demonstrating how NFTC create consumer value through product and technology features.

1 | INTRODUCTION

In times when blockchain technology and crypto currencies are available to major parts of the world population, non-fungible tokens (NFTs) have emerged to challenge traditional ownership structures. NFTs can be defined as "a representation of a unique digital asset that cannot be equally swapped or traded for another NFT of the same type" and which is publicly registered on a blockchain (Popescu, 2021, p. 26). Digital assets are almost any content that can be represented by source code. This includes, but is not limited to, images, video, music, books, e-mails, academic papers, social media postings, and so on (Kanellopoulos et al., 2021). In March 2021 the ownership of the first-ever Twitter post was acquired for US $2.9 m (Park et al., 2022). The digital assets are deposited on a blockchain and thus stored

uniquely. Each correctly generated NFT and its owner can thus be verified by a tamper-proof entry on the blockchain (Park et al., 2022). While crypto currencies, similar to fiat currencies, are exchangeable, each NFT has individual characteristics that mark it as non-fungible (Kanellopoulos et al., 2021). Through this fuse mechanism, researchers have assigned NFTs a revolutionizing role for the concept of ownership and a disrupting impact on several industries, such as gaming, media and arts (Popescu, 2021). For example, NFT ownership, from the NFT creator to the current owner, is transparent through the historical entries on the blockchain. Hence, costly gatekeepers and market powers, such as retailers, galleries, curators, and auctioneers, are replaced by the decentralized consensus protocol from the network participants (Malik et al., 2022). Furthermore, NFT structures allows ownership rights to be divided into smaller fragments, so that many market participants can secure (partial) ownership of valuable objects (Park et al., 2022).

Vendors with multi-faceted digital platforms provide NFTs for acquisition, ownership, and trading. In 2024, NFT investment volume is predicted to reach approximately US $2.2 b, up from US $656 m in 2021 (Statista, 2023). This increase can be attributed to the progressive adoption of crypto currencies, new trends in pop culture, and a digital investment boom. Furthermore, high market volatility, less complex barriers to entry, and investors' search for speculative assets drove the transaction numbers and prices of NFTs (Baker et al., 2022). Despite initial enthusiasm, some NFT projects have experienced decreased interest leading to market volatility, price drops, and declining market volume (NonFungible, 2023). Additionally, concerns have been raised regarding the environmental impact of energy-intensive blockchain networks used in NFT transactions (Ali et al., 2023) as well as unclear regulations and taxation (Fairfield, 2022). Despite these challenges, the NFT market remains dynamic, attracting new investors and established players who seek innovative opportunities for digital ownership in varying use cases (Wu et al., 2023). By considering the evolving landscape of the NFT market, our study aims to contribute valuable insights into consumer purchase intention within this complex domain.

The collectibles sector has emerged as the largest use case of NFTs for consumers, showing the willingness of people to invest money and time in NFTs (Baker et al., 2022; Wu et al., 2023). Collectibles are defined as "an object that people collect as a hobby or an investment" (Cambridge Dictionary, 2022). The first NFT-based collectible (NFTC) was registered on a blockchain and traded between consumers in 2017. By now, numerous well-known companies have released their own NFTC, including Disney, McDonalds, Nike, and professional sports franchises. For the most part, NFTC distribution is carried out on secondary markets. Digital marketplaces, such as OpenSea and Rarible, enable NFTC creators, owners, (re)sellers, and buyers to interact. Especially in the art and gaming industries, the field of NFTC has grown immensely (Bao & Roubaud, 2022; Valeonti et al., 2021).

Therefore, NFTC represent a paradigmatic use case of blockchain technology, where entire industries, such as artworks and collectibles, are augmented by a digital space (Malik et al., 2022). Accordingly, focusing on collectibles within the NFT and crypto space allows for an exploration of the unique benefits and challenges that arise when applying blockchain technology to a traditional market. Here, ownership of digital works can be distinctly documented on the blockchain, while the supply can be artificially limited to a certain edition (O'Dwyer, 2020). Thus, NFTC solve the previous challenges of digital collecting, namely scarcity and authenticity (Mardon & Belk, 2018), and might constitute a game changer for the lively discussion on the value of digital products among theorists (Belk et al., 2022).

Researchers have focused on conceptual work to point out the challenges and opportunities NFTs pose for advertisement (Joo et al., 2022; Peres et al., 2022) or brand value (Colicev, 2022). The majority of existing studies on the consumer perspective focus on explorative and qualitative study designs that show the high potential for companies, consumers, and platforms (Bao & Roubaud, 2022; Chohan & Paschen, 2021; Mardon et al., 2022; Wang et al., 2021). Addressing the purchase intention as a central component of consumer behavior can help producers, distributors, and digital platforms to establish a consistent future market (Morwitz, 2012). However, a quantitative examination from an academic perspective has been lacking (Bao & Roubaud, 2022; Wu et al., 2023). Given the future potential and disruptive nature of NFTs to traditional ownership, our work strives to narrow this gap by answering the following research question. *Which factors determine the purchase intention of non-fungible token-based collectibles?*

Due to their novelty and technical complexity, NFTC provide a variety of stimuli that might impact consumer behavior. While some people might buy NFTC as an investment, others want to enjoy the artistic aspect, invest due to fear of missing out (FOMO), or hope for future usefulness in metaverses. We therefore propose a research model which is built on the Stimulus-Organism-Response (SOR) model by Mehrabian and Russell (1974). The SOR model has been widely used to explain consumer decisions in related digital contexts, particularly for products with visual features and infrastructural dependencies, which represent important properties of NFTC (Aw et al., 2021; Eroglu et al., 2003). By employing the SOR model, we can integrate distinct stimuli relevant to NFTC purchase intention, thus seeking to gain nuanced insights into its composition (Belk, 1995; Lee & Yun, 2015). By investigating NFTC with an established consumer behavior framework, we present a pioneer work on this novel and disruptive environment, upon which future studies can build. With one of the few quantitative consumer-focused studies in the field of blockchain and NFTs, we aim to verify previous conceptual research and unite their varied focuses in one research model. Furthermore, we contribute to the vivid discussion on digital ownership. Since NFTC provide artificial scarcity and ensure authenticity, the prerequisites for value creation from digital collecting are met (Mardon & Belk, 2018). The advent of NFTC therefore enables us to enrich the body of research on digital ownership with novel insights on how to create consumer value from purely digital goods. In this regard, we confirm significant product and technology-related stimuli that elicit hedonistic and utilitarian attitudes toward NFTC and thus shape purchase intention. Given the intangibility of NFTC and the option to

copy, that is, NFT artwork from the Internet (without rights) instead of buying it, this represents a concise finding for digital ownership research.

2 | THEORETICAL BACKGROUND

2.1 | Disrupting digital ownership and collecting with NFTs

Digital products have become omnipresent parts of our lives and revolutionized the way people possess goods (Belk, 2013). Purely digital products lack tangibility and sensory cues, making it more difficult for consumers to evaluate their quality and utility (Denegri-Knott et al., 2013). In addition, digital products are easily copied and distributed, which raises issues of piracy and intellectual property protection. Yet, digital products also offer unique advantages, such as immediacy, interactivity, and customization, that can enhance consumer engagement and satisfaction (Mardon & Belk, 2018). Therefore, understanding how consumers perceive, evaluate, and use digital products is crucial for marketers and researchers alike.

Due to the characteristics of digital goods, the question of their ownership has moved to the forefront of consumer research. Possession can be fragmented, temporary, or dependent on the underlying software (Denegri-Knott et al., 2020). According to several studies, tangible goods tend to provide a greater feeling of ownership and value than digital ones (Atasoy & Morewedge, 2018; Morewedge et al., 2021). Nonetheless, other researchers found that despite the absence of physicality, digital products are still seen as substantial and of emotional value for the owner (Belk, 2013; Denegri-Knott et al., 2013). As described later, NFTs contribute disruptively here to manifesting ownership in the digital space, making our research an important contribution to the ongoing discussion on digital ownership.

Within this research field, digital collectibles are of particular relevance. Collectibles, in the traditional understanding, are objects of a "process of actively, selectively, and passionately acquiring and possessing things removed from ordinary use and perceived as part of a set of non-identical objects or experiences" (Belk, 1995, p. 67). At first glance, digital collectibles lack decisive features through which collecting becomes meaningful, such as travelling to distant vendors or evidencing the object's history. Accordingly, researchers found that digital collecting lacks a number of traditional collecting's enjoyments (Watkins et al., 2015). However, Mardon and Belk (2018) demonstrated that the pleasure of collecting in the digital space, as in computer games, is fostered by creating artificial elusiveness and object authenticity.

NFTs satisfy the demand for digital collectability since the underlying blockchain technology provides an unalterable record of ownership and origin. Thus, the technical implementation of NFTC opens a research gap in the literature on digital ownership. Our study aims to address this gap by investigating how digital, intangible NFTC create utilitarian and hedonic consumer value.

To narrow the wide field of NFTC, we focus on digital artworks as they represent a growing market that is an impactful use case of blockchain technology potentially disrupting creative industries (Malik et al., 2022). Our notion of digital artworks includes complex fine art, as well as simple comic works, both of which enjoy popularity in the NFT scene (Belk et al., 2022). For example, the "Bored Ape Yacht Club" is a famous NFTC collection of 10,000 different monkey head images, each of them varying in expressions or accessories. With the purchase of a "Bored Ape" the intellectual rights to the image are transferred to the buyer, including the right to derive new goods from it (Zhang, 2022). Many owners see NFTC as having promising applications in games, videos, and in metaverses. We thereby demarcate our work from other NFT use cases, such as, virtual land ownership in metaverses, gaming implementations, or music rights (Nadini et al., 2021). Answering the call of Belk et al. (2022) to further investigate NFT-based ownership, our study provides a more comprehensive and detailed understanding of how digital collectibles are disrupting traditional perceptions of ownership and originate value for potential buyers.

2.2 | SOR model in the digital realm

The willingness to pay for a particular NFTC depends on the individual buyer rather than the common belief of future value (Zhang, 2022). Studying the composition of NFTC purchase intention therefore contributes to understanding consumer behavior in this new product category. The SOR model has been widely used to explain customer buying decisions in the digital space (Wang et al., 2023). It is particularly suitable for products where visual features are used to evoke effects in the potential buyer, but where there are also infrastructural dependencies, for example, in the form of presentation, or platform operation (Aw et al., 2021; Eroglu et al., 2003). Furthermore, the model has proven to be meaningful for questions that address the lack of product tangibility (Silva et al., 2021). NFTC provide a wide range of possible stimuli, from visual appearance to technical implementation and a functionality that, in some cases, might uncertainly be applied in the future. From this reasoning, we consider the SOR model as fruitful base for building our research model.

The SOR model was originally developed by Mehrabian and Russell (1974) to explain the human decision process. Accordingly, this process links observable stimuli from the environment (S) to internal processing within the human organism (O) to finally obtain an observable response (R). In consumer behavior research in the digital space, external stimuli frequently comprise advertising, product features, or the purchase infrastructure (Gatautis et al., 2016; Zhu et al., 2020). To transfer this to our investigation, the stimuli will be represented by product characteristics as marketing stimuli and the underlying technology as the infrastructural environment. Hence, we will elaborate specific product (NFTC) and technology (blockchain) features in the following chapters.

In previous studies, the SOR model has proven its value for explaining consumer behavior in related digital settings. Chen and Yao

(2018) used it to explain impulse buying at online auctions. Yin and Qiu (2021) demonstrated on a SOR basis how marketing with artificial intelligence influences purchase intention in online shopping. Likewise, technological characteristics were taken as stimuli that produced a utilitarian and hedonistic value in the organism. Using the SOR model, Zhu et al. (2020) showed that website security has a strong influence on online purchase. Especially in virtual environments, technical implementations are among the stimuli studied (Gatautis et al., 2016). For this, Laroche (2010) suggests expanding the stimuli side towards components of technology acceptance, such as usefulness. In Baker et al.'s (2022) overview paper on NFT research fields, the authors call for an examination on the basis of established models of consumer research. NFTC represent new and disruptive stimuli in the digital collectibles market. By using the SOR model, we can explore how this new stimulus affects consumer perceptions, emotions, and behavioral responses. In the light of our research question, we consider the SOR model to be ideally suited and draw on its structure for our research model. Thereby, our model will be among the first to apply the SOR model to explain consumer behavior for blockchain-based technologies.

The motives that lead people to purchase (traditional) collectibles were found to cover rational and emotional components (Batra & Ahtola, 1991; Dickie et al., 1994). On the one hand, buyers see collectibles as an investment with the potential for future profit as part of a diversified investment strategy (Dickie et al., 1994). On the other hand, possession triggers an emotional satisfaction (Belk, 1995). Accordingly, our research context particularly reflects the organism's bifurcation of internal processes between utilitarian and hedonistic evaluation. In our model, the organism processes will therefore be represented by the utilitarian and hedonic attitude towards NFTC. For this, we refer to Eagly and Chaiken (1993, p. 1), who define attitude as "a psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor." The utilitarian dimension defines the usefulness of an object, while the hedonic dimension describes the emotional state associated with the object (Lee & Yun, 2015). Particularly, the purchase intention, defined as the "preference of consumer to buy the product or service" (Younus et al., 2015, p. 9), has been frequently examined as an SOR outcome construct and will be implemented as our dependent variable.

2.3 | Product stimuli from non-fungible token-based collectibles

NFTC transfer the phenomena of collecting into the digital world on the technical basis of blockchain technology. In this context, Valeonti et al. (2021) analyzed the opportunities and risks for museums and galleries to transfer their collections to NFT assets. Accordingly, NFTC represent a promising source of funding, whereas their speculative nature poses a risk of exploitation. Due to its short existence period, Park et al. (2022) classify NFT users as in the "early adopters" stage of Rogers's (1995) Innovation Diffusion Theory. With our study, we extend theoretical and qualitative studies by testing whether previous

findings stand up to a larger sample. Therefore, the following literature review on NFTC aims to identify distinctive NFTC characteristics that could serve as purchase stimuli for consumers in terms of the SOR model.

Particularly in the digital space, the question of a product's functionality arises due to its intangibility (Spears & Yazdanparast, 2014). The functional dimension reflects the consumer's perception of a product's ability to fulfill its purpose (Bloch, 2011). When examining an innovative technology, functionality or usefulness are regularly named as strong adoption drivers (Venkatesh et al., 2012). Initial studies considered NFTC with a focus on their function as investment objects with the prospect of future profits. For example, Pinto-Gutiérrez et al. (2022) showed that expected Bitcoin and Ethereum returns significantly influence the attention buyers paid to NFTs. Ko et al. (2022) proved, that NFTC can be part of a diversified portfolio, since their prices are not correlated to traditional investment assets. Kapoor et al. (2022) looked at the impact of social media activities on NFTC value and found projects with social media support achieved a significant increase in prices. Kampakis and Schaar (2022) examined price-determining variables of the famous NFTC collection "CryptoPunks," which generated an average monthly return of 34% from 2018 to 2021. In particular, scarcity and the low correlation with other asset classes had a positive effect on prices. Kanellopoulos et al. (2021) investigated how the introduction of basketball trading cards as NFTC affected their physical collectible counterparts. They showed that physical collectibles prices decrease by about 5%, and buyers' willingness to pay decreases by about 10%. In addition to the financial investment, NFTC have various other functions. In the case of NFTC as artworks, this can also represent an attachment to the art and a tie with the artist (Vasan et al., 2022). Other common NFTC use cases include access to exclusive communities, participation in competitions, use as a ticketing system, use as a payment system, and dematerialization of the real world (Park et al., 2022; Wang et al., 2021). NFT adopters also expect to equip own metaverse avatars with the NFTC in the future (Belk et al., 2022). Given the wide range of NFTC applications, we will draw on the construct of *perceived functionality* for our research model.

As next, natural scarcity of collectibles can result in a positive attitude and increased purchase intention (Wu et al., 2012). For our case, scarcity refers to the consumer's perception of a product's limited availability due to demand outstripping supply or planned supply restrictions (Ku et al., 2013). According to Becker (1991) perceived scarcity is part of social influence, which strongly shapes human decisions and is also part of the environmental stimuli in terms of the SOR model. Likewise, John et al. (2018) demonstrated that people preference scarce goods in the presence of competitors due to FOMO. The FOMO effect is more prominent when the value of the good is uncertain (John et al., 2018). FOMO was regularly linked to the NFT hype in 2021 and will therefore find consideration in our study within the scarcity perception. For NFTC, cryptographic technologies are used to artificially restrict what are otherwise unlimited digital products (Valeonti et al., 2021). This enables the development of limited collections that make NFTs unique. In addition to the opportunity to control

and issue a digital good, authentication of originality can thus also be assured (O'Dwyer, 2020). Mekacher et al. (2022) found that the rarer an NFT, the higher the price and less frequent the trading. Within artwork collections, some traits are rarer than others on individual images. For the "CryptoPunks" collection, researchers Kampakis and Schaar (2022) showed that earrings, for example, are not as rare of an attribute as a cap. They found that the rarity of the attributes alone contributes to a higher price, without these traits differing much in aesthetics. We therefore expect the purchase of NFTC to also be influenced by scarcity, which is why we integrate the construct *perceived scarcity* into the research model.

Nadini et al. (2021) analyzed the characteristics of several leading NFTC marketplaces and found that traders are mostly specialized and have close relationships with traders merchandizing the same type of NFTC. Further, collections of NFTC are closely related in their visual characteristics. Since many collections have the same technology, pricing, and functions, only the visual appearance ensures the differentiation between NFTC. Product aesthetics has been confirmed as driver for the purchase intention of traditional, tangible collectibles and can be defined as the perceived appearance and beauty of a product (Bloch, 2011; Zolfagharian & Cortes, 2011). Accordingly, if we look at the NFTC collections "CryptoPunks," "CryptoKitties," and "Bored Ape Yacht Club" visual standouts, such as bright colors and comical content, are directly present. There are also digital artworks that contain more detailed images with higher artistic standards and a significant amount of creation work, which are more rewarding to look at (Belk et al., 2022; Malik et al., 2022). Therefore, we will include the *perceived product aesthetics* into our research model.

Especially due to the crypto hype in 2021, price is also the focus of attention. As with traditional collectibles, consensus on price is formed by resale on secondary markets: in this case, online platforms. However, the individual buyer has little indication of the true value of the NFTC, as they are limited and not comparable. Dowling (2022) showed that NFT pricing is linked to the pricing of crypto currencies. This is also evident in the strong price volatility that characterize well-known NFTC collections (Kampakis & Schaar, 2022). In these cases, where the price is variable and the value is subjective, consumer behavior research refers to the price value construct (Dodds et al., 1991). In line with this approach, we refer to Venkatesh et al. (2012), p. 161) defining price value as the "consumers' cognitive trade-off between the perceived benefits of the applications and the monetary cost for using them." Due to NFTC's immateriality, the price value is considered to play a decisive role in the purchase process. Accordingly, the *perceived price value* is included in the research model.

2.4 | Environmental stimuli from blockchain infrastructure

The important element in enabling the disruptive impact of NFTC on digital ownership is the underlying technology. By using a decentralized ledger, blockchain technology ensures that ownership information is stored and verified in a tamper-proof and permanent manner,

which eliminates the need for intermediaries or central authorities (Tan & Saraniemi, 2022). Furthermore, the use of smart contracts in blockchain technology allows for the creation of programmable ownership rules and conditions. For example, an NFT can be programmed to automatically transfer ownership to a new owner once a certain condition is met, such as the payment confirmation.

According to the SOR model, the technological environment also acts as a stimulus on the individual. Therefore, security and privacy must not only be ensured technically, but also be perceived by the user. We refer to the construct of security perception, defined as the "degree to which person believes that the online vendor or website [in our case, the blockchain,] is secure" (Meskaran et al., 2013, p. 310), while perceived privacy is defined as the ability of individuals to control when, how, and to what extent their personal information is accessed (Smith et al., 1996).

The asymmetric cryptographic scheme used to encrypt the data on the blockchain strengthens the defense against external attacks and secures against falsification. Decentralization prevents the significant exploitation of market power. The automation and transparency signal comprehensive data protection to the users, which cannot be assured to this extent by, for example, cloud systems. However, due to the technology's commitment to decentralization, a residual risk cannot be isolated at any point in time (Sayeed & Marco-Gisbert, 2019). Moubarak et al. (2018) provide an overview of the possible attack points such as Race Attack, Finney Attack, Vector76 Attack, Targeted DDoS Attack, or Timejacking Attack. Therefore, for consumers, the use of blockchain technologies does not mean guaranteed protection. While technical security is one aspect, the user's perception of security must also be established. This thought concurs with the work of Tan and Saraniemi (2022), who state that in blockchain-based transactions, the need for trust has shifted from intermediaries, such as banks, to trust in a secure decentralized technology. Because of this, we will include the constructs *perceived blockchain security* in our research model.

Blockchain-based technology strives for privacy protection for its users. In fact, NFTC transactions take place via digital pseudonyms that can be decoupled from the person (Marthews & Tucker, 2022). However, within a blockchain-based transaction, the participant's pseudonym becomes unalterably stored on the blockchain. Accordingly, due to the absolute transparency enabled by the blockchain, it is possible to create a comprehensive profile of the digital pseudonym (Marthews & Tucker, 2022). In the case of NFTC, for example, the buying power behind them could be associated with past transactions of the wallet. Since it is possible to deduce the real person behind the pseudonym (Christiansen & Jarrett, 2019), privacy again becomes an issue. This was confirmed by Biryukov and Tikhomirov (2019), who revealed security and privacy issues in various crypto currency wallets. Ali et al. (2023) labels this challenge in NFT trading as "pseudoanonymity." Accordingly, we integrate *perceived blockchain privacy* into our research model.

In summary, our overview identifies the following aspects that substantiate the relevance of our work. There is an ongoing discussion on whether digital possession can create value for the owner, and, if

yes, how the value is composed. Regarding NFTC, most studies have focused on NFTC as financial investments or from a technical perspective. Our research seeks to bridge a critical gap by delving deeper into the value proposition of digital possession and the components contributing to its perceived value. Our study advances beyond previous research which was centered around NFTC price composition (Costa et al., 2023; Nadini et al., 2021) and shifts towards focusing on the unexplored consumer preferences and value composition, representing a meaningful contribution of our study (Wu et al., 2023). To fill this research gap, we see NFTC-specific product features and technology characteristics as conceivable indicators and thereby examine NFT consumer behavior based on the SOR model for the first time.

3 | HYPOTHESES AND MODEL DEVELOPMENT

The functionalities of NFTC are wide-ranging. Viewed as an investment, they can be used both for a utilitarian purpose (retirement provision, portfolio diversification) and as an emotional one (as a form of gambling and thrill-seeking) (Belk et al., 2022; Ko et al., 2022). If NFTC are bought as an art object, the function is the attachment to the motif, the artist, or art in general (Vasan et al., 2022). Hagtvedt and Patrick (2014) analyzed product functionality and aesthetics, comparing them in a hedonic and utilitarian context. Accordingly, aesthetics can deceive in the context of the user's hedonic attitude about a functionality impairment, but not with regard to the utilitarian attitude. Ziamou and Ratneshwar (2003) found that the effect of functionality on attitude and purchase intention is particularly strong when a product is launched with a previously atypical functionality. This is the case with NFTC, where blockchain mechanisms are used to create scarcity and collectability of digital goods. We therefore hypothesize:

> **H1.** The perceived functionality of NFTC has a positive effect on the utilitarian attitude toward NFTC.

> **H2.** The perceived functionality of NFTC has a positive effect on the hedonic attitude toward NFTC.

That NFTC have any value at all is due to the fact that, unlike other digital goods, they are artificially scarce via blockchain (O'Dwyer, 2020). From tangible collectibles, it is known that limited editions are traded for higher prices than their functionally equivalent counterparts without quantity limits (Hughes, 2022). The effect is revealed, for example, in the snob or bandwagon effect, in which exclusivity has a direct impact on the demand for the products. According to the study by Ku et al. (2013), scarcity has both negative and positive effects on purchase decisions. Persons who purchased a utilitarian product were more likely to respond to demand-related scarcity, while participants who purchased a hedonic product were more likely to respond to supply-related scarcity. In mobile auctions, scarcity was also confirmed as a driver of buying behavior (Chen & Yao, 2018). Mekacher et al. (2022) found that rare NFTC are traded

less frequently and with higher prices. In the well-known "CryptoKitties" NFTC from 2017, 82,000 users bought one, although a total of 1.7 m were for sale. After 4 years, when the producers stopped sales, the value of the remaining collectibles increased sharply (Serada et al., 2021). In their qualitative study, Wu et al. (2023) found that uniqueness represents a crucial success factor for NFTs. Therefore, we assume:

> **H3.** The perceived scarcity of NFTC has a positive effect on the utilitarian attitude toward NFTC.

> **H4.** The perceived scarcity of NFTC has a positive effect on the hedonic attitude toward NFTC.

Many NFTC are similar regarding function, technology, and pricing. Only the visual appearance distinguishes them from another. For tangible artworks, Zolfagharian and Cortes (2011) found aesthetics are an essential driver of purchase intention. For NFTC, Vasan et al. (2022) showed that artists receive repeated investments from the same collectors, indicating a favoring of their style. Nadini et al. (2021) confirm the correlation of the visual features of NFTC and selling price. Kim and Forsythe (2007) assessed whether the use of digital product visualization technologies among online apparel shoppers is more influenced by hedonic or utilitarian motivations. The results show that hedonic motivation has a stronger positive relationship with technology. Accordingly, the entertainment value provided by the visualization is superior to the actual utility. Since NFT-based collectibles are also digitally visualized, we conclude:

> **H5.** The perceived aesthetics of NFTC has a positive effect on the hedonic attitudes toward NFTC.

Sellers set a price for NFTC initially and in the secondary market without regulatory limits. Consumers automatically weigh this price in relation to the presumed quality of the product, assessing the valuation of the price value (Chang & Wildt, 1994). If customers perceive the price value as high, purchase intention increases (Lin et al., 2009). Depending on the product category, price perception has already been confirmed as an antecedent of both utilitarian and hedonic attitudes (Levrini & Jeffman Dos Santos, 2021). Also, perceived rising prices of products can lead to a significant negative impact on consumer attitudes (Lee & Yun, 2015). Regarding NFTC, Vasan et al. (2022) found that perceived value is impacted by strong network effects between artists and collectors. However, since NFT markets are characterized by high volatility (Kim et al., 2021), we focus on the more resistant utilitarian attitude and postulate:

> **H6.** The perceived price value of NFTC has a positive effect on the utilitarian attitude toward NFTC.

Digital security has been established as a central factor influencing consumers' online purchase intentions (Meskaran et al., 2013). Consumers tend to buy the products of their choice on well-known

websites to avoid worrying about security issues. If security vulnerabilities occur and the platforms do not take appropriate countermeasures, the purchase intention will be severely impaired (Tsai & Yeh, 2018). Chang et al. (2014) investigated the influences of the Internet of Things features on consumers' purchase intentions. In this context, security was a positive factor for the utilitarian experience. Khalilzadeh et al. (2017) found security concerns to be the strongest influencing factor on consumer behavioral intentions for accepting mobile payment systems. The studies show that technology security is an important driver with direct impact on consumers' utilitarian attitudes. We transfer these insights to the NFTC context and blockchain technology as the underlying infrastructure, leading us to H7:

> **H7.** The perceived security of blockchain technology has a positive effect on the utilitarian attitude toward NFTC.

The protection of digital privacy using blockchain technology is in close proportion to the security guarantees it provides. Robinson (2018) suggests that trust in digitalization and its institutions fosters attitudes toward disclosing personal data. Trust in data protection leads to an increased intention to disclose personal data and, as a result, indirectly to an increased willingness to purchase (Zimaitis et al., 2022). The unwanted disclosure of private information impairs this trust and will lead to a negative attitude on the part of buyers in the long term. This is especially the case if users have the impression that their privacy is controlled by other parties (Wang et al., 2019). Accordingly, privacy concerns lead to a lower intention to use a digital service or mobile application (Wang et al., 2019). Shrestha et al. (2021) used the Technology Acceptance Model to investigate user acceptance and attitudes regarding blockchain systems. They found that the perceived privacy has the strongest effect on the utilitarian attitude, substantiating H8:

> **H8.** The perceived privacy of blockchain technology has a positive effect on the utilitarian attitude toward NFTC.

The two-dimensional attitude (utilitarian and hedonic) and its significant impact on purchase intention has been widely documented in literature. According to Irani and Hanzaee (2011), consumers' hedonic and utilitarian attitudes influence satisfaction during the purchase process. A significant impact of utilitarian and hedonic attitudes on digital purchase intention has also been confirmed (Avcilara & Ozsoyi, 2015). Yin and Qiu (2021) investigated the use case of artificial intelligence marketing technology, which has a similar disruptive nature as blockchain technology. For this purpose, they examined perceived utilitarian and hedonic attitudes and their effect on the purchase intention for a digital shopping platform. The artificial intelligence marketing technology factors had a significant positive effect on both attitudes, which in turn impacted purchase intention. For collectibles in particular, this two-pronged approach is reasonable, since the purchase has both rational and emotional components (Dickie et al., 1994).

> **H9.** The utilitarian attitude toward NFTC has a positive effect on the NFTC purchase intention.

> **H10.** The hedonic attitude toward NFTC has a positive effect on the NFTC purchase intention.

The hypotheses shape our research model as illustrated in Figure 1.

4 | METHODOLOGY

4.1 | Data collection

In May and June 2022, we conducted an online survey and generated 356 participants. For distribution, we used Facebook groups, Discord channels, Messenger groups, and Reddit forums which were topically related to NFTs and NFTC. This procedure ensured that the target group of NFT collectors and buyers was reached. Thus, participants were able to form a valid opinion on NFTC, resulting in a low dropout rate (12.7%). Validity was further enhanced by implementing a screening question that asked for a basic understanding of and familiarity with NFTC.

The sample is characterized as follows. The participants' average age was $M(\text{age}) = 26.5$ years (min. $= 18$; max. $= 75$; SD $= 5.6$). Due
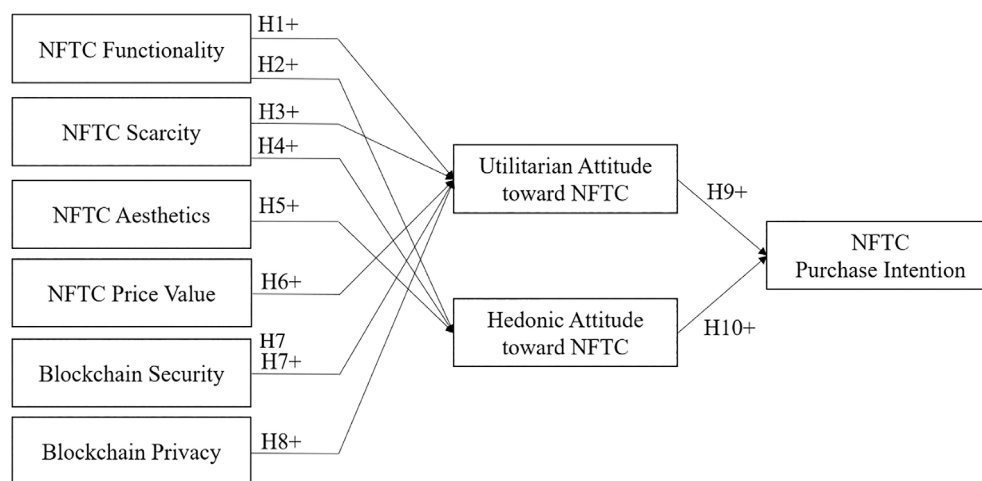
FIGURE 1 Research model.

to digital distribution and the linkage of NFTC to blockchain projects, such an age range is assumed acceptable and was already observed in related studies (Binance Research, 2021; Yin & Qiu, 2021). One hundred and eighty-eight participants were male (52.8%), 167 female (46.9%), and 1 non-binary (0.3%). The geographical distribution shows 301 participants from Germany (84.6%), where this survey was initiated, followed by Austria with 14 (3.9%). Concerning annual income, 163 participants report earning less than US $25,000 (45.8%), 70 are between US $25,000 and US $50,000 (19.7%), 50 are in the range of US $50,000 to US $75,000 (14.0%), 28 earn between US $75,000 and US $100,000 (7.9%), and 21 participants are above US $100,000 (5.9%). Twenty-four individuals did not provide information on income (6.7%). This income distribution is consistent with the 2021 Global Crypto Index (Binance Research, 2021). At the time of the survey's conduction, 107 participants owned NFTC (30.1%) and 249 did not own NFTC (69.9%). In summary, the sample represents the target group of those interested in NFTC. This is a younger, digitally savvy target group with a low annual income who have a basic interest in virtual collectibles and assets (Belk et al., 2022).

4.2 | Operationalization of constructs

In terms of construct measurement, we refer to well-established scales with proven reliability in similar studies and modified the items regarding spelling and applicability to the research context of NFTC (see Appendix for the questionnaire). For the perception of product functionality and aesthetics, we used the items Homburg et al. (2015) developed in their work on product design. For price value, we refer to Venkatesh's et al. (2012) measurement for price perceptions of technologies. To operationalize perceived scarcity, we combined items from Wu et al. (2012), who examined the impact of product scarcity on purchase intention, and Chen and Sun (2014), who explicitly investigated intangible goods' scarcity. For perceived blockchain security, we modified Salisbury et al.'s (2001) scale in the context of online purchases. To survey the privacy perception, we transferred Wang et al.'s (2019) items from e-health to the blockchain context. To measure hedonic and utilitarian attitudes, we refer to the Hedonic/Utilitarian Scale by Voss et al. (2003), which they validated across diverse product categories, such as video games, cars, food, fashion, and hotels. Finally, to measure purchase intention, we adapted Moon et al.'s (2018) items, who investigated purchase intention on an SOR basis. For all measurements, we used seven-point Likert scales, as this reaches the upper limits of reliability (Nunnally, 1978).

5 | RESULTS

5.1 | Measurement model

We employed structural equation modeling with the statistical software SPSS AMOS 25 to validate the proposed research model (Arbuckle, 2017). To test validity and reliability, we examined

Cronbach's alpha (α), composite reliability (CR), convergent validity, and discriminant validity. Factor loadings (FL) should be greater than .5 to assess convergent validity (Fornell & Larcker, 1981), composite reliabilities should exceed .8 (Nunnally, 1978), and the average variance extracted (AVE) is recommended to be at least .5 (Barclay et al., 1995). Table 1 illustrates that the criteria to confirm reliability and convergent validity were met.

To confirm that the construct measurements are distinct from another, we tested discriminant validity. It can be verified when the square roots of the AVEs exceed the corresponding off-diagonal inter-construct correlations (Fornell & Larcker, 1981; Henseler et al., 2015). In our data, the AVE square roots thoroughly exceed the corresponding inter-construct correlations, confirming discriminant validity for all constructs (see Table 2).

To diminish the risk of Type 1 and Type 2 errors, we inspected the measurement model with an established combination of various model fit indices (Hu & Bentler, 1999). Accordingly, for a sample size between 150 and 5000, the Incremental Fit Index (IFI), the Tucker-Lewis Index (TLI), the Comparative Fit Index (CFI), and the Standardized Root Mean Square Residual (SRMR) are the proposed indices to reduce the risk for Type 1 and Type 2 errors. In compliance with common procedure, we further included the ratio χ2 to the degrees of freedom (χ2/df) and the Root Mean Square Error of Approximation (RMSEA). Overall, the consulted indices are consistently within the specified threshold (see Table 3), indicating a proficient measurement model fit.

5.2 | Structural model

We applied the same indices to assess the fit of the structural model. Again, the values consistently complied with the critical values for a good model fit. Table 3 presents a summary of the figures for the measurement model, the structural model, and the corresponding thresholds.

The path diagram revealed a variance explained of $R^2 = .584$ for NFTC purchase intention. The R^2 value lies in the range of related SOR-based studies on purchase intention and can thus be considered suitable (Moon et al., 2018; Zhu et al., 2020). Both the utilitarian and hedonic attitude toward NFTC were revealed as its impactful determinants. Herein, the utilitarian attitude was shaped by perceived NFTC functionality and price value from the product side, and perceived blockchain security and privacy from the technology side. The hedonic attitude was affected by perceived NFTC functionality, scarcity, and aesthetics. Table 4 outlines the results of direct effects.

Looking at the utilitarian attitude toward NFTC, the perceived functionality had the strongest impact (H1, $\beta = .376^{***}$). In order of decreasing impact, the analysis furthermore confirmed the perceived blockchain privacy (H8, $\beta = .174^{**}$), price value (H6, $\beta = .144^{*}$), and blockchain security (H7, $\beta = .137^{*}$) as antecedents of the utilitarian attitude toward NFTC. However, the effect of scarcity turned out to be negative (H3, $\beta = -.135^{**}$), leading to H3 rejection. Regarding the hedonic attitude toward NFTC, we found significant effects of

TABLE 1 Descriptive statistics, reliability, and convergent validity of the measurements.

Construct	Item	M	SD	FL	α	CR	AVE
Perceived NFTC Functionality (FCT)	FCT 1	5.32	1.428	.808	.877	.879	.708
	FCT 2	5.23	1.408	.852			
	FCT 3	4.96	1.599	.863			
Perceived NFTC Scarcity (SCA)	SCA 1	5.49	1.000	.720	.848	.855	.664
	SCA 2	5.60	1.257	.876			
	SCA 3	5.61	1.250	.841			
Perceived NFTC Aesthetics (AST)	AST 1	5.14	1.490	.928	.941	.942	.843
	AST 2	5.01	1.557	.896			
	AST 3	5.21	1.484	.930			
Perceived Price Value (PVL)	PVL 1	5.06	1.497	.772	.853	.854	.662
	PVL 2	5.07	1.510	.875			
	PVL 3	5.24	1.482	.790			
Perceived Blockchain Security (SEC)	SEC 1	5.01	1.501	.806	.908	.912	.777
	SEC 2	5.32	1.311	.898			
	SEC 3	5.23	1.391	.935			
Perceived Blockchain Privacy (PCY)	PCY 1	4.86	1.326	.717	.881	.889	.729
	PCY 2	4.64	1.578	.942			
	PCY 3	4.55	1.583	.887			
Utilitarian Attitude toward NFTC (UTI)	UTI 1	4.37	1.577	.825	.934	.935	.782
	UTI 2	3.96	1.654	.907			
	UTI 3	3.95	1.576	.891			
	UTI 4	3.80	1.595	.912			
Hedonic Attitude toward NFTC (HED)	HED 1	4.58	1.638	.907	.947	.947	.782
	HED 2	4.84	1.552	.881			
	HED 3	4.25	1.551	.870			
	HED 4	4.68	1.583	.841			
	HED 5	4.54	1.571	.920			
NFTC Purchase Intention (PUI)	PUI 1	4.15	1.873	.946	.959	.959	.854
	PUI 2	4.22	1.808	.909			
	PUI 3	4.26	1.788	.924			
	PUI 4	4.41	1.846	.917			

Abbreviations: AVE, average variance extracted; CR, composite reliability; FL, factor loadings; M, mean; SD, standard derivation; α, Cronbach's alpha.

TABLE 2 Inter-construct correlations and square roots of AVE.

Construct	FCT	SCA	AST	PVL	SEC	PCY	UTI	HED	PUI
FCT	**.841**								
SCA	.016	**.815**							
AST	.139	.332	**.918**						
PVL	.470	.041	.245	**.814**					
SEC	.306	.194	.198	.213	**.881**				
PCY	.129	.067	.084	.143	.630	**.854**			
UTI	.365	.323	.367	.491	−.091	.138	**.884**		
HED	.312	.313	.105	.206	.273	.461	.571	**.884**	
PUI	.321	.292	.222	.378	.000	.278	.734	.694	**.924**

Note: Diagonal elements in bold are the square roots of the average variance extracted. Overconfidence is not listed due to single item measurement.

perceived NFTC aesthetics (H5, $\beta = .394^{***}$), functionality (H2, $\beta = .180^{***}$), and scarcity (H4, $\beta = .127^*$). Concerning NFTC purchase intention, the utilitarian (H9, $\beta = .554^{***}$) and hedonic attitude (H10, $\beta = .465^{***}$) evinced a significant effect. Figure 2 summarizes the hypotheses tests visually.

Since our structural model includes a two-tiered path of the NFTC and technology characteristics on purchase intention via attitude (utilitarian and hedonic), we additionally performed a mediation analysis to test for indirect effects. Therefore, we draw on Zhao

et al.'s (2010) approach and conducted a bootstrap analysis with 4000 iterations, which is regarded as robust in identifying indirect effects through mediating variables (Hayes, 2013). We observed the indirect effect of perceived NFTC functionality, scarcity, aesthetics, price value, blockchain security, and blockchain privacy on NFTC purchase intention and found positive indirect effects for all characteristics, except scarcity. Next, we consulted the bias-corrected 95% confidence interval (CI) around the point estimate. To indicate significance of the indirect effect, the CI must not contain a switch from positive

TABLE 3 Model fit indices of the measurement and structural model.

Fit index	Measurement model	Structural model	Recommended value	Source
($\chi 2/df$)	2.169	2.513	≤3.000	Hair et al. (2021)
TLI	.945	.928	≥.900	Byrne (2010)
CFI	.953	.937	≥.900	Bentler (1990)
IFI	.953	.937	≥.900	Meyers et al. (2006)
NFI	.916	.900	≥.900	Meyers et al. (2006)
RMSEA	.057	.065	≤.070	Steiger (2007)
SRMR	.049	.087	≤.080	Hu and Bentler (1999)

TABLE 4 Summary of the hypothesis tests.

Hypothesis		B	SE B	CRA	β	p	Confirmed
H1	FCT → UTI	.478	.078	6.151	.376	<.001***	Yes
H2	FCT → HED	.227	.065	3.468	.180	<.001***	Yes
H3	SCA → UTI	−.188	.070	−2.698	−.135	<.01**	No
H4	SCA → HED	.175	.076	2.306	.127	<.05*	Yes
H5	AST → HED	.413	.057	7.248	.394	<.001***	Yes
H6	PVL → UTI	.181	.072	2.506	.144	<.05*	Yes
H7	SEC → UTI	.166	.083	1.992	.137	<.05*	Yes
H8	PCY → UTI	.268	.099	2.698	.174	<.01**	Yes
H9	UTI → PUI	.586	.045	13.034	.554	<.001***	Yes
H10	HED → PUI	.496	.044	11.307	.465	<.001***	Yes

Abbreviations: B, unstandardized coefficient; CRA, critical ratio; n. s., not significant; p, *p*-value; SE B, standard error B; β, standardized coefficient.
*p < .05; **p < .01; ***p < .001.
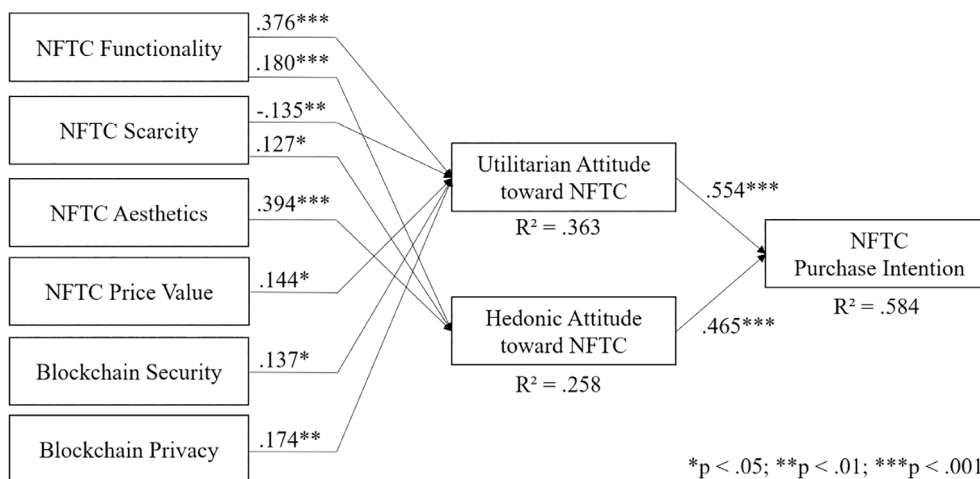
*p < .05; **p < .01; ***p < .001

FIGURE 2 Structural model.

to negative or vice versa (Preacher & Hayes, 2008). Accordingly, perceived functionality showed the strongest indirect effect on NFTC purchase intention with $\beta = .393$ and 95% CI = [.245; .558], followed by aesthetics ($\beta = .205$; CI = [.133; .286]), blockchain privacy ($\beta = .157$; CI = [.039; .309]), price value ($\beta = .106$; CI = [.000; .214]), and blockchain security ($\beta = .097$; CI = [.000; .200]). Scarcity, the only negative indirect effect ($\beta = -.024$), did not reveal significance (CI = [−.146; .117]).

6 | DISCUSSION

6.1 | Implications for theory and practice

Drawing on our findings on the determinants of purchase intention for NFTC, this paper advances theory and practice by successfully adapting the SOR model to the NFT context. To our knowledge, this study marks the first time researchers have developed a coherent model to explain purchase intention for NFT products.

Regarding theory, our study bridges the research gap between consumer behavior and technology acceptance by providing a unique perspective on the intersection of blockchain technology, NFTs, and consumer behavior. This interface has consisted of qualitative, conceptual work. We aggregated the key messages to build a powerful model to explain NFTC purchase intention. This approach allows for a more nuanced understanding of how different stimuli interact with the individual to influence behavior. We also confirm the successful validation of the SOR model to explain the stimuli deriving from a purely digital product. Previous studies examining product features with the SOR model regularly involved physical contact with the product at least at some point, for example, when an online order arrives (Aw et al., 2021; Silva et al., 2021).

Furthermore, our work contributes to the understanding of how individuals perceive and value digital possessions. The results provide insight into how consumers evaluate the utilitarian and hedonic features of NFTC, as well as the role of blockchain technology in shaping consumer intention. Digital goods were attributed a lower sense of psychological ownership than physical ones (Atasoy & Morewedge, 2018). In addition, particularly the emotional value of digital goods was questioned (Belk, 2013; Siddiqui & Turley, 2006). As Mardon and Belk (2018) point out, digital collectibles only have a rationale for existence if scarcity and authenticity can be guaranteed. Before NFTs, digital collectibles were mostly examined within video games. With NFTC however, owners do not equip their video game character but their own virtual identity. We add novelty to the discussion on digital ownership and the meaningfulness of collectibles by demonstrating that NFTC are able to create measurable stimuli and value for the consumer. For digital artwork NFTs, we show that there are both rational-utilitarian and emotional drivers of purchase intention. Considering that these are images that are easy to find and copy on the Internet and created by an anonymous person, this marks an outstanding insight.

We further contribute to the research stream of digital privacy. We show that from a consumer perspective, the mere presence of blockchain technology is not a sufficient reason for abandoning privacy concerns. In fact, users seem to be aware that their transactions are publicly visible on the blockchain and therefore care about privacy features. As Belk et al. (2022) explained, the transparency of blockchain-based technology poses new challenges for privacy protection, e.g., the "right to be forgotten" when transactions and data are stored immutably.

Practically, our findings provide useful insights for NFTC stakeholders who need to address consumer needs, including creators, artists, resellers, and marketplaces. Moreover, players in traditional collectibles markets could use our study to develop strategies adapt to the changing landscape. This could include implementing blockchain-based provenance and authentication systems to enhance the trust and transparency of the market, as well as exploring new business models enabled by blockchain such as fractional ownership and smart contracts. Traditional collectible markets where NFT implementation seems conceivable include travel souvenirs, pop culture memorabilia (e.g., action figures), or historical artifacts. In the following paragraphs, we will comment on the particular lessons from our results.

Regarding functionality, our results are consistent with existing studies in similar product categories, assigning functionality a key role (Homburg et al., 2015). Currently, NFTC product functionality is in the early stages of development and will gain increased relevance for real world applicability in the coming years (Popescu, 2021). The functionality and usefulness of NFTs must therefore be communicated clearly. Only by positioning NFTC as investment objects, art, exclusive content, metaverse accessory, etc., will buyers assign value (Valeonti et al., 2021; Wang et al., 2021). The proposed model confirms the view of Ziamou and Ratneshwar (2003) that when a product is launched with a previously untypical functionality, the effect on attitude and purchase intention is particularly strong. The NFT component enables digital collectibles to be clearly differentiated from classic collectibles, which is reflected in their functionality. Due to the transparent and immutable storage on the blockchain, they can be used for a variety of applications that are, in contrast to material collectibles, not subject to any physical barriers. Accordingly, use cases are increasingly found in gaming apps, collect-to-earn systems, and as access to digital worlds (Guidi & Michienzi, 2023; Malik et al., 2022; Park et al., 2022). Finally, emphasizing the strong direct as well as indirect effect on attitude and purchase intention, functionality must be guaranteed at all times.

Our results revealed that perceived NFTC scarcity had an ambivalent impact on NFTC purchase intention. While the influence on the hedonic attitude was positive, the impact on the utilitarian attitude was negative. One possible explanation is demonstrated by Ku et al. (2013), who present both a positive and negative effect of scarcity on purchase intention. Here, participants were more likely to respond to demand-related scarcity for utilitarian products, while supply-related scarcity was more likely to be perceived as positive for hedonic products. Thus, scarcity can be perceived positively or negatively for consumers, depending on the specific product. Accordingly, this contrary effect neutralized the indirect effect on purchase intention. This

suggests that communicating scarcity is particularly relevant for NFTC with hedonic uses, such as art and games. For NFTC creators, scarcity can be generated regarding quantity, time, or based on skill, for example, only the successful solving of a riddle or game receives the NFTC (Mardon & Belk, 2018). Especially skill-based scarcity could trigger the hedonistic determinant. It is essential to substantiate these findings with further studies, for example by examining different models of scarcity with concrete NFTC. To this end, it is worth noting that the most effective use of scarcity is when high demand meets relatively low supply. For successful collectibles such as "CryptoPunks" and "CryptoKitties," the positive effect of product scarcity on purchases and sales was only present when demand was high (Serada et al., 2021). NFTC creators should accordingly offer their works in limited collections.

In line with previous studies, perceived aesthetics significantly influenced hedonic attitude and indirectly influenced NFTC purchase intention. Within the present structural equation model, this was the strongest direct positive effect of a factor on the attitude dimensions. Zolfagharian and Cortes (2011) reported equivalent results in tangible collectibles segments. Visual distinctiveness is of high importance for NFTC, since other factors, such as blockchain selection, functionality, and scarcity, are not directly visible to the consumer. Here, Amatulli et al. (2020) refer to this in their work on luxury goods, according to which an increase in hedonic attitude is achieved through the implementation of recognition values. Likewise, for NFT collections, similar visual features were found to increase buying interest in the collections (Nadini et al., 2021). Thus, producers of NFTC should work out unique design features and apply them continuously in their designs, while resellers should focus on recognizable subcategories, such as style or content. Since digital collectibles come in various forms, there is almost no limit to innovative visual approaches.

We furthermore observed that the perceived price value directly drives the utilitarian attitude and thus indirectly influences purchase intention. It is therefore important to produce NFTC with a sufficient qualitative countervalue with regard to the price. As soon as a product appears to be too expensive for consumers, the positive effect on purchase intention decreases significantly (Lee & Yun, 2015). In the future, researchers and producers need to work out concrete models and solutions for pricing NFTC. One promising approach here might be dynamic pricing, which is particularly applicable in the digital context (Frohmann, 2018). Automation of blockchain technology provides an appropriate basis to operate dynamic pricing strategies for digital collectibles. Song et al. (2021) present a concrete model that can enable dynamic pricing for NFTC on the Ethereum blockchain. NFTC distributors can draw upon these approaches to generate positive effects on attitude and purchase intention with a quality-based product price.

Counterfeit protection and property recording through blockchain technology can be regarded as a fundamental prerequisite for NFTC to exist at all. Otherwise, digital assets would be available infinitely or exposed to the risk of data theft. This is where the consensus protocol of the blockchain enables guaranteed immutability of the transferred data (Tan & Saraniemi, 2022). Our findings of perceived blockchain security affecting the utilitarian attitude and purchase intention are in line with previous consumer-focused studies on digital products, confirming the high value of security aspects in digital spaces (Aldughayfiq & Sampalli, 2022; Chang et al., 2014). In studies on physical collectibles, an integration of security perceptions has not been present, underlining the specific relevance for NFTC. Thereby, platforms and producers are challenged to prevent possible attacks on blockchain systems and emphasize a safe transaction infrastructure. On the downside, the security of an NFTC's authenticity bears the risk of absolute visibility of a pseudonym's transaction record. Accordingly, creators and (re)sellers should be aware that dubious activities will be visible forever and therefore should be avoided from the outset.

Perceived blockchain privacy exhibited a positive direct effect on consumers' utilitarian attitudes in the purchasing process. Likewise, the further indirect effect on the purchase intention appeared to be positive. This reinforces existing studies that consider privacy a fundamental factor in terms of attitudes toward the operating blockchain (Shrestha et al., 2021). In particular, the transparency and decentralization of the blockchain shifts into focus here. If there is a lack of trust in the privacy of the application or a perception of use of private data by third parties, consumer purchase intent will be greatly reduced (Robinson, 2018; Wang et al., 2019). In the case of NFTC, these third parties primarily are represented by marketplace platforms. Accordingly, platforms should point out the dilemma of ultimate transparency and its consequences for privacy, for example, that transactions will forever be linked to particular pseudonyms or wallets. To actively communicate efforts of data protection, deploying independent seals is considered a suitable approach (Rifon et al., 2005). Furthermore, providers who empower their users with different options for the use of personal data were attributed with lower privacy concerns by consumers (Xu et al., 2011). Studies already give specific assessments of the security and privacy of different blockchain systems, which should serve as reference (Li et al., 2018). Thereby, marketplaces should strive for a combination of usability, scalability, and security.

Our findings regarding the strong effect of attitude on purchase intention are in line with previous studies that attest attitude has a significant effect when investigating digital products on an SOR basis (Yin & Qiu, 2021). In our research model, the effect of the utilitarian attitude is stronger than the hedonic attitude. Voss et al. (2003) used the HED/UT scale to classify 16 product categories where significant differences in hedonic and utilitarian attitudes were found. A similar approach would be useful for NFTC in order to provide individual effect sizes and recommended actions for the different digital asset items. Just as for tangible collectibles, some collectibles are used primarily for rational objectives, such as investment, while others fulfill emotional purposes, such as the joy of art (Belk, 1995; Dickie et al., 1994). Such a distinction could also be developed for NFTC as some seem to be more concerned with artistic value, and others with price development (Belk et al., 2022). Nevertheless, a high relevance of both attitude dimensions for the purchase of NFTC can be derived from the proposed research model.

In summary, our study investigated the unique drivers of NFTC purchase intention. The research model demonstrated that the intention is marked by a dual path over utilitarian and hedonic attitudes. With NFTC functionality, scarcity, aesthetics, and price value, we confirmed product-related drivers that have previously been linked to collectibles in a traditional sense and converted them towards the digital context. Furthermore, the technological characteristics of NFTs enriched our research model, which addresses the novel research field in the intersection of blockchain technology and consumer behavior.

6.2 | Summary of the investigation

NFTC use cases promise a fundamental transformation not only in the early adopting sectors arts, sports, and gaming, but for the whole concept of ownership in general (Bao & Roubaud, 2022; Guidi & Michienzi, 2023; Popescu, 2021). However, the topics blockchain, NFTs, and digital collectibles are mainly covered by technically oriented work or, from the consumer side, with explorative studies. Therefore, our investigation forms an important component to profoundly understand consumer intention within this future market.

We present the first study to develop and validate a parsimonious research model to explain a consumer's intention to buy NFT products. Thereby, we confirmed the successful modification of the SOR model towards the explanation of NFTC purchase intention. In doing so, we took into account that the intention to collect things is motivated by both rational and emotional drivers (Dickie et al., 1994). Accordingly, we found NFTC-specific product features and blockchain-specific technology features to shape (1) the utilitarian and (2) the hedonic attitude toward NFTC. Specifically, the utilitarian attitude was impacted by the perceived NFTC functionality and price value, as well as perceived blockchain security and privacy. The hedonic attitude toward NFTC was significantly influenced by perceived NFTC functionality, scarcity, and aesthetics. Both the utilitarian and hedonic attitude then affect the NFTC purchase intention. A continuative mediation analysis furthermore showed an indirect effect of all the investigated NFTC and blockchain characteristics on purchase intention, except scarcity. Consequently, this study offers important theoretical and practical insights in the under-investigated interface of blockchain technology and consumer behavior in the digital realm.

6.3 | Limitations and further research

Despite its valuable findings, our study is not free of limitations. While conducting the survey, we actively chose a narrowed target group for the sake of validity and meaningful results. According to Rogers's (1995) Innovation Diffusion Theory, these early adopters are trendsetters for the mass espousal of subsequent majorities. Therefore, the results can be considered valuable despite the potential criticism of generalizability. In addition, the timing of the study must be considered. After a crypto and NFT hype in the years 2020 and 2021, a downward trend became apparent at the time of the survey. Both the

previous hype and current decline might cause cognitive biases, such as the hindsight bias. While our study focused primarily on beneficial effects for NFT purchase, Mardon et al. (2022) indicate that digital ownership can be shaped by affordance misalignments. Future studies could therefore investigate the hurdles which accordingly arise when consumers have expectations of NFTC utility which these cannot fulfil. Lastly, we note that NFTs can have diverse application formats. The digital collectibles focused on in our study represent an exemplary use case for the potential of blockchain technology. However, considering use cases such as metaverse land space or accessories, researchers could integrate new influencing factors.

ORCID
Marius Arved Fortagne https://orcid.org/0000-0003-4136-7493

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AUTHOR BIOGRAPHIES

Marius Arved Fortagne is a research assistant at the Chair of General Business Administration at the University of Bayreuth, Germany. His research interests and publications cover quantitative work on human requirements for adopting innovative

technology, as well as the outcome of technology usage for human psychology. In his Bachelor, he studied Business Administration with a focus on digital marketing in cooperation with an international insurance company. Later, he studied Sports, Business and Law (M. Sc.) at the University of Bayreuth, Germany. In addition to research, he gained practical experience by successfully launching a digital startup company.

Prof. Dr. Bettina Lis holds the Chair of General Business Administration at the University of Bayreuth, Germany. She has completed several international engagements for study, research, and teaching purposes. Her research focuses on quantitative research within the intersection of media, management, digitalization, as well as consumer behavior and corporate responsibility. Accordingly, her list of publications covers works on technological innovations, media management, and corporate social responsibility in top-tier journals.

APPENDIX A: . Questionnaire items

Construct Definition Items		Source
Perceived NFTC Functionality (FCT) *The consumer's perception of a product's ability to fulfill its purpose*		Bloch (2011)
FCT 1	It is important that NFTC are likely to perform well	Homburg et al. (2015)
FCT 2	It is important that NFTC are capable of doing their task	
FCT 3	It is important that NFTC are functional	
Perceived NFTC Scarcity (SCA) *The consumer's perception of a product's limited availability due to demand outstripping supply or planned supply restrictions*		Ku et al. (2013)
SCA 1	I feel that limited-amount editions of NFTC will cause many people to buy	Chen and Sun (2014); Wu et al. (2012)
SCA 2	I feel that limited-amount editions of NFTC surely attract more people to buy than unlimited editions of NFTC	
SCA 3	I feel that limited editions of NFTC sell better than unlimited editions of NFTC	
Perceived NFTC Aesthetics (AST) *The perceived appearance and beauty of a product*		Bloch (2011)
AST 1	It is important that NFTC are visually striking	Homburg et al. (2015)
AST 2	It is important that NFTC are good-looking	
AST 3	It is important that NFTC look appealing	
Perceived NFTC Price Value (PVL) *The consumers' cognitive tradeoff between the perceived benefits of the applications and the monetary cost for using them*		Venkatesh et al. (2012, p. 161)
PVL 1	It is important that NFTC are reasonably priced	Venkatesh et al. (2012)
PVL 2	It is important that the price of NFTC is a good value for money	
PVL 3	It is important that the price of NFTC provides a good value	
Perceived Blockchain Security (SEC) *The degree to which person believes that the online vendor or website [in our case, the blockchain,] is secure*		Meskaran et al. (2013, p. 310)
SEC 1	I feel secure buying NFTC through a blockchain technology	Salisbury et al. (2001)
SEC 2	Blockchain technology is a secure means through which to buy NFTC	
SEC 3	Overall, the blockchain technology is a safe place to buy NFTC	
Perceived Blockchain Privacy (PCY) *The ability of individuals to control when, how, and to what extent their personal information is accessed*		Smith et al. (1996)

(Continues)

Construct *Definition* Items		Source
PCY 1	Blockchain technology prevents third parties from collecting personal information from purchasing transactions of NFTC	Wang et al. (2019)
PCY 2	I am not afraid that third parties get more of my privacy through buying NFTC via blockchain technology than they are allowed	
PCY 3	I am not concerned that the information transmitted through purchasing transactions of NFTC via blockchain technology could be intercepted by third parties	
Utilitarian Attitude toward NFTC (UTI) *The psychological tendency that is expressed by evaluating a particular entity regarding its usefulness and performance with some degree of favor or disfavor*		Eagly and Chaiken (1993, p. 1); Lee and Yun (2015)
UTI 1	For me, buying NFTC is beneficial	Voss et al. (2003)
UTI 2	For me, buying NFTC is useful	
UTI 3	For me, buying NFTC is productive	
UTI 4	For me, buying NFTC is helpful	
Hedonic Attitude toward NFTC (HED) *The psychological tendency that is expressed by evaluating a particular entity regarding the emotional state associated with the object*		Eagly and Chaiken (1993, p. 1); Lee and Yun (2015)
HED 1	For me, buying NFTC is fun	Voss et al. (2003)
HED 2	For me, buying NFTC is exciting	
HED 3	For me, buying NFTC is delightful	
HED 4	For me, buying NFTC is thrilling	
HED 5	For me, buying NFTC is enjoyable	
NFTC Purchase Intention (PUI) *The preference of consumer to buy the product or service*		Younus et al. (2015, p. 9)
PUI 1	My willingness to buy NFTC is very high	Chandran and Morwitz (2005);Moon et al. (2018)
PUI 2	I am certain to purchase NFTC at some point	
PUI 3	I have a high intention to buy NFTC at some point	
PUI 4	There is a high chance that I will buy NFTC at some point	