International Journal of Human–Computer Interaction

ISSN: 1044-7318 (Print) 1532-7590 (Online) Journal homepage: www.tandfonline.com/journals/hihc20

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To cite this article: Xinyi Yang, Nannan Xi & Juho Hamari (04 Feb 2026): Understanding Metaverse Consumer Motivation: A Study on the Perceived Value, Cultural Dimensions, and Prior Experience in NFT Assets Purchase, International Journal of Human–Computer Interaction, DOI: 10.1080/10447318.2026.2618572

To link to this article: https://doi.org/10.1080/10447318.2026.2618572

INTERNATIONAL JOURNAL OF HUMAN–COMPUTER INTERACTION
https://doi.org/10.1080/10447318.2026.2618572

Understanding Metaverse Consumer Motivation: A Study on the Perceived Value, Cultural Dimensions, and Prior Experience in NFT Assets Purchase

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ABSTRACT

The virtual economy has rapidly evolved alongside advances in digital technologies, including the integration of blockchain and interactive media that enable novel experiences and business opportunities. A notable development is the trading of non-fungible tokens (NFTs), where users participate as buyers, owners, sellers, and investors. This multi-role context, coupled with individual differences, adds complexity to understanding consumer motivations for trading and recommending NFTs. Focusing on NFT art as a representative type of NFTs, this study identifies 14 value dimensions from NFT technology-related, art-related, and product-related perspectives. Based on a large-scale international survey, the research examines how these value perceptions influence purchase and recommendation intention, and how these relationships are moderated by cultural factors (uncertainty avoidance and long-term orientation) and prior purchase experience. The findings indicated that product-related values exerted the strongest influence on consumer behavior, while technology-related values played a lesser role. Cultural and experiential factors showed limited moderating effects.

KEYWORDS

Metaverse; web 3.0; blockchain; virtual reality; FinTech

1. Introduction

The rapid development of virtual technologies, the Internet of Things (IoT), and FinTech has given rise to a parallel virtual world where human activities increasingly mirror those in the physical world (Lyu, 2024; Wang & Ahn, 2024). Within this virtual environment, resources and assets are digitized, creating new categories of virtual goods such as digital currencies, non-fungible tokens (NFTs), in-game items, and virtual real estate. As metaverse infrastructures and digital economies continue to develop, the virtual asset market is projected to expand further, offering new forms of ownership, exchange, and value creation (Statista, 2025a).

Among these assets, NFTs have emerged as a transformative innovation, enabling verifiable ownership of unique content such as artworks, music, and collectibles (e.g., Chen et al., 2025; Peres et al., 2023; Wang et al., 2021). Their combination of technological immutability, esthetic appeal, financial potential, and other functionalities has attracted a wide range of stakeholders, including artists, consumers, developers, and investors (Wilson et al., 2022). In only a few years, NFTs evolved from a niche blockchain application into a global economic and cultural phenomenon, attracting millions of consumers and billions in transaction volume (Statista, 2025b). For instance, the digital artwork "The Merge" by the artist Pak sold for $91.8 million in 2021 through Nifty Gateway, with nearly 29,000 collectors participating in over 300,000 transactions (Crypto.com, 2023).

Despite these record-breaking successes, the NFT market remains highly volatile, experiencing rapid rises, sharp collapses, and unpredictable fluctuations (Statista, 2025b). Some NFTs reach multimillion-dollar valuations, but many others sell for minimal amounts. Underscoring the speculative and unstable

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nature of the market. This paradox raises a fundamental question: What kinds of values do these virtual products deliver that make them meaningful, desirable, or justify their risk?

From an academic perspective, emerging research has started to examine the perceived value of NFTs, emphasizing factors like authenticity, inclusivity, and security (e.g., Chen et al., 2025; Damodaran, 2024; Lee et al., 2023). While these studies offer valuable insights, they often conceptualize NFTs as isolated products, overlooking the fact that NFTs function primarily as tokens that verify ownership and derive meaning from the underlying assets they represent. For instance, artistic value drives NFT art, functional utility drives NFT gaming assets, and membership benefits drive NFT membership cards. Consequently, existing studies often fail to capture the contextual and multidimensional nature of NFT values.

A comprehensive understanding of NFT consumption, therefore, requires a multidimensional perspective on perceived value. Such a perspective should encompass the value of the underlying asset (e.g., artistic, functional, or experiential), technology-driven value (e.g., transparency, uniqueness, and authenticity), and core product value (e.g., economic, emotional, and social benefits). Equally important is understanding how these perceived values translate into consumer responses, particularly attitudes, purchase intentions, and word-of-mouth (WOM) intentions, which play a critical role in shaping market dynamics and diffusion.

In addition to identifying value dimensions, it is necessary to consider factors that influence how consumers perceive and interpret these values. Prior studies have highlighted the role of demographic characteristics (Sung et al., 2023) and consumer expectations (Griffiths et al., 2024) in NFT purchase decisions. However, other aspects remain underexplored. One such factor is consumers' prior experience with NFTs. Research in behavioral decision-making suggests that knowledge gained through experience shapes risk perception and behavioral intentions (Fishbein & Ajzen, 1977; Taylor & Todd, 1995). Nevertheless, existing studies predominantly focus on current NFT consumers, limiting insight into how value perceptions differ between experienced and inexperienced consumers (e.g., Ng et al., 2025; Xie et al., 2024; Yilmaz et al., 2023). Moreover, the novelty and uncertainty inherent in NFTs may heighten concerns related to financial risk, social acceptance, and legal ambiguity. These concerns are likely to vary across cultural contexts, as cultural orientations such as uncertainty avoidance and long-term orientation influence individuals' willingness to engage with speculative and technologically novel products (Bartikowski et al., 2023). Although prior research has underscored the importance of cultural influences on NFT adoption (Schlimm et al., 2024; Yang et al., 2024; Yilmaz et al., 2023), empirical evidence explaining how cultural orientations shape consumers' perceived value of NFTs remains limited.

To address these gaps, this study focuses on NFT art, which represents one of the most prominent and commercial segments of the virtual economy, ranging from 2D images, music, animations, and illustrations to 3D models and interactive works. NFT art consumers often occupy multiple roles, including investors, collectors, sellers, and participants in digital communities. This role multiplicity complicates the relationship between value perception and decision-making, making NFT art a particularly suitable context for examining how different value dimensions influence consumer behavior.

Accordingly, this study develops an integrated framework to examine how consumers' perceived values of NFT art influence their attitudes, purchase intentions, and WOM intentions, as well as how these relationships are moderated by cultural factors (uncertainty avoidance and long-term orientation) and prior experience. Grounded in the PERVAL framework (Sweeney & Soutar, 2001), this study extends value conceptualization by incorporating both the artistic and technological nature of NFT art. 14 perceived value dimensions across three domains are identified: NFT technology-related values (authenticity, security, information transparency, novelty, and uniqueness); art-related values (esthetics, return on investment (ROI), artists/developers' attractiveness, and self-expressiveness); and product-related values (enjoyment, sense of community, subjective norms, quality, and cost). Using data from an international survey of 805 participants, this study employs Partial Least Squares Structural Equation Modeling (PLS-SEM) to uncover the mechanisms underlying consumer value perception and behavioral intentions.

The remainder of this paper is structured as follows: It begins with a review of the relevant literature. Next, we outline the methodology, including the data collection procedure and data analysis.

Following this, the empirical results are presented, alongside a comprehensive discussion of the findings. Finally, the paper concludes by offering practical implications and proposing potential directions for future research.

2. Background

2.1. Virtual item purchase – from "traditional" to "non-fungible"

Virtual items are digitally stored elements, objects, or assets that can be traded, downloaded, and accessed across various digital platforms and devices, such as music, images, currencies, and avatar accessories (Hamari & Keronen, 2017; Kim et al., 2011; Peres et al., 2023). The commercial consumption of virtual items can be traced back to early virtual worlds and social platforms, including Cyworld, Second Life, and Tencent (Lehdonvirta, 2009). Early research examined the motivations and values underlying virtual consumption, highlighting factors such as social norms, user involvement, perceived system quality, social influence, competency, playfulness, enjoyment, and visual appearance (Guo & Barnes, 2011; Kim et al., 2012; Lehdonvirta, 2009).

As digital environments gradually evolved into gaming ecosystems, research attention shifted toward motivations and values associated with purchasing in-game items. This stream of research identified additional value dimensions, including gaming culture, self-expression, functional enhancements, esthetic decoration, visual distinctiveness, telepresence, escapism, and gifting (Cleghorn & Griffiths, 2015; Hermawan et al., 2023; Mäntymäki & Salo, 2015; Marder et al., 2019).

In recent years, technological convergence and social changes have ushered in a new era of metaverse-based commerce in which ownership, identity, and value increasingly extend into virtual spaces, driven by blockchain, extended reality (XR), and FinTech innovations (Al-Adwan et al., 2024; Bilquise et al., 2025). Within this landscape, NFTs have emerged as a new class of virtual assets that enable verifiable ownership of unique content, ranging from art and collectibles to gaming assets and virtual real estate. Unlike traditional virtual items that can be easily replicated, NFTs are underpinned by blockchain technology, which ensures authenticity, provenance, and immutability (Peres et al., 2023).

Recent research has begun to examine consumer perceptions of NFT value and their effects on behavioral intentions. For instance, Fortagne and Lis (2024) found that functionality, price, security, privacy, and esthetics positively impact consumer attitudes toward NFTs, while perceived scarcity has a negative impact. Griffiths et al. (2024) indicated that intrinsic motivation (pleasure) and identified regulation positively impact purchase intention, whereas amotivation has the opposite impact. Efendioğlu (2023) emphasized the role of uniqueness in purchase intention. Xie et al. (2024) demonstrated that informative, entertaining, uniqueness, and expressive values promote WOM toward branded NFTs. Despite these insights, existing studies largely conceptualize NFTs as isolated products, neglecting their hybrid nature as digital tokens that integrate traditional products, such as artworks, membership cards, and game assets, with blockchain-based technologies. This narrow conceptualization limits our understanding of the multidimensional value construction that characterizes NFTs.

Among various NFT categories, NFT art has emerged as one of the most prominent and commercially significant segments. NFT art combines blockchain-based tokenization with creative expressions, including 2D imagery, animations, music, and 3D models, redefining the creation, consumption, and value of art (Guan et al., 2025).

2.2. Consumer perceived value on NFT art

Understanding consumer-perceived value is crucial to explaining consumer behaviors, as value represents the overall assessment of a product's utility based on perceptions of what is received versus what is given (Sheth et al., 1991; Zeithaml, 1988).

Early conceptualizations of consumer-perceived value were largely centered on economic factors, defining value as the balance between utility and cost (Sánchez-Fernández & Iniesta-Bonillo, 2007). However, this view has been acknowledged for its simplicity, as it neglects other important dimensions, such as hedonic (pleasurable feeling), social, and conditional aspects (Hirschman & Holbrook, 1982).

Building upon this, Sheth et al. (1991) introduced one of the first multidimensional frameworks that incorporates both utilitarian and hedonic dimensions, providing a more comprehensive perspective to explain consumer choices. Later, Holbrook (1999) advanced a broader typology of consumer value, distinguishing between extrinsic versus intrinsic, self-oriented versus other-oriented, and active versus reactive forms of value, resulting in eight categories including efficiency, excellence, status, esteem, play, esthetics, ethics, and spirituality. This multidimensional categorization underscores that consumer value is highly context-dependent, varying across consumption situations.

As theoretical understandings of value have continued to evolve, additional perspectives have further enriched the discourse. For example, from the psychological ownership perspective, consumers derive value from efficacy, self-identity, and having a place to dwell (feel at home) (Pierce et al., 2003). In the domain of information systems, the Technology Acceptance Model (TAM) remains one of the most influential frameworks for explaining individuals' motivations and perceived values related to technology adoption, emphasizing perceived usefulness and ease of use (Lee et al., 2003). In the digital era, Belk (2013) conceptualized the extended self in the digital world, arguing that the digitization of property and identity has reshaped how individuals derive meaning and value from virtual assets. Among these approaches, Sweeney and Soutar (2001) PERVAL framework stands out as one of the most comprehensive and empirically validated models for assessing consumer perceived value across products and services. PERVAL consists of four foundational dimensions: emotional, social, quality (functional), and economic value. Its parsimonious yet multidimensional structure makes it highly adaptable to diverse consumption contexts.

As a hybrid product category that combines artistic content, blockchain-enabled technological infrastructure, and fundamental product attributes, NFT art engages consumers in multiple roles, including buyer, technology adopter, collector, and investor. Accordingly, consumer value perceptions are derived from multiple, conceptually distinct sources. To capture this multidimensionality, we conceptualize consumers' perceived value of NFT art across three overarching categories: (1) Product-related values, which incorporate the core value dimensions of the PERVAL model and represent the fundamental values associated with any product; (2) NFT technology-related values, derived from blockchain attributes such as authenticity, transparency, and security; and (3) Art-related values, grounded in literature on art consumption. This categorization preserves the theoretical foundation of PERVAL while integrating context-specific dimensions that reflect the technological and artistic characteristics of NFT art.

2.2.1. Product-related values

The PERVAL framework conceptualizes consumer-perceived value as a multidimensional construct encompassing emotional, social, economic, and quality dimensions that have been validated across diverse product and service contexts (Sweeney & Soutar, 2001).

Emotional value pertains to the affective responses elicited from engaging with a product or service (Sweeney & Soutar, 2001). It is often operationalized as "enjoyment" – a hedonic feeling derived from engaging in an activity for its intrinsic entertainment and pleasure (Deci & Ryan, 2013). In virtual consumption contexts, emotional value has been shown to play a significant role in influencing purchase intentions (Hamari, 2017; Hermawan et al., 2023; Kim et al., 2011).

Social value derives from the extent to which a product or service enhances an individual's social self-concept or social identity through ownership or usage (Sánchez-Fernández & Iniesta-Bonillo, 2007; Sweeney & Soutar, 2001). Social value is always conceptualized through two key constructs: subjective norms, which refer to perceived social pressure or expectations to engage in certain behaviors; and sense of community, which captures feelings of belonging and shared identity within a group (Ajzen, 1991). Prior studies have shown that both constructs significantly influence virtual item purchase intentions and participation in virtual commercial activities (Al-Adwan et al., 2024; Cleghorn & Griffiths, 2015; Kim et al., 2012).

Economic value traditionally refers to the perceived tradeoff between benefits and costs (Sweeney & Soutar, 2001). Nowadays, it extends beyond monetary considerations to include time, effort, and perceived efficiency, which remains a strong determinant in the purchasing decisions of virtual items

(Hamari & Keronen, 2017). In this study, cost refers to the expenses associated with buying and owning NFT art.

Quality reflects consumers' evaluations of a product's functional performance and its ability to meet expectations (Sweeney & Soutar, 2001). For virtual goods, quality encompasses consumers' objective opinions regarding aspects like craftsmanship, design, and style (Lehdonvirta, 2009). High perceived quality has been shown to enhance both satisfaction and purchase intention in online markets (Winata et al., 2022).

2.2.2. NFT technology-related values

While the PERVAL framework captures fundamental product evaluations, NFTs introduce new sources of value derived from blockchain technology, necessitating the inclusion of technology-related dimensions. Core blockchain attributes, including decentralization, immutability, traceability, and smart contract functionality, address persistent challenges in art markets, including preservation, fraud, and authentication (proof of ownership) (Polak et al., 2017; Vuong et al., 2018). These attributes give rise to technology-driven value perceptions that are conceptually distinct from traditional product attributes, including authenticity, security, information transparency, novelty, and uniqueness (Damodaran, 2024; Hofstetter et al., 2022; Kugler, 2021; Peres et al., 2023; Tan & Saraniemi, 2023).

Authenticity refers to the verifiable originality and ownership of an NFT, underpinned by blockchain's traceability and immutability. Each NFT's metadata and transaction history are permanently recorded on a distributed ledger, ensuring verifiable provenance and preventing forgery (Kugler, 2021; Marthews & Tucker, 2023). These guarantee that NFTs remain legitimate and traceable virtual assets, thereby enhancing the value of asset authenticity to consumers while fostering higher levels of trust and confidence (Joy et al., 2022; Peres et al., 2023; Tan & Saraniemi, 2023).

Security arises from blockchain's decentralized and cryptographically protected architecture, which minimizes risks of manipulation, fraud, theft, and transactional error, long-standing concerns in traditional art markets (Vuong et al., 2018; Wang et al., 2021). Once data is recorded and validated across distributed nodes, it becomes immutable. This structure provides a strong perception of safety, reinforcing security in blockchain-based transactions (Król & Zdonek, 2022), thereby potentially generating value for consumers.

Information transparency reflects blockchain's ability to make ownership, transactions, and creation data publicly accessible and verifiable in real time (Al-Jabri & Roztocki, 2015; Joo et al., 2023). Transparency reduces information asymmetry between buyers and sellers, promotes fairness, accountability, and informed decision-making in the NFT market, thereby delivering value to consumers (Hofstetter et al., 2022).

Novelty encompasses new or unconventional ideas, approaches, expressions, and experiences (Chen, 2009). In the context of NFTs, novelty value reflects engagement with emerging technologies and new consumption experiences, which can be particularly valuable to innovators and early adopters.

Uniqueness represents consumers' perception of NFTs as distinct and one-of-a-kind virtual assets (Dwivedi et al., 2018). Blockchain verification ensures that each NFT exists as a unique entity within the network, reinforcing exclusivity and rarity (Hofstetter et al., 2022; Wang et al., 2021; Wilson et al., 2022). This attribute is especially salient in art markets, where distinction and exclusivity are central to value formation and collector motivation (Geman & Velez, 2015).

2.2.3. Art-related values

Art inherently contains multiple value dimensions that extend beyond basic product or technological values. These values arise from both the esthetic and symbolic nature of artworks, as well as from the broader practices of art appreciation and collection (Formanek, 1991; Geman & Velez, 2015). Drawing on art consumption and collection literature, this study identifies four art-related value dimensions: esthetics, ROI, artists/developers' attractiveness, and self-expressiveness.

Esthetics refers to the consumers' appreciation of an artwork's style, form, and composition. Unlike product quality, which reflects an objective opinion on product performance, esthetics is inherently subjective and tied to personal perceptions of beauty and artistic expression that can influence art

purchasing decisions (Li & Li, 2022; Velthuis, 2003). Esthetics plays a central role in art creation, evaluation, and appreciation (McIntosh & Schmeichel, 2004), and this role may similarly extend to the context of NFT art.

ROI captures the perceived financial potential of NFT art, which emphasizes expected financial returns. Art collectors have long viewed artworks as financial assets with investment potential (Formanek, 1991; McIntosh & Schmeichel, 2004; Mei & Moses, 2002). In the context of NFTs, empirical evidence suggests that prices are largely driven by buyers' willingness to pay, underscoring the investment-oriented nature of NFT art and its associated profit potential (Zhang, 2023).

Artists/developers' attractiveness represents the perceived appeal, reputation, and credibility of the artist and developer. In traditional art markets, works by renowned artists or developers command higher prices and greater prestige, regardless of objective quality (Renneboog & Spaenjers, 2013; Velthuis, 2003). Similarly, in the context of NFTs, creators' online visibility, reputation, and community engagement may enhance perceived value for consumers.

Self-expressiveness reflects the extent to which NFT art ownership enables consumers to express personal identity. Art offers consumers spiritual shelter to reflect on life, reality, and illusion, enhancing self-expressive value (Chen, 2009; McIntosh & Schmeichel, 2004). For collectors, engaging with art often fulfills self-expressive and emotional needs, offering a sense of personal enrichment and social distinction (Baekeland, 2012). Within NFT communities, such expressions may also extend and bring value to consumers.

Collectively, these perceived value dimensions can potentially impact consumers' overall evaluations of NFT art. According to the Theory of Planned Behavior, individuals form behavioral intentions based on rational evaluations, and favorable attitudes toward a behavior increase the likelihood of performing it (Ajzen, 1991). Empirical research consistently demonstrates that positive attitudes toward products and services lead to stronger purchase intentions and more favorable word-of-mouth behaviors (Homburg et al., 2009; Mishra et al., 2022; Wang et al., 2019). Accordingly, in the context of NFT art, consumers' perceived values are expected to influence attitudes, which in turn shape purchase and recommendation intentions.

Importantly, the strength of these relationships may vary across individuals. Prior experience can moderate the relationship between perceived value and behavioral intentions by enhancing familiarity and reducing perceived risk, thereby shaping how consumers interpret and respond to perceived value (Fishbein & Ajzen, 1977; Taylor & Todd, 1995). In the context of NFTs, experienced consumers may interpret and evaluate NFT art values differently from newcomers, resulting in divergent behavioral responses.

2.3. The moderating role of cultural factors

Culture represents the collective beliefs, values, and mental frameworks that shape the behavior of a group of people (Guiso et al., 2006). Among the most influential models for analyzing and comparing cultural differences is Hofstede's cultural dimensions framework, which identifies several key dimensions: power distance, uncertainty avoidance, individualism versus collectivism, femininity versus masculinity, and short-term versus long-term orientation (Hofstede, 1984, 2001).

Hofstede's cultural framework has been widely applied in information systems and consumer behavior research. For example, cultural dimensions have been shown to influence community engagement among tourists (Nusair et al., 2024) and to moderate the effects of social, individual, and technological factors on behavioral intentions in social commerce (Jadil et al., 2023). Recent work by Schlimm et al. (2024) further suggests that cultural variations may shape how consumers perceive the value of NFTs. Despite these advances, empirical research examining how cultural factors moderate the relationship between consumer-perceived value and behavioral intentions in NFT contexts remains limited.

Hofstede (1984, 2001) emphasized that not all cultural dimensions are equally salient across contexts. Accordingly, this study focuses on uncertainty avoidance and long-term orientation, as NFT art markets are characterized by technological novelty, pricing volatility, speculative investment motives, and uncertainty regarding long-term value. These characteristics make uncertainty avoidance and long-term

orientation particularly influential in shaping how consumers evaluate perceived value and translate such evaluations into behavioral responses.

2.3.1. Uncertainty avoidance

Uncertainty avoidance reflects the extent to which individuals within a culture feel uncomfortable with ambiguous and uncertain situations (Hofstede, 2001). Cultures high in uncertainty avoidance prefer stability, structured environments, and established rules to mitigate uncertainty, whereas low uncertainty avoidance cultures are more open to novelty, adventure, and diversity (Ma et al., 2023).

Prior studies have found that high uncertainty avoidance often exerts a negative moderating impact on consumer behaviors related to adopting new products and emerging technologies (Erumban & De Jong, 2006). For example, individuals perceiving high uncertainty in virtual commercial activities exhibit greater non-adoption intentions (Al-Adwan, 2024). However, existing findings are not entirely consistent, as some studies report insignificant or context-dependent effects of uncertainty avoidance on innovation adoption (Bukowski & Rudnicki, 2019).

Given the inherently speculative and volatile characteristics of NFT art, it is plausible that uncertainty avoidance moderates the relationship between perceived value and behavioral intentions.

2.3.2. Long-term orientation

Long-term orientation distinguishes cultures that prioritize future-oriented outcomes from those emphasizing immediate gratification (Hofstede, 1984, 2001). Long-term oriented societies tend to value sustained progress, innovation, and delayed rewards, while short-term oriented societies emphasize immediate results and show a stronger attachment to tradition (Mattila, 1999).

Previous research demonstrates that long-term orientation can moderate the relationship between consumer psychology and behavior (Sharma et al., 2023). However, its impact on new product and innovation acceptance is mixed, with some studies reporting strong moderating effects on innovation adoption and technology use (Bukowski & Rudnicki, 2019; Chi et al., 2023), while others find limited or no impact (Jadil et al., 2023).

In the context of NFT art, where consumers may weigh both short-term speculative gains and long-term investment potential, long-term orientation is likely to shape how individuals evaluate and respond to perceived value.

2.4. Research questions

Building upon the research gaps and theoretical framework developed in the preceding sections, this study aims to address the following research questions:

RQ1: How do consumers' perceived values of NFT art influence their attitudes, purchase intentions, and willingness to recommend (i.e., word-of-mouth)?

RQ2.1: To what extent do cultural dimensions (i.e., uncertainty avoidance and long-term orientation) moderate the relationships between perceived value and consumer responses, i.e., attitudes and behavioral intentions?

RQ2.2: Does prior NFT purchase experience moderate the relationships between perceived value and consumer responses, i.e., attitudes and behavioral intentions?

Figure 1 presents a visual conceptual map summarizing the structure of the perceived value dimensions in this study. The map illustrates how the 14 value dimensions are grouped into three overarching categories (NFT technology-related, art-related, and product-related values). It also shows the moderating variables (uncertainty avoidance, long-term orientation, and prior purchase experience) and outcome variables (attitude, purchase intention, and WOM).

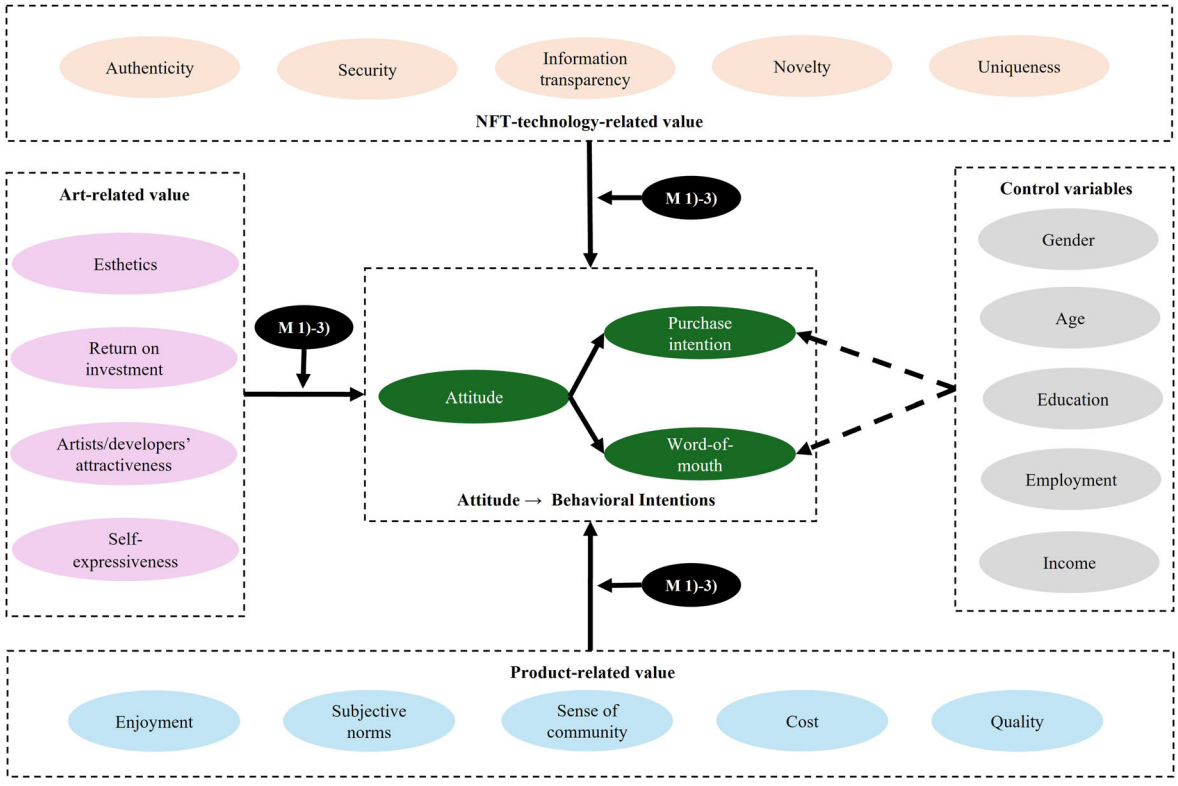

Figure 1. Research model.
Note: Moderators (1): cultural belief – uncertainty avoidance; (2) cultural belief – long-term orientation; (3) prior purchase experience.

3. Research method

3.1. Participants

The final sample consisted of 805 participants (Table 1). In terms of gender, 64.2% identified as male and 35.8% as female, reflecting market statistics that report a predominantly male NFT user base (Statista, 2024). Age distribution is also closely aligned with global NFT consumer profiles: 89.7% of respondents were under 45, consistent with industry data indicating that NFT adoption is concentrated among individuals aged 18–44 (Statista, 2025b). These demographic patterns suggest that the sample broadly represents the core population driving current NFT consumption.

Participants exhibited diverse socioeconomic backgrounds. A majority of participants (60.4%) reported being in full-time employment, with diverse educational backgrounds ranging from middle school to doctoral degrees. The largest groups held either a high school/vocational/technical school qualification (28.8%) or a bachelor's degree (45.8%). In terms of household income, 64.5% of respondents reported earnings between $10,000 and $69,999. A portion of the participants indicated limited income, with 12.2% reporting annual earnings of less than $10,000. This is consistent with the demographic profile, which includes students (10.7%) and unemployed individuals (9.8%) who may not have a steady source of income.

Geographically, the sample was internationally diverse. The most represented countries were South Africa, the United Kingdom, the United States, Nigeria, and Poland. Benchmarking against global NFT market statistics indicates that most participants originate from countries ranked within the top 40 NFT markets worldwide (Statista, 2025b). However, the sample underrepresents several major markets, including Japan, Germany, and India, which account for a substantial share of global NFT activity. This underrepresentation might limit the generalizability of the findings to regions with distinct cultural or technological adoption profiles.

Besides, regarding NFT experience, 48.7% of participants had experience of purchasing NFTs, while 51.3% had not.

Table 1. Demographic information.

Variables	Category	Frequency	Percentage (%)	Variables	Category	Frequency	Percentage (%)
Gender	Female	288	35.8	Yearly household income (USD)	Less than $10,000	98	12.2
	Male	517	64.2		$10,000 to $19,999	120	14.9
Age	16–20	29	3.6		$20,000 to $29,999	114	14.2
	21–25	186	23.1		$30,000 to $39,999	95	11.8
	26–30	181	22.5		$40,000 to $49,999	76	9.4
	31–35	140	17.4		$50,000 to $59,999	59	7.3
	36–40	94	11.7		$60,000 to $69,999	55	6.8
	41–45	92	11.4		$70,000 to $79,999	37	4.6
	46–50	20	2.5		$80,000 to $89,999	32	4.0
	51–55	30	3.7		$90,000 to $99,999	33	4.1
	56–60	16	2.0		$100,000 to $109,999	25	3.1
	61–65	7	0.9		$110,000 or more	61	7.6
	More than 65	10	1.2	Employment	Working full-time	486	60.4
Education	Middle school	13	1.6		Working part-time	115	14.3
	High school/Vocational education/ Technical school	232	28.8		Student	86	10.7
	Associate's degree	36	4.5		Unemployed	79	9.8
	Bachelor's degree	369	45.8		Retired/Pensioner	15	1.9
	Master's degree	144	17.9		Other	24	3.0
	Doctoral degree	11	1.4	Prior NFT purchase experience	Yes	392	48.7
					No	413	51.3

3.2. Procedure

3.2.1. Survey design and participant recruitment

The survey was implemented using LimeSurvey, with data collected through Prolific (https://www.prolific.com), a globally recognized crowdsourcing research platform widely utilized in academic research. The study drew from Prolific's pool of over 150,000 eligible international participants, encompassing diverse demographic and cultural backgrounds. Each participant was compensated for $3 in accordance with Prolific's policies and payment guidelines.

Prolific allows open recruitment within defined demographic criteria. This study did not specifically target individuals with prior NFT purchasing experience; rather, it included participants with varying levels of NFT familiarity to ensure representativeness and capture diverse consumer perspectives. We provided an introduction to NFTs at the beginning of the survey to ensure that participants without prior NFT experience understood what NFTs are and how they function (further details are presented in Section 3.2.2). A brief screening question ("Have you heard of or interacted with NFTs before?") was included to confirm a basic awareness of the concept. Moreover, the study did not apply additional demographic filters such as age, gender, education, income, or country of residence, in order to obtain a more heterogeneous and globally distributed sample. This open recruitment strategy enabled the inclusion of respondents with diverse demographic and cultural backgrounds, as well as varying levels of prior NFT experience.

To ensure survey quality, precision, and clarity, we rigorously optimized the survey's logic and validity. Prior to launching the main data collection, the survey was reviewed by six doctoral researchers, two postdoctoral researchers with expertise in NFTs or survey methodology, and two professors specializing in marketing to evaluate readability, rationale, and clarity. Additionally, we gathered industry insights on the perceived values of NFT art to ensure the survey's relevance and comprehensiveness.

3.2.2. Survey structure

The survey consisted of three main sections. Section 1: At the start of the survey, all participants were required to review and consent to a form that detailed their participation was entirely voluntary and that they could choose to withdraw from the study at any stage without any consequences. To protect participant privacy, all responses were anonymized and securely stored on the university server. Section 2: Given that NFT art is a relatively new and unfamiliar topic for many, this section began with an introduction to NFTs and NFT art to provide participants with foundational knowledge, covering topics such as NFT definitions, characteristics of NFT art, and NFT purchasing methods (see Figure 2 for an example). This section was crafted to maintain a neutral tone and avoid mentioning the variables we intended to measure. Multiple rounds of discussion, internal review, and revisions were conducted

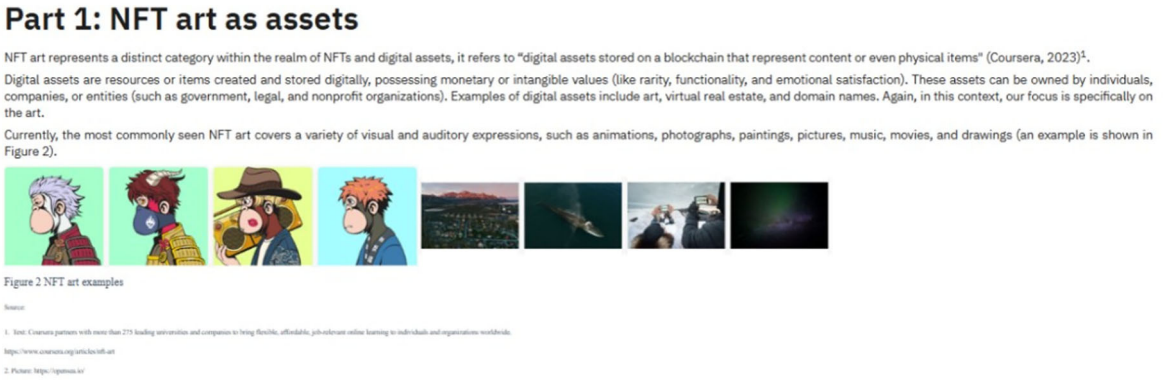

Figure 2. Example of the NFT introduction section.
Note: The NFT examples shown in the figure were obtained via screenshots from the OpenSea platform (https://opensea.io/).

to ensure the section was clear, complete, and unbiased. A 13-question quiz followed the introduction to verify participants' understanding of the material (e.g., "The price of NFT is market-oriented—true/false"). Participants needed to answer all of the questions correctly to proceed to Section 3. Those who did not pass the quiz could either read the introductory content to retake the quiz or exit the survey. Following the quiz, participants were directed to the demographic information section, which included questions about gender, financial attitudes, and other relevant details. A screening question ("Do you have experience buying NFTs?") was included to segment participants into two groups: those with prior NFT purchase experience and those without. Participants with NFT experience answered additional questions about their purchasing experiences, such as "How much did you spend on purchasing NFTs (estimated, in USD)?," "How many NFTs do you own (approximately)," and "How often do you buy NFT art?" Section 3: Participants were asked to report their perceptions and opinions about NFT art, as well as their cultural beliefs. Details of the measurement items are outlined in the subsequent part of the study.

3.2.3. Pilot study

We conducted a pilot study in December 2023 with a sample of 47 participants to identify potential challenges respondents might face and to evaluate the validity of the measurement items. Open-ended feedback was gathered to enhance item clarity, improve readability, and address potential misunderstandings.

3.2.4. Formal study

The formal survey was conducted through the Prolific platform between January and February 2024. To avoid duplicating participants, cookies were set to block repeated participation based on IP addresses, and participants' Prolific IDs were recorded. A total of 875 respondents successfully completed the survey.

3.2.5. Data screening

To maintain data quality and reliability, a rigorous screening process was applied. Participants were excluded from the analysis if they met one or more of the following disqualification criteria: (1) failed two attention check questions, e.g., "If you are still paying attention to the question, please select 1 (strongly disagree)"; or (2) displayed response patterns indicating a lack of engagement, such as selecting the same answer across multiple items; or (3) completed the survey in an unreasonably short amount of time (Meade & Craig, 2012). Following this process, 70 cases (8% of the dataset) were excluded, leaving a final sample of 805 responses for analysis.

The final sample size ($N = 805$) exceeds the recommended thresholds for PLS-SEM. Following the "10-times rule" (Hair et al., 2021), the most complex construct in the model was predicted by 14 value dimensions, requiring a minimum sample of 140 participants. The obtained sample thus exceeds this requirement and provides robust statistical power. To further confirm adequacy, we conducted a priori power analysis using G*Power 3.1 (F tests; Linear multiple regression: Fixed model, R^2 deviation from zero). With parameters set at $f^2 = 0.15$ (medium effect), $\alpha = 0.05$, and desired power = 0.95, the analysis indicated a minimum required sample size of $N = 194$ (numerator $df = 14$; denominator $df = 179$; critical $F = 1.747$). Our actual sample ($N = 805$) substantially exceeds this threshold, confirming that the study is well powered for detecting medium effects in the proposed model.

3.3. Measurement

Building on established scales and insights from prior research, the authors either adapted or developed measurement items to capture the 14 dimensions of consumer-perceived value, ensuring alignment with the objectives of this study. Specifically, new scales for authenticity and security were proposed based on recent studies on blockchain technology and NFTs. For instance, recognizing that "the distributed ledger technology helps to authenticate ownership of a digital asset" (Chohan, 2024), we included items "NFT art generally features verified ownership" and "NFT art generally has proven authenticity."

For the dimensions of information transparency and uniqueness, we adapted existing scales and added items to enhance their relevance to our study. In terms of information transparency, we added the item "NFT art generally has publicly visible information records," reflecting the transparency of blockchain transactions, where all transactions are visible to the public (Valeonti et al., 2021). Regarding uniqueness, we adapted the measurement scale by splitting an original item: "These BNFTs are really special and different to others" (Lee et al., 2023) into two separate items: "NFT art generally exhibits a degree of scarcity" and "NFT art generally possesses a certain level of specialness." This adaptation better reflects the varied attributes of uniqueness inherent in NFT art. Additionally, consumer attitude, purchase intention, WOM, uncertainty avoidance, and long-term orientation were adapted from extant research. All measurements employed a 7-point Likert scale, with responses ranging from 1 ("strongly disagree") to 7 ("strongly agree"), as outlined in Table 2. Both adapted and newly developed items were rigorously reviewed, discussed, and refined by an expert panel that comprised of four senior researchers, each holding a Ph.D. in either economics or business management and having knowledge about NFTs. All measurement items demonstrated satisfactory outer loadings ranging from 0.643 to 0.952, which exceeded the recommended threshold. Given that loadings as low as 0.40 are acceptable in exploratory research, these results confirm adequate indicator reliability and support the convergent validity of the constructs (Hair, Ringle, et al., 2013).

3.4. Validity and reliability

The research model was tested using PLS-SEM in SmartPLS 4. This method was selected because it is well-suited for exploratory research and construct validation, particularly when data may deviate from normal distribution assumptions (Chin et al., 2003; Marcoulides et al., 2009). Although PLS-SEM does not provide global goodness-of-fit indices like covariance-based SEM, its predictive orientation, capacity to handle complex and hierarchical models, and flexibility regarding data distribution make it the most appropriate and robust method for analyzing this study's exploratory and multidimensional framework (Hair et al., 2017).

The model, incorporating moderators, was assessed for validity and reliability, with all variables based on reflective measures. To evaluate convergent validity, Cronbach's alpha (α), composite reliability (CR), and average variance extracted (AVE) were calculated (Table 3). All metrics exceeded the established thresholds from the literature: $\alpha > 0.7$, CR > 0.7, and AVE > 0.5 (Fornell & Larcker, 1981; Nunnally, 1994). As no data was missing, imputation methods were unnecessary. These results confirm that the model satisfies the convergent validity and reliability requirements.

Discriminant validity was evaluated through three methods. First, item cross-loadings were examined to ensure that each item's loading on its intended construct exceeded its loading on any other construct (Hair, Ringle, et al., 2013), resulting in the removal of item COS 3. Second, the Fornell-Larcker criterion was applied (Table 4), comparing the square root of the AVE for each construct with the highest correlation between constructs (Fornell & Larcker, 1981). Additionally, no inter-correlation should exceed 0.9 (Pavlou et al., 2007). During this analysis, issues were identified with the PI and WOM constructs, leading to the removal of item PI 3. Third, we applied the Heterotrait-Monotrait Ratio of Correlations (HTMT) (Henseler et al., 2015), following the criterion that validity is deemed insufficient if the HTMT value reaches 1. In our analysis, all HTMT values fell below this threshold, and none of the corresponding confidence intervals (CI) included zero, confirming discriminant validity and statistical significance (Hair et al., 2021). Together, these tests confirmed that discriminant validity was adequately established.

To mitigate common method bias (CMB), several procedural remedies were implemented during the survey design stage. All items were phrased using neutral wording, presented in a randomized order, and responses were collected anonymously for academic purposes only. Statistically, potential CMB was assessed using Harman's single-factor test, conducted through an unrotated principal component analysis in SPSS (Podsakoff et al., 2003). The first factor accounted for 49.92% of the total variance, which is below the commonly applied 50% threshold for indicating substantial CMB (Fuller et al., 2016).

In addition, measurement invariance was examined using the Measurement Invariance of Composite Models (MICOM) procedure in SmartPLS. Respondents were divided into high and low groups based

Table 2. Measurements.

Construct	Code	Item	Loading (C)	Sources
NFT technology-related perceived value				
Authenticity	AUT 1	NFT art generally features verified ownership	0.783	Chohan, 2024; Park et al., 2022
	AUT 2	NFT art generally ensures that the art piece is the original one	0.809	
	AUT 3	NFT art generally avoids unauthorized copying	0.814	
	AUT 4	NFT art generally has proven authenticity	0.853	
Security	SEU 1	NFT art can generally be protected from fraud issues	0.840	Iansiti and Lakhani, 2017; Park et al., 2022
	SEU 2	NFT art generally has a secure transaction process	0.785	
	SEU 3	NFT art can generally be protected from hacking	0.837	
	SEU 4	NFT art generally has untampered information (untampered means retaining an original and unaltered state)	0.726	
Information transparency	INT 1	NFT art generally has publicly visible information records	0.738	Malik et al., 2021; Valeonti et al., 2021
	INT 2	NFT art generally has transparent access to its information records	0.835	
	INT 3	NFT art generally has a transparent view of any activity in the information records	0.874	
	INT 4	NFT art generally has a transparent flow (the entire lifecycle of data) of the information record	0.889	
Novelty	NOV 1	The combination of NFT and art is imaginative	0.835	Huang, 2003
	NOV 2	The combination of NFT and art is surprising	0.827	
	NOV 3	The combination of NFT and art is innovative	0.880	
	NOV 4	The combination of NFT and art is new	0.690	
Uniqueness	UNI 1	NFT art is generally highly unique	0.878	Franke and Schreier, 2008; Lee et al., 2023
	UNI 2	NFT art is generally one of a kind	0.836	
	UNI 3	NFT art generally possesses a certain level of specialness	0.895	
	UNI 4	NFT art generally exhibits a degree of scarcity	0.643	
Art-related perceived value				
Esthetics	AES 1	NFT art is generally visually or auditorily striking	0.864	Homburg et al., 2015
	AES 2	NFT art is generally good-looking or good-sounding	0.922	
	AES 3	NFT art generally looks or sounds appealing	0.935	
Return on investment	ROI 1	NFT art is generally a good financial investment	0.911	He et al., 2018
	ROI 2	NFT art generally experiences price increases over time	0.846	
	ROI 3	NFT art is generally a good store of value (its price will not diminish surprisingly)	0.878	
	ROI 4	NFT art generally enables one to make more money	0.813	
Artists/developers' attractiveness	ATR 1	NFT art generally involves artists/developers whom I like	0.871	Torres et al., 2019
	ATR 2	NFT art generally involves well-recognized artists/developers	0.861	
	ATR 3	NFT art generally involves artists/developers with a good reputation	0.886	
	ATR 4	NFT art generally involves artists/developers who make me feel comfortable	0.901	
Self-expressiveness	SEE 1	NFT art generally helps me represent what kind of person I am	0.897	De Vries et al., 2017
	SEE 2	NFT art generally crafts my identity	0.914	
	SEE 3	NFT art generally lets me express myself	0.910	
	SEE 4	NFT art generally lets me shape my own identity/personality	0.920	
Product-related perceived value				
Enjoyment	ENJ 1	NFT art is generally enjoyable	0.897	Van der Heijden, 2004
	ENJ 2	NFT art is generally exciting	0.923	
	ENJ 3	NFT art is generally pleasant	0.922	
	ENJ 4	NFT art is generally interesting	0.925	
Subjective norms	SBN 1	People I know would think that buying NFT art is a good idea (if they are familiar with NFTs)	0.891	Hamari and Koivisto, 2015
	SBN 2	People who influence my attitudes would recommend NFT art (if they are familiar with NFTs)	0.930	
	SBN 3	People who are important to me would think positively of me purchasing NFT art (if they are familiar with NFTs)	0.951	
	SBN4	People whom I appreciate would encourage me to buy NFT art (if they are familiar with NFTs)	0.948	
Sense of community	SOC 1	NFT art enables me to feel like a member of NFT community	0.902	Peterson et al., 2008
	SOC 2	NFT art enables me to feel that I belong to a community	0.939	
	SOC 3	NFT art enables me to feel connected to other people of a community	0.949	
	SOC 4	NFT art enables me to have a good bond with others in the NFT community	0.939	
Cost	COS 1	NFT art is generally reasonably priced	0.835	Sweeney and Soutar, 2001

(*continued*)

Table 2. Continued.

Construct	Code	Item	Loading (C)	Sources
	COS 2	NFT art generally offers value for money	0.916	
	COS 3	NFT art is generally a good product for the price	omitted	
	COS 4	NFT art would be generally economical	0.886	
Quality	QUA 1	NFT art, on average, exhibits consistent quality (based on my perception)	0.878	Sweeney and Soutar, 2001
	QUA 2	NFT art, on average, is well-made (based on my perception)	0.903	
	QUA 3	NFT art, on average, maintains an acceptable standard of quality (based on my perception)	0.904	
	QUA 4	NFT art, on average, would perform consistently (based on my perception)	0.875	
Attitude and intention				
Attitude	ATT 1	NFT art is generally thought to be a wise thing	0.877	Hamari and Koivisto, 2015
(R^2= 0.893, Q^2=0.886)	ATT 2	NFT art is generally a positive thing	0.917	
	ATT 3	NFT art is generally a good idea	0.931	
	ATT 4	NFT art is generally favorable	0.914	
Purchase intention	PUI 1	I intend to purchase NFT art rather than not purchasing it	0.937	Bhattacherjee, 2001
(R^2= 0.76, Q^2=0.729)	PUI 2	My intention is to purchase NFT art rather than other forms of art	0.941	
	PUI 3	If I could, I would like not to purchase NFT art (*, reverse)	omitted	
Word-of-mouth	WOM 1	How likely are you to spread positive word-of-mouth of NFT art?	0.924	Maxham III, 2001
(R^2= 0.851, Q^2=0.836)	WOM 2	I would recommend NFT art to my friends	0.952	
	WOM 3	Given my experience with NFT art, I would not recommend it to my friends (*, reverse)	0.682	
	WOM 4	If my friends were looking for art, I would tell them to try NFT art	0.936	
Cultural dimension				
Uncertainty avoidance	UNA 1	I believe it is important to have instructions spelled out in detail so that I always know what I'm expected to do.	0.811	Yoo et al., 2011
	UNA 2	I think it is important to closely follow instructions and procedures.	0.858	
	UNA 3	For me, rules and regulations are important because they inform me of what is expected of me.	0.829	
	UNA 4	Personally, standardized work procedures are helpful.	0.787	
	UNA 5	For me, instructions for operations are important.	0.873	
Long-term orientation	LTO 1	I tend to think that using my money carefully in the present is wise because it allows me to save for the future.	0.720	Yoo et al., 2011
	LTO 2	I believe that failure should not stop me from trying again and again.	0.665	
	LTO 3	I think that working hard now is essential for achieving success in the future.	0.769	
	LTO 4	I believe in the importance of being secure in the future, which is why I prefer long-term planning.	0.785	
	LTO 5	I don't mind giving up today's fun for success in the future.	0.712	

Table 3. The reliability and convergent validity of the reflective measures.

Construct	α	CR	Ave
Authenticity	0.832	0.888	0.664
Security	0.811	0.875	0.638
Information transparency	0.857	0.902	0.699
Novelty	0.826	0.884	0.658
Uniqueness	0.833	0.889	0.671
Esthetics	0.893	0.933	0.824
Return on investment	0.885	0.921	0.744
Artists/developers' attractiveness	0.903	0.932	0.774
Self-expressiveness	0.931	0.951	0.829
Enjoyment	0.937	0.955	0.841
Subjective norms	0.948	0.963	0.866
Sense of community	0.950	0.964	0.870
Cost	0.854	0.911	0.774
Quality	0.912	0.938	0.792
Attitude	0.931	0.951	0.828
Purchase intention	0.867	0.937	0.882
Word-of-mouth	0.900	0.932	0.776
Uncertainty avoidance	0.889	0.918	0.693
Long-term orientation	0.784	0.851	0.535

Note: α: Cronbach's alpha; CR: composite reliability; AVE: average variance extracted.

on mean splits for uncertainty avoidance and long-term orientation. The results showed that all constructs satisfied the criterion for compositional invariance ($p > 0.05$), indicating that respondents across different levels of cultural values interpreted the constructs in a comparable manner (Henseler et al., 2016). This establishes partial measurement invariance, supporting the valid interpretation of moderation effects involving cultural dimensions in the PLS-SEM model.

3.5. Model fit

To evaluate model fit, we employed the Standardized Root Mean Square Residual (SRMR), a metric used to determine how well the estimated model reproduces the observed covariance matrix. The SRMR value was 0.047, meeting the criteria for a good model fit (Hu & Bentler, 1999). We also assessed the in-sample predictive power using R^2, and the out-of-sample predictive using Q^2 (Hair et al., 2019). R^2 values range from 0 (weak explanatory capacity) to 1 (strong explanatory capacity). In our model, R^2 values were 89.3% for attitudes, 76% for purchase intentions, and 85.1% for WOM. A positive Q^2 value indicates that the model's predictive error is smaller than that of using mean values alone (the baseline prediction error), thereby demonstrating better predictive performance. Our findings show that Q^2 values were 88.6% for attitudes, 72.9% for purchase intentions, and 83.6% for WOM, confirming predictive relevance across all constructs.

Meanwhile, multicollinearity at the construct level was assessed using variance inflation factors (VIF). With a large sample size ($n > 500$), all values were below 10 (range = 1.78–9.55), which satisfies the classical regression threshold (Hair, Black, et al., 2013; Kutner, 2005), and most were below or close to 5, which represents the more conservative guideline for PLS-SEM. These results indicate that multicollinearity is not a major concern. Slightly higher VIF values for certain constructs (e.g., enjoyment and esthetics) likely reflect conceptual proximity, meaning that these dimensions capture related facets of hedonic value rather than problematic redundancy. This interrelatedness is theoretically consistent with the multidimensional nature of consumer perceived value.

4. Results

A three-step structural modeling analysis was conducted for the primary model and models with two primary categories of moderators. Section 4.1 shows the results of the primary research model, examining the impact of perceived value on attitudes and behavioral intentions toward NFT art. Section 4.2 reports the moderating effects of uncertainty avoidance, long-term orientation, and prior NFT purchase

Table 4. Discriminant validity.

	AUT	SEC	INT	NOV	UNI	AES	ROI	ATR	SEE	ENJ	SBN	SOC	COS	QUA	ATT	PUI	WOM	UNA	LTO
AUT	0.815																		
SEC	0.771	0.799																	
INT	0.732	0.690	0.836																
NOV	0.671	0.616	0.560	0.811															
UNI	0.754	0.675	0.577	0.780	0.819														
AES	0.614	0.590	0.514	0.780	0.780	0.908													
ROI	0.529	0.546	0.418	0.654	0.695	0.754	0.863												
ATR	0.601	0.597	0.509	0.703	0.727	0.811	0.788	0.880											
SEE	0.518	0.534	0.424	0.677	0.679	0.780	0.755	0.809	0.910										
ENJ	0.621	0.600	0.525	0.798	0.793	0.895	0.762	0.842	0.801	0.917									
SBN	0.485	0.501	0.394	0.614	0.651	0.733	0.796	0.760	0.792	0.755	0.930								
SOC	0.594	0.576	0.509	0.682	0.689	0.769	0.686	0.774	0.858	0.798	0.720	0.933							
COS	0.541	0.557	0.438	0.656	0.698	0.768	0.848	0.804	0.796	0.786	0.795	0.731	0.880						
QUA	0.610	0.602	0.495	0.740	0.777	0.878	0.825	0.845	0.795	0.878	0.787	0.768	0.823	0.890					
ATT	0.618	0.606	0.505	0.768	0.770	0.857	0.837	0.840	0.819	0.894	0.834	0.776	0.853	0.885	0.910				
PUI	0.455	0.476	0.370	0.590	0.614	0.708	0.772	0.739	0.789	0.740	0.819	0.726	0.775	0.751	0.796	0.939			
WOM	0.537	0.532	0.437	0.680	0.708	0.789	0.822	0.788	0.822	0.825	0.864	0.775	0.828	0.829	0.876	0.867	0.881		
UNA	0.274	0.259	0.258	0.328	0.322	0.347	0.338	0.337	0.301	0.327	0.285	0.342	0.308	0.346	0.326	0.277	0.302	0.832	
LTO	0.315	0.277	0.290	0.331	0.333	0.328	0.294	0.321	0.296	0.333	0.300	0.343	0.299	0.305	0.300	0.293	0.345	0.500	0.731

Note: NFT technology-related values: AUT: authenticity; SEC: security; INT: information transparency; NOV: novelty; UNI: uniqueness; art-related values: AES: esthetic; ROI: return on investment; ATR: artists/developers' attractiveness; SEE: self-expressiveness; product-related values: ENJ: enjoyment; SBN: subjective norms; SOC: sense of community; COS: cost; QUA: quality; ATT: attitude; PUI: purchase intention; WOM: word-of-mouth; UNA: uncertainty avoidance; LTO: long-term orientation.

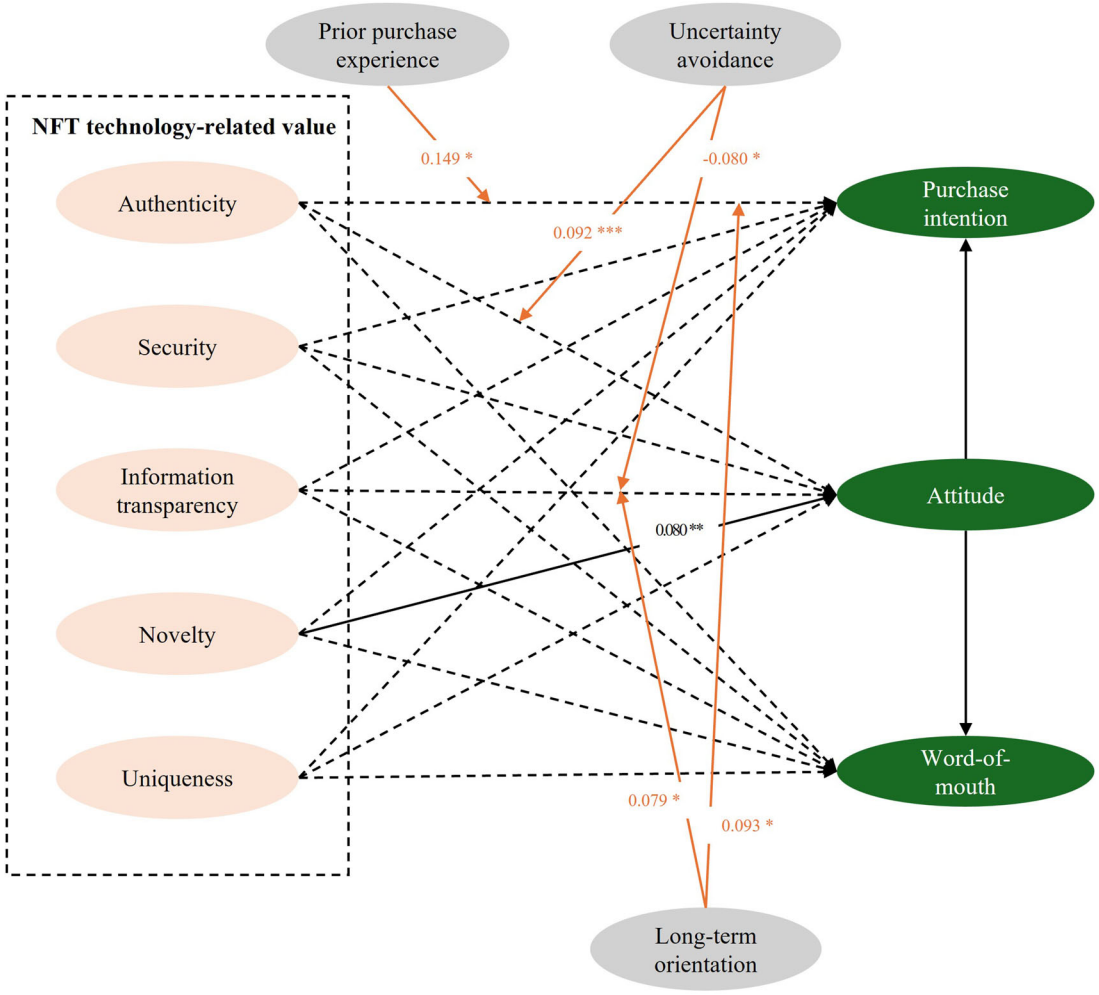

Figure 3. Impact of NFT technology-related value.
Note:
• This result is derived from the full model presented in Figure 1. In the current figure, only the NFT technology-related value paths are displayed for clarity.
• Dashed lines indicate non-significant paths, whereas solid lines represent significant paths.

experience (Figures 3–5). All models were tested with five control variables (gender, age, education, employment, income).

4.1. Main effects

For NFT technology-related values, novelty showed a statistically significant positive association with consumer attitudes ($\beta = 0.080$, $p = 0.001$). None of the other NFT technology-related values demonstrated significant relationships with purchase intentions or WOM. For art-related values, ROI was positively associated with consumer attitudes ($\beta = 0.108$, $p < 0.001$), purchase intentions ($\beta = 0.171$, $p < 0.001$), and WOM ($\beta = 0.128$, $p < 0.001$). Self-expressiveness also showed significant positive associations with purchase intentions ($\beta = 0.175$, $p < 0.001$) and WOM ($\beta = 0.093$, $p = 0.011$). Artists/developers' attractiveness exhibited a small but significant negative association with WOM ($\beta = -0.069$, $p = 0.035$), while esthetics was not significantly related to any of the outcome variables. For product-related values, several factors displayed statistically significant associations with consumer attitudes, including enjoyment ($\beta = 0.304$, $p < 0.001$), subjective norms ($\beta = 0.190$, $p < 0.001$), cost ($\beta = 0.155$, $p < 0.001$), and quality ($\beta = 0.125$, $p = 0.001$). Subjective norms ($\beta = 0.327$, $p < 0.001$), sense of community ($\beta = 0.091$, $p = 0.031$), and cost ($\beta = 0.092$, $p = 0.029$) were positively associated with purchase intentions. Enjoyment ($\beta = 0.135$, $p = 0.002$), subjective norms ($\beta = 0.316$, $p < 0.001$), sense of community ($\beta = 0.097$, $p = 0.006$), and cost ($\beta = 0.083$, $p = 0.021$) were positively associated with WOM.

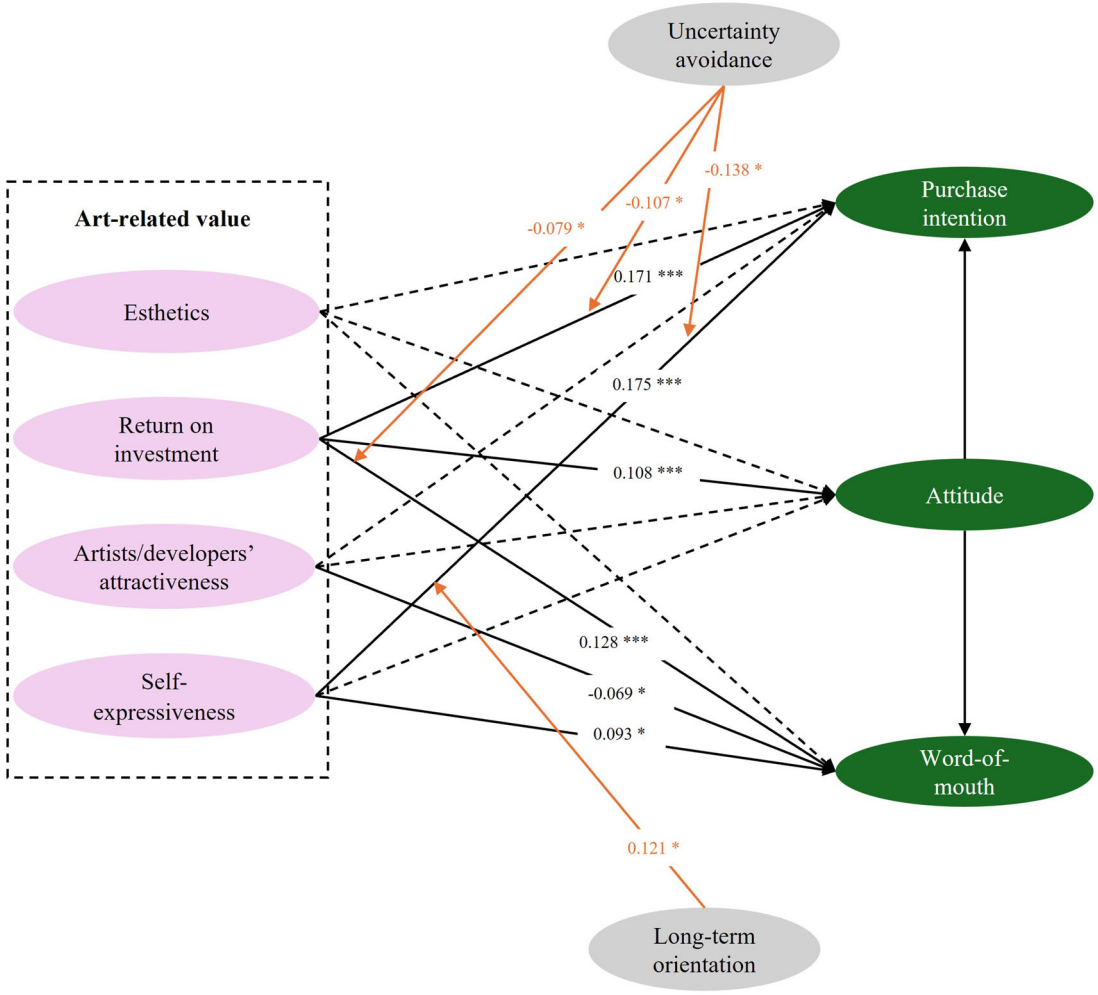

Figure 4. Impact of art-related value.

Note:

- This result is derived from the full model presented in Figure 1. In the current figure, only the art-related value paths are displayed for clarity.
- Dashed lines indicate non-significant paths, whereas solid lines represent significant paths.
- The moderator prior purchase experiences is not included in this figure because it did not exhibit any statistically significant moderating effect.

Furthermore, consumer attitudes were significantly associated with both purchase intentions ($\beta = 0.147$, $p = 0.016$) and WOM ($\beta = 0.228$, $p < 0.001$). A complete summary of standardized path coefficients is reported in Table 5.

Regarding control variables, gender, age, education, employment status, and income were not significantly related to attitudes or WOM. However, gender showed a significant positive association with purchase intentions ($\beta = 0.193$, $p < 0.001$). With male coded as the reference category, this result indicates that male participants reported higher purchase intentions compared with female participants.

4.2. Moderation effects

The moderating analyses showed that uncertainty avoidance and long-term orientation exhibited limited overall effects. Uncertainty avoidance showed a positive moderating association with the link between authenticity and consumer attitudes ($\beta = 0.092$, $p < 0.001$) and with the relationship between quality and purchase intentions ($\beta = 0.151$, $p = 0.011$). Conversely, it showed negative moderating associations for the relationship between uniqueness and attitudes ($\beta = -0.080$, $p = 0.012$), as well as for the associations of ROI ($\beta = -0.107$, $p = 0.034$), self-expressiveness ($\beta = -0.138$, $p = 0.019$), and enjoyment ($\beta = -0.165$, $p = 0.003$) with purchase intentions. Uncertainty avoidance also negatively moderated the association between ROI and WOM ($\beta = -0.079$, $p = 0.037$).

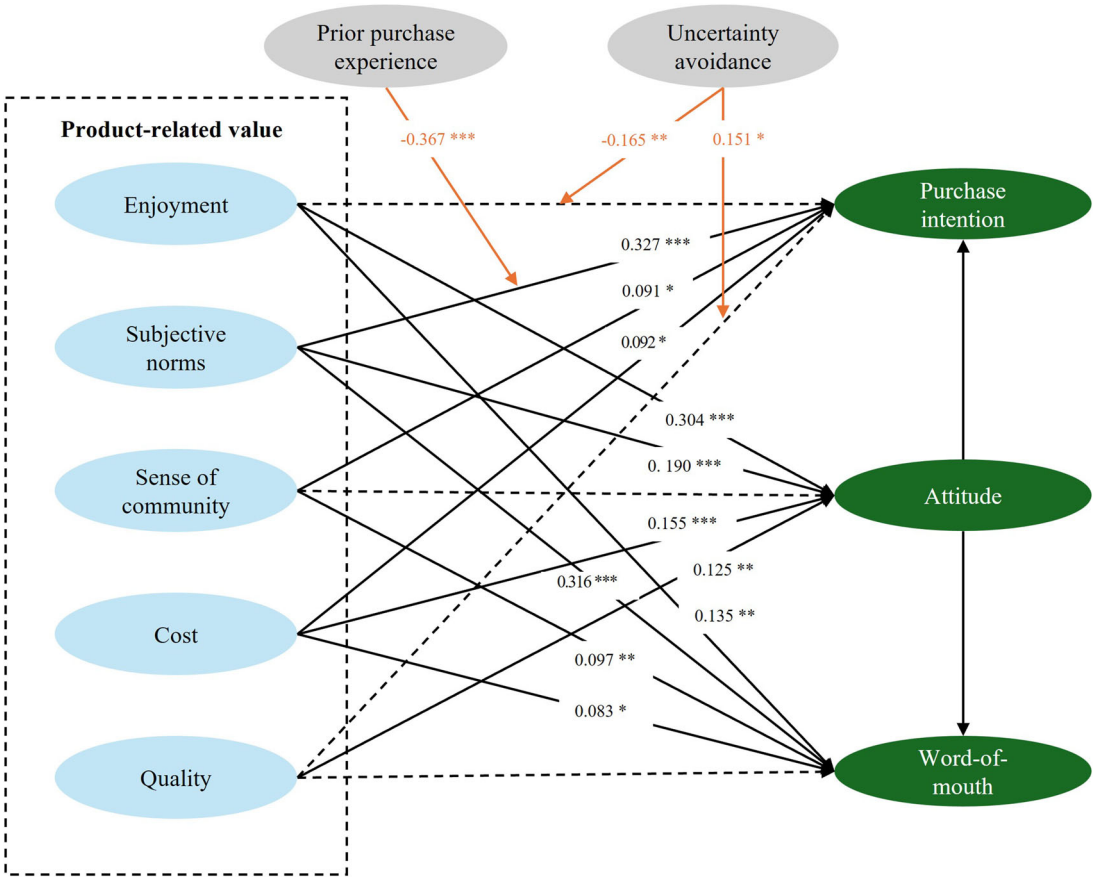

Figure 5. Impact of product-related value.

Note:

- This result is derived from the full model presented in Figure 1. In the current figure, only the product-related value paths are displayed for clarity.
- Dashed lines indicate non-significant paths, whereas solid lines represent significant paths.
- The moderator long-term orientation is not included in this figure because it did not exhibit any statistically significant moderating effect.

Long-term orientation strengthened the relationships between uniqueness and attitudes ($\beta = 0.079$, $p = 0.022$), authenticity ($\beta = 0.093$, $p = 0.026$) and purchase intentions, and self-expressiveness ($\beta = 0.121$, $p = 0.045$) and purchase intentions.

Prior NFT purchase experience strengthened the association between authenticity and purchase intentions ($\beta = 0.149$, $p = 0.040$) and weakened the association between subjective norms and purchase intentions ($\beta = -0.367$, $p < 0.001$).

5. Discussion

To interpret the empirical findings in relation to the research questions, this section synthesizes the results through three themes: the effects of perceived values on consumers' behavior intentions (**RQ 1**), the moderating roles of cultural orientations (**RQ 2.1**), and the moderating role of prior NFT experience (**RQ 2.2**). Overall, our findings showed that product-related values exerted the strongest influence on consumers' behavioral intentions, followed by art-related values, whereas NFT technology-related values exhibited comparatively weaker effects. Furthermore, uncertainty avoidance, long-term orientation, and prior experience exhibited selective and limited moderating effects on the relationships between perceived values and behavioral intentions. The following discussion highlights and interprets the most salient findings in light of the research questions and the broader literature.

Table 5. Effects of perceived value on attitude, purchase intention, and WOM.

Perceived value		β	S	p	95% CI	
NFT technology-related value						
Authenticity	Attitude	0.044		0.079	−0.004	0.096
Security		0.003		0.894	−0.043	0.048
Information transparency		−0.002		0.904	−0.043	0.037
Novelty		0.080	**	0.001	0.032	0.128
Uniqueness		−0.020		0.479	−0.077	0.034
Authenticity	Purchase intention	−0.026		0.463	−0.096	0.043
Security		−0.023		0.528	−0.092	0.047
Information transparency		−0.010		0.726	−0.064	0.044
Novelty		−0.039		0.219	−0.100	0.024
Uniqueness		−0.032		0.417	−0.110	0.047
Authenticity	Word-of-mouth	−0.007		0.802	−0.063	0.052
Security		−0.033		0.236	−0.089	0.021
Information transparency		0.004		0.882	−0.043	0.052
Novelty		−0.025		0.376	−0.078	0.032
Uniqueness		0.024		0.448	−0.038	0.084
Art-related value						
Esthetics	Attitude	0.039		0.276	−0.029	0.111
Return on investment		0.108	***	<0.001	0.055	0.162
Artists/developers' attractiveness		0.010		0.760	−0.053	0.073
Self-expressiveness		0.043		0.208	−0.023	0.111
Esthetics	Purchase intention	−0.020		0.639	−0.105	0.061
Return on investment		0.171	***	<0.001	0.087	0.252
Artists/developers' attractiveness		0.011		0.800	−0.076	0.096
Self-expressiveness		0.175	***	<0.001	0.083	0.269
Esthetics	Word-of-mouth	−0.018		0.662	−0.096	0.063
Return on investment		0.128	***	<0.001	0.065	0.190
Artists/developers' attractiveness		−0.069	*	0.035	−0.134	−0.005
Self-expressiveness		0.093	*	0.011	0.021	0.164
Product-related value						
Enjoyment	Attitude	0.304	***	<0.001	0.231	0.377
Subjective norms		0.190	***	<0.001	0.139	0.238
Sense of community		−0.033		0.275	−0.093	0.025
Cost		0.155	***	<0.001	0.097	0.210
Quality		0.125	**	0.001	0.052	0.202
Enjoyment	Purchase intention	0.074		0.131	−0.024	0.172
Subjective norms		0.327	***	<0.001	0.234	0.418
Sense of community		0.091	*	0.031	0.006	0.171
Cost		0.092	*	0.029	0.010	0.174
Quality		−0.019		0.715	−0.122	0.083
Enjoyment	Word-of-mouth	0.135	**	0.002	0.050	0.221
Subjective norms		0.316	***	<0.001	0.239	0.391
Sense of community		0.097	**	0.006	0.027	0.165
Cost		0.083	*	0.021	0.012	0.152
Quality		0.029		0.471	−0.049	0.110
Purchase intention and WOM						
Attitude	Purchase intention	0.147	*	0.016	0.026	0.264
Attitude	Word-of-mouth	0.228	***	<0.001	0.133	0.316
Control variables						
Gender	Attitude	−0.003		0.894	−0.051	0.043
Age		0.041		0.362	−0.073	0.106
Education		−0.022		0.484	−0.072	0.053
Employment		−0.015		0.732	−0.104	0.066
Income		0.063		0.443	−0.142	0.167
Gender	Purchase intention	0.193	***	<0.001	0.118	0.266
Age		−0.093		0.355	−0.243	0.170
Education		−0.050		0.403	−0.132	0.104
Employment		0.059		0.313	−0.079	0.159
Income		−0.028		0.758	−0.167	0.180
Gender	Word-of-mouth	−0.029		0.327	−0.088	0.028
Age		−0.035		0.558	−0.141	0.098
Education		−0.052		0.321	−0.110	0.089
Employment		0.002		0.964	−0.084	0.067
Income		−0.047		0.452	−0.138	0.106

Note: S: significance; *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$; CI: confidence interval.

5.1. The impacts of perceived value of NFT art on consumers' attitudes, purchase intentions, and willingness to recommend

5.1.1. The impact of NFT technology-related values

Our results indicate that only the technological novelty of NFTs, stemming from their distinctiveness relative to traditional art forms, was significantly associated with consumer attitudes. This aligns with previous findings that novelty enhances consumer engagement by providing a differentiated experience (Choi & Johnson, 2019). However, this interest did not translate into purchase or WOM intentions. A plausible explanation is that novelty simultaneously introduces perceived risk (Chavas & Nauges, 2020), which may discourage behavioral intentions when real financial costs and uncertainties are involved.

Other NFT technology-related values did not demonstrate significant effects on consumer attitudes and behavior intentions. This diverges from earlier studies that identify authenticity as a predictor of consumer behavioral intentions (Paschina, 2023; Razmus et al., 2024; Yang et al., 2022). A potential explanation lies in the limitations of blockchain verification, which confirms token ownership but does not necessarily confer legal rights to the underlying digital asset, such as copyright or commercial use (Polenakis et al., 2024). Moreover, many consumers lack a technical understanding of how blockchain ensures the authenticity of NFTs, which may weaken the behavioral relevance of this value dimension.

Similarly, security did not yield significant effects despite being a core promise of blockchain technologies. This could stem from persistent security concerns associated with blockchain-related products, including vulnerabilities in decentralized finance protocols and smart contracts (Das et al., 2022). Negative reports and past scandals involving blockchain-based products such as Race Attack, Finney Attack, and cryptocurrency thefts (Biryukov & Tikhomirov, 2019; Moubarak et al., 2018) may have shaped skeptical cognitive schemas, thereby eroding consumers' perceived value of the security of NFTs.

Regarding information transparency, prior research has shown that greater information transparency can enhance behavioral intentions (Yang et al., 2022; Zhou et al., 2018). However, this relationship did not hold in the NFT context. This may be because perceived transparency depends on which aspects of information consumers value, such as product features, vendor reputation, and warranty policies, rather than price and privacy information (Zhou et al., 2018). According to schema theory, individuals interpret new information through the lens of prior knowledge and experiences (Winn, 2013; Zhou et al., 2018). Consumers accustomed to transparent e-commerce systems may already take information accessibility for granted, diminishing its perceived importance. Furthermore, transparency is often associated with both trust and perceived risk (Fu et al., 2025). In the context of NFTs, however, trust and risk are primarily based on decentralized technologies rather than human intermediaries (Tan & Saraniemi, 2023). This technological reliance may dilute the perceived benefits of transparency, as confidence in blockchain systems depends on consumers' understanding and belief in the reliability of the underlying technology. Consequently, the positive effect of information transparency on behavioral intentions may be mitigated, leading to insignificant results.

With respect to uniqueness, prior studies present contradictory evidence: uniqueness can enhance desirability (Efendioğlu, 2023; Lee et al., 2023; Mardon & Belk, 2018; Xie et al., 2024), yet it may also deter purchase intentions (Fortagne & Lis, 2024). Our findings indicated no significant effect. This result may be explained by opposing psychological pathways. On one hand, uniqueness increases hedonic appeal by signaling exclusivity; on the other hand, in NFT markets, extreme uniqueness may reduce utilitarian expectations by limiting future buyer interest and lowering anticipated financial returns. These competing effects likely counteract one another, producing the observed nonsignificant relationship (Fortagne & Lis, 2024).

5.1.2. The impact of art-related values

The findings indicate that consumers tended to view NFT art primarily as an investment vehicle rather than as an esthetic or cultural product when deciding whether to purchase or share it. This aligns with previous studies showing that ROI considerations are central to cryptocurrencies (Mishra et al., 2023) and parallels traditional art markets where financial valuation and speculation have long been critical

determinants of demand (Lee & Cha, 2024; Mei & Moses, 2002). This highlights a growing trend in the virtual economy, where artistic expression and financial investment increasingly converge.

Moreover, consumers' intentions to purchase and disseminate NFT art were driven by its capacity to express identity and foster emotional connection. This finding is consistent with prior research emphasizing self-expressiveness as a key motivation in art collecting and virtual ownership contexts, where artworks allow individuals to express inner values, signal social distinction, and reinforce self-concept (Formanek, 1991; McIntosh & Schmeichel, 2004). It also aligns with studies indicating that expressive value enhances WOM and advocacy behaviors in NFT contexts (Xie et al., 2024). From a psychological perspective, this relationship can be understood through psychological ownership theory, which posits that ownership helps individuals to define themselves, express identity to others, and maintain a sense of continuity over time (Pierce et al., 2003). When consumers perceive that NFT art enables them to express their identity, they are more likely to develop a stronger sense of psychological ownership, thereby increasing their purchase intentions and willingness to recommend to others.

However, in contrast to prior studies showing that esthetics can influence purchase intentions in virtual items and NFT contexts (Fortagne & Lis, 2024; Marder et al., 2019). Our findings indicate that esthetic value exerted an insignificant impact on consumer behavior within the NFT art context. One possible explanation lies in the growing integration of AI-generated art within NFTs (Maidin et al., 2025). Existing research suggests that non-experts do not differentiate significantly between AI- and human-created artworks in terms of appreciation, purchase intention, or collection interest, whereas art experts tend to evaluate AI-generated works less favorably (Gu & Li, 2022). These opposing effects may offset each other, thereby diminishing the overall influence of esthetic value. Moreover, esthetics is inherently subjective, and the NFT ecosystem is strongly shaped by rapidly shifting market trends rather than purely by artistic appeal. As a result, consumers may prioritize other values such as investment potential or symbolic meaning over the visual or auditory appeal of the art.

Similarly, artist or developer attractiveness showed a limited and slightly negative impact on consumer behavior, particularly regarding WOM. This finding contrasts with the traditional art market, where the reputation of established figures such as Van Gogh or Picasso substantially enhances consumers' behavioral intentions. One possible explanation is that artistic reputation and perceived attractiveness require time and consistent public exposure to develop. In contrast, the NFT art market is relatively new and largely populated by emerging or lesser-known creators who possess limited public recognition or perceived expertise. This lack of established reputation may weaken the influence of creator attractiveness and expertise on consumer evaluations, thereby reducing WOM intentions (Sun et al., 2021).

5.1.3. The impact of product-related values

Our findings indicate that the pleasure derived from NFT art emerged as a key driver of positive consumer attitudes and WOM intentions, consistent with previous studies showing that enjoyment enhances favorable evaluations and sharing intentions (Huang et al., 2017; Widyastuti et al., 2024). However, its effect on purchase intentions was less direct. This finding diverges from prior research identifying enjoyment as a strong predictor of purchase intentions in virtual items and gaming contexts (Franque et al., 2020; Hermawan et al., 2023), as well as earlier NFT research suggesting a direct link between pleasure and buying behaviors (Griffiths et al., 2024). The weaker relationship observed here may reflect the dual nature of NFT art as both a creative and financial asset, where rational evaluation of cost and investment potential tempers the influence of emotional enjoyment (Kumar & Goyal, 2016). In other words, while enjoyment enhances the emotional appeal of NFT art, consumers may hesitate to purchase if the perceived price is too high or if the product offers hedonic satisfaction without clear utilitarian or financial justification.

In terms of social value, subjective norms played a critical role in shaping consumer attitudes, purchase intentions, and WOM intentions toward NFT art. This finding aligns with prior research demonstrating that peer influence drives decision-making across various contexts, ranging from virtual goods to traditional asset purchases (Ajzen, 1991; Mäntymäki & Salo, 2015; Mishra et al., 2023). Likewise, sense of community was associated with purchase intentions and WOM, but not with consumer

attitudes. This pattern suggests that community participation functions as a behavioral motivator rather than an attitudinal driver. Consistent with findings in virtual goods and cryptocurrency contexts, community engagement appears crucial to value creation, as most trades occur in online marketplaces, fostering a sense of identity and enhancing social standing (Marder et al., 2019; Yilmaz et al., 2023).

Cost (value for money) was also positively associated with attitudes, purchase intentions, and WOM. This finding aligns with prior literature highlighting that cost plays a central role in fostering favorable consumer behavior (Fortagne & Lis, 2024; Rajaguru, 2016). In NFT art, cost is interpreted through perceived value for money rather than through objective standards. Because NFTs lack clear functional benchmarks, consumers rely on subjective perception, market trends, and contextual factors such as potential financial return and symbolic appeal (Nadini et al., 2021). Price thus acts as a diagnostic cue of quality or investment potential (Rao & Monroe, 1989), helping consumers justify their decision. As a result, perceived cost efficiency remains an important driver of NFT art consumption.

Finally, quality was positively associated with consumer attitudes but was not significantly associated with purchase intentions or WOM. While objective product quality can shape subjective opinion on perceived quality, overall evaluations, and purchase intention (Monroe, 1985; Rao & Monroe, 1989; Winata et al., 2022), its direct behavioral impact appears limited in the NFT art context. This may stem from the perception that quality is an inherent and expected attribute, rather than a differentiating factor in driving purchase behavior. Consumers may appreciate high-quality NFT artworks, but without additional functional or emotional incentives, quality alone is insufficient to trigger purchasing or sharing behaviors.

5.2. The moderating role of cultural dimensions

5.2.1. The moderating effect of uncertainty avoidance

NFTs are inherently speculative and volatile, creating substantial uncertainty for consumers. Our results indicate that uncertainty avoidance moderated several value dimensions intersected with perceptions of risk or reliability. Within NFT technology-related values, high uncertainty avoidance consumers were more likely to develop positive attitudes when authenticity was emphasized. For these consumers, authenticity may provide psychological assurance by verifying ownership and protecting against unauthorized duplication (Polenakis et al., 2024), thus enhancing perceived reliability and reducing perceived uncertainty. Conversely, when consumers perceive a platform or digital asset as unreliable, their attitudes toward virtual transactions tend to decline (Al-Adwan, 2024).

Moreover, uncertainty avoidance weakened the influence of uniqueness on consumer attitudes. Although uniqueness typically satisfies the need for differentiation (Cheema & Kaikati, 2010), in the NFT context, it may also introduce ambiguity because uniqueness is tied to speculative resale potential and unstable market demand. High uncertainty avoidance individuals, who tend to view unpredictability as threatening (Ma et al., 2023; Moon et al., 2008), may therefore be less receptive to highly distinctive or unconventional NFT art.

Other NFT technology-related values, including security, information transparency, and novelty, did not interact significantly with uncertainty avoidance. Despite blockchain being promoted as secure and transparent, these attributes are technically complex and often not well understood by general consumers, which may weaken their relevance for uncertainty reduction. Moreover, consumers may already expect transparency from digital platforms and may view NFT marketplaces as functionally similar to traditional e-commerce platforms. As a result, transparency may no longer serve as a distinctive feature or meaningfully reduce perceived risk, which helps explain why it did not significantly alter perceptions of uncertainty.

For art-related values, uncertainty avoidance exerted more substantial effects. Consumers with high uncertainty avoidance placed less emphasis on ROI when forming purchase and WOM intentions. This finding is consistent with research indicating that individuals with high uncertainty avoidance tend to show lower investment responsiveness in volatile or unpredictable environments (Bloom et al., 2007) and are less willing to participate in virtual commercial activities (Al-Adwan et al., 2024). Given the speculative nature of NFT art, these consumers are likely to perceive an elevated risk of financial loss, which reduces their willingness to purchase or recommend NFTs (Lee & Cha, 2024).

Similarly, uncertainty avoidance weakened the relationship between self-expressiveness and purchase intentions. According to construal-level theory, psychological distance shapes how individuals evaluate objects and determine their value (Trope & Liberman, 2010). Although self-expressiveness can reduce psychological distance by fostering a sense of personal relevance to the NFT artwork, it also introduces elements of customization and individuality that deviate from standardized norms (Li et al., 2024). Such uniqueness may create additional uncertainty, especially when considering its economic value when reselling. Consumers with a strong aversion to uncertainty may therefore find highly self-expressive products less appealing.

Furthermore, uncertainty avoidance did not moderate the effects of esthetics or artists/developers' attractiveness. A possible explanation is that esthetic judgments are subjective and tied to changing trends; consumers may value certain NFT styles because they are popular rather than because they reduce uncertainty (Maidin et al., 2025). Similarly, creator attractiveness functions as a relatively weak evaluative signal in this context. Most NFT artists do not possess widespread public recognition, and the growing involvement of AI in content creation further reduces the relevance of individual creators' reputations. These value dimensions are therefore less connected to uncertainty reduction.

Within product-related values, uncertainty avoidance weakened the relationship between enjoyment and purchase intentions. Although unpredictability can, in some contexts, heighten enjoyment (Allen & Greenberger, 1979), such as mystery-box purchases, it can also serve as a deterrent when financial costs and risks are involved. In the context of NFT art, market volatility and pricing uncertainty are likely to shift consumers' focus from emotional enjoyment to more rational evaluations of financial risks (Faraji-Rad & Pham, 2017). As a result, high uncertainty avoidance consumers may prioritize caution over hedonic appeal when deciding whether to purchase NFTs.

Conversely, uncertainty avoidance strengthened the relationship between quality and purchase intentions. High-quality NFTs that meet perceived standards may serve as signals of reliability, reducing perceived risk. This aligns with prior research indicating that high uncertainty avoidance consumers tend to value product reliability, consistency, and conformity to expectations, exhibiting a low tolerance for deviations from established standards (Reimann et al., 2008).

However, our results diverge from prior research suggesting that uncertainty can be reduced through informational influence, such as observing or receiving recommendations from peers, where subjective norms typically serve as stronger determinants of behavioral intention among individuals from high uncertainty avoidance cultures (Srite & Karahanna, 2006). One possible explanation is that social endorsement may not directly alleviate perceptions of market risk. In the NFT context, where volatility and speculation remain prominent, uncertainty surrounding the product's future value persists regardless of social influence. Consequently, cultural tendencies toward uncertainty avoidance appear to exert an insignificant moderating effect on the relationship between perceived social values and behavioral intentions. Furthermore, uncertainty avoidance did not moderate the effect of sense of community on behavioral intentions. Although herd behavior can reduce uncertainty in some financial contexts by signaling collective confidence (Loxton et al., 2020), community belonging in NFT markets may not offer the same reassurance. NFT communities often support interaction between consumers rather than predictable financial outcomes (Colicev, 2023). As a result, participation in these communities does not necessarily mitigate perceptions of market volatility or investment risk. Therefore, for high uncertainty avoidance consumers, a stronger sense of community does not translate into reduced uncertainty or stronger behavioral intentions.

Finally, some dimensions were unlikely to be moderated by uncertainty avoidance because they lack a direct conceptual link to uncertainty reduction. Novelty, as measured in this study, refers to artistic novelty rather than technological uncertainty. Cost captures perceived value for money rather than potential profit or financial loss; as such, it does not directly address concerns about market unpredictability. These conceptual characteristics help explain why uncertainty avoidance did not interact significantly with novelty or cost.

5.2.2. The moderating effect of long-term orientation

Long-term orientation demonstrated modest moderating effects, with its influence emerging primarily in relation to authenticity, uniqueness, and self-expressiveness. Consumers with stronger long-term orientations were more likely to exhibit purchase intentions driven by authenticity. A plausible explanation is that authenticity fosters trust and perceived stability, factors that are highly valued by individuals who prioritize sustained benefits and enduring reliability (Safeer & Liu, 2023; Sallaku & Vigolo, 2024). Long-term-oriented consumers also responded more positively to the uniqueness of NFT art compared with consumers who prioritize immediate gains. Although prior research suggests that long-term orientation does not typically predict preferences for uniqueness (Alzahrani & Copeland, 2017), uniqueness in NFTs can be interpreted as a potential investment advantage, since rarity often drives long-term price appreciation (Aaker, 1996). Furthermore, long-term orientation strengthened the relationship between self-expressiveness and purchase intentions. This indicates that consumers may view self-expression as a durable source of emotional fulfillment and personal continuity. Self-expressive products foster emotional attachment and psychological ownership (Siddique & Rajput, 2022), which may be perceived as long-lasting benefits and particularly salient for individuals with future-oriented mindsets.

However, long-term orientation did not moderate most other relationships. One explanation is that long-term orientation reflects a broader cultural tendency toward perseverance and delayed gratification, which is less directly connected to short-term product evaluations or immediate experiential responses. For NFT art, the long-term benefits mainly come from financial and emotional value, making this cultural dimension less relevant to other value constructs such as hedonic enjoyment and information transparency. Additionally, the limited influence may reflect sample characteristics: long-term orientation is more prominent in certain cultural regions, particularly in East and Southeast Asia (Srite & Karahanna, 2006), whereas the present study draws from a globally distributed sample with substantial cultural heterogeneity. As a result, the variability necessary for strong moderating effects may have been diluted.

5.3. The moderating role of prior NFT experience

Prior research suggests that experienced consumers possess greater familiarity and cognitive accessibility, which facilitates information processing, impression formation, and decision-making (Fishbein & Ajzen, 1977; Higgins, 2012; Taylor & Todd, 1995). However, in the context of this study, prior NFT experience exhibited only a limited moderating role, influencing only the effects of authenticity and subjective norms. Our results indicate that consumers with prior NFT experience placed greater value on blockchain-enabled authenticity than those unfamiliar with NFTs. For inexperienced consumers, a lack of technical knowledge may lead to skepticism toward the product. This skepticism may also stem from persistent issues in the traditional art market, where issues like forgery and unauthorized reproductions create doubt and uncertainty (Gerstenblith, 2011). Consequently, when encountering an unfamiliar and technologically complex market, inexperienced consumers may adopt a cautious stance until they acquire greater understanding and confidence.

In contrast, consumers who had previously purchased NFTs placed less importance on peer opinions when considering future purchases. This diverges from prior literature, which indicates that subjective norms significantly affect perceived usefulness and behavioral intentions (Schepers & Wetzels, 2007), and once subjective norms are internalized, they become resistant to change unless confronted with new information (Ajzen, 1991). A plausible explanation is that experienced consumers have gained a deeper understanding of the market, technology, and NFT value, which leads to greater confidence in their decision-making and less reliance on others' opinions. Over time, these consumers develop their own criteria for evaluating NFTs, based on personal preferences and past experiences, rather than social influences.

However, prior experience did not moderate other value dimensions. One reason is the rapid and continual evolution of the NFT ecosystem, which reshapes technological features, esthetic styles, pricing norms, and creator reputations (Maidin et al., 2025). This dynamic environment makes past experiences less applicable to current or future decision-making, especially for dimensions such as esthetics, cost, security, quality, and artist attractiveness. Moreover, consumer experiences with NFTs are highly heterogeneous: while some consumers benefit from profitable transactions, others encounter financial losses or

disappointment due to high market volatility. Such divergent experiences may hinder the formation of stable cognitive schemas or consistent evaluative criteria. As a result, the moderating role of prior experience becomes diluted for value dimensions such as ROI, enjoyment, and sense of community.

6. Research contribution and implications

6.1. Theoretical contributions

This study makes interdisciplinary contributions across human-computer interaction (HCI), marketing, information systems, art, psychology, finance, and cultural studies, offering new insights into how consumers evaluate and engage with hybrid products in the emerging virtual economy.

First, this study contextualizes consumer perceived value by identifying 14 perceived value dimensions organized into three overarching categories: NFT technology-related, art-related, and product-related values. This categorization preserves the conceptual integrity of PERVAL while incorporating context-specific dimensions that reflect the technological and artistic foundations of NFT art. Together, these dimensions provide a coherent framework for understanding how consumers evaluate hybrid products that combine art and edge-technology. This also offers a foundation for future research exploring value perception in interdisciplinary or cross-domain products.

Second, the study contributes to HCI literature by proposing how consumers interpret blockchain-enabled value dimensions such as authenticity, security, and novelty in the context of NFTs, yet the findings reveal that technological values do not necessarily translate into behavioral intentions.

Third, this study deepens art consumption literature by identifying four key art-related values (esthetics, ROI, artists/developers' attractiveness, and self-expressiveness) relevant to consumer behavior in NFT art contexts. The findings highlight a conceptual shift, wherein consumers increasingly approach NFT art through a dual lens of investment and self-expression, rather than purely esthetic appreciation. This reconceptualization bridges literature on art valuation, digital collectibles, and virtual economies, suggesting that the boundaries between artistic appreciation and financial speculation are becoming increasingly fluid.

Fourth, by integrating cultural dimensions as moderating variables, the study enriches cross-cultural literature in the virtual environment. Although the moderating effects were limited, this finding contributes to ongoing debates in cross-cultural HCI research, suggesting that traditional cultural frameworks may hold limited explanatory power in markets driven by emerging, technology-embedded products such as NFTs.

Fifth, this study enriches the emerging virtual economy literature by incorporating prior experience as a moderating factor in consumer decision-making. The findings indicate that prior experience exerts only a limited influence on attitudes and behavioral intentions toward NFT art, suggesting that familiarity may play a less critical role in shaping consumer behavior within rapidly evolving virtual environments.

6.2. Practical implications

This study offers several actionable implications for NFT marketplaces, platform designers, artists and developers, and policymakers operating in the rapidly evolving virtual economy, while also contributing to the broader field of HCI.

6.2.1. For NFT marketplaces and platform designers

The strong influence of enjoyment, peer influence, self-expressiveness, and perceived financial return underscores the need to design the NFT purchasing experience around interactivity, social engagement, and decision-support features rather than relying primarily on esthetic presentation. To strengthen the experiential dimension, platforms can embed interactive and community-oriented features such as collector discussion boards and creator livestream sessions, while also enabling self-expression through customizable digital galleries, avatars, and virtual display environments. Moreover, given that consumers place substantial weight on financial potential, the user interface should foreground decision-

relevant information, including price history graphs, benchmark pricing, rarity indicators, and comparative price analytics.

At the same time, the limited behavioral impact of NFT technology-related values suggests a perception gap between technological capabilities and consumer understanding. Many consumers lack technical literacy to fully understand blockchain-enabled benefits such as authenticity and security. Accordingly, NFT marketplaces and platform designers should simplify the presentation of technical attributes by streamlining user interfaces, integrating intuitive verification tools, and incorporating guided provenance visualizations. Complementary educational resources, such as onboarding modules, contextual tooltips, and simplified explainers, can further increase user trust, reduce perceived risk, and strengthen confidence in NFT transactions.

Furthermore, in high uncertainty avoidance contexts, marketplaces and platforms may benefit from placing stronger emphasis on trust-enhancing signals, such as verified creator badges, third-party authentication marks, risk-level indicators, and visible compliance with legal or regulatory standards. Conversely, in low uncertainty avoidance contexts, marketplaces and platforms may attract consumers more effectively by highlighting creativity, innovation, novelty, and exclusivity, thereby appealing to audiences more comfortable with experimentation and risk-taking.

6.2.2. For artists and developers

The findings reveal that consumers primarily value NFT art for its investment potential and self-expressive capacity, rather than purely for esthetic appreciation. Creators should therefore communicate both the financial and symbolic dimensions of their works. Providing transparent information on rarity, provenance, and market performance can enhance perceived investment appeal, while emphasizing storytelling, artistic intent, and emotional resonance can foster personal connection and self-expression among collectors.

6.2.3. For policymakers and regulators

The study highlights the need to establish regulatory frameworks that both protect consumers and support innovation. Such measures can help to reduce consumers' perceptions of uncertainty and enhance confidence in NFT transactions. Policies should clearly define the legal ownership rights associated with NFTs, including copyright, reproduction, and resale conditions, to prevent potential disputes and ensure benefit assurance.

7. Limitations

Despite providing valuable insights, this research is not without limitations. First, while NFT art represents a prominent and commercially significant segment within the broader NFT and metaverse ecosystems, other product categories like gaming items and memberships also warrant examination. Including these categories in future studies would enable a more comprehensive understanding of consumer value perception and behavior across the virtual economy. Second, although this study examined how perceived values shape behavioral intentions toward NFT art using a large and diverse sample, it relied on self-reported data collected through a cross-sectional survey. This design limits the ability to capture actual purchasing behaviors or changes in consumer behavior over time. Future research could address this limitation by employing field experiments, case studies, or longitudinal approaches to observe real-world purchasing behavior and track the long-term changes in consumer behavior. Third, although 14 value dimensions were proposed to assess NFT art, certain factors, such as information transparency and esthetics, were not found to significantly influence consumer attitudes, purchase intentions, and WOM intentions. These unexpected findings may stem from the influence of unexamined mediators or moderators that offset their effects. Future research should therefore explore these underlying pathways and boundary conditions to further refine the proposed model, for example, by considering individual-level factors such as investment habits, personality traits, and technological literacy. Fourth, this study found that value dimensions such as ROI and subjective norms exerted significant effects on attitudes, purchase intentions, and WOM intentions. These factors are crucial from an investment and asset acquisition perspective. Future research could extend this line of inquiry by examining NFTs within a

broader economic and behavioral finance context, incorporating theories such as fear of missing out and herd behavior to provide complementary insights into NFT-related decision-making from an economic viewpoint. Fifth, although this study employed Prolific to collect data from a globally distributed sample, the respondents may not fully represent the broader population of NFT art consumers. Benchmarking our sample against global NFT market data shows that most respondents were from countries ranked within the top 40 NFT markets worldwide in 2024—markets with annual NFT transaction volumes exceeding USD 3 million (Statista, 2025b). This alignment supports the external validity of the findings. However, the sample underrepresents several major NFT markets, including Japan, Germany, and India. This underrepresentation might limit the generalizability of the findings to regions. Future research should therefore incorporate targeted sampling in these markets to generate complementary insights and capture more nuanced cultural and contextual influences on NFT adoption and valuation.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Author contributions

CRediT: **Xinyi Yang**: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Validation, Visualization, Writing – original draft, Writing – review & editing; **Nannan Xi**: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Supervision, Validation, Visualization, Writing – review & editing; **Juho Hamari**: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Supervision, Validation, Writing – review & editing.

Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this work, the authors used ChatGPT to improve readability and language. After using this service, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

Funding

This work has been supported by the Ministry of Education and Culture (Finland); Business Finland Decision 6742/31/2023 (MetaMarketing); the Foundation for Economic Education under [Grant No. 210301] (GAMETH); the Academy of Finland Flagship Programme under [Grant No. 337653 (UNITE)].

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References

Aaker, D. A. (1996). Measuring brand equity across products and markets. *California Management Review*, *38*(3), 102–120. https://doi.org/10.2307/41165845

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50*(2), 179–211. https://doi.org/10.1016/0749-5978(91)90020-t

Al-Adwan, A. S. (2024). The meta-commerce paradox: Exploring consumer non-adoption intentions. *Online Information Review*, *48*(6), 1270–1289. https://doi.org/10.1108/oir-01-2024-0017

Al-Adwan, A. S., Jafar, R. M. S., & Sitar-Tăut, D. A. (2024). Breaking into the black box of consumers' perceptions on metaverse commerce: An integrated model of UTAUT 2 and dual-factor theory. *Asia Pacific Management Review*, *29*(4), 477–498. https://doi.org/10.1016/j.apmrv.2024.09.004

Al-Jabri, I. M., & Roztocki, N. (2015). Adoption of ERP systems: Does information transparency matter? *Telematics and Informatics*, *32*(2), 300–310. https://doi.org/10.1016/j.tele.2014.09.005

Allen, V. L., & Greenberger, D. B. (1979). Enjoyment of destruction: The role of uncertainty. *Journal of Nonverbal Behavior*, *4*(2), 87–96. https://doi.org/10.1007/bf01006353

Alzahrani, S. G., & Copeland, L. (2017). The need for uniqueness among Gulf cooperation council countries' consumers: A cross-culture study. *International Journal of Marketing Studies*, *9*(4), 29–37. https://doi.org/10.5539/ijms.v9n4p29

Baekeland, F. (2012). Psychological aspects of art collecting. In *Interpreting objects and collection* (pp. 205–219). Routledge.

Bartikowski, B., Laroche, M., & Kizgin, H. (2023). Introduction to the special issue: Information Communication Technology (ICT): People, culture, and globalization. *International Journal of Information Management*, *70*, 102591. https://doi.org/10.1016/j.ijinfomgt.2022.102591

Belk, R. W. (2013). Extended self in a digital world. *Journal of Consumer Research*, *40*(3), 477–500. https://doi.org/10.1086/671052

Bhattacherjee, A. (2001). Understanding information systems continuance: An expectation-confirmation model. *MIS Quarterly*, *25*(3), 351–370. https://doi.org/10.2307/3250921

Bilquise, G., Shaalan, K., & AlKhatib, M. (2025). A comprehensive review of virtual commerce applications for the metaverse: Open issues, challenges and recommended solution for benchmarking. *International Journal of Human–Computer Interaction*, *41*(24), 15700–15726. https://doi.org/10.1080/10447318.2025.2499662

Biryukov, A., & Tikhomirov, S. (2019). Security and privacy of mobile wallet users in Bitcoin, Dash, Monero, and Zcash. *Pervasive and Mobile Computing*, *59*, 101030. https://doi.org/10.1016/j.pmcj.2019.101030

Bloom, N., Bond, S., & Van Reenen, J. (2007). Uncertainty and investment dynamics. *Review of Economic Studies*, *74*(2), 391–415. https://doi.org/10.1111/j.1467-937x.2007.00426.x

Bukowski, A., & Rudnicki, S. (2019). Not Only Individualism: The effects of long-term orientation and other cultural variables on national innovation success. *Cross-Cultural Research*, *53*(2), 119–162. https://doi.org/10.1177/1069397118785546

Chavas, J., & Nauges, C. (2020). Uncertainty, learning, and technology adoption in agriculture. *Applied Economic Perspectives and Policy*, *42*(1), 42–53. https://doi.org/10.1002/aepp.13003

Cheema, A., & Kaikati, A. M. (2010). The effect of need for uniqueness on word of mouth. *Journal of Marketing Research*, *47*(3), 553–563. https://doi.org/10.1509/jmkr.47.3.553

Chen, Y. (2009). Possession and access: Consumer desires and value perceptions regarding contemporary art collection and exhibit visits. *Journal of Consumer Research*, *35*(6), 925–940. https://doi.org/10.1086/593699

Chen, H., Yang, Z., & Lyu, T. (2025). Empirical investigation of digital collectibles purchase intention: The roles of value, risks, identification, and scarcity. *International Journal of Human–Computer Interaction*, *41*(16), 9861–9880. https://doi.org/10.1080/10447318.2024.2429755

Chi, O. H., Chi, C. G., Gursoy, D., & Nunkoo, R. (2023). Customers' acceptance of artificially intelligent service robots: The influence of trust and culture. *International Journal of Information Management*, *70*, 102623. https://doi.org/10.1016/j.ijinfomgt.2023.102623

Chin, W. W., Marcolin, B. L., & Newsted, P. R. (2003). A partial least squares latent variable modeling approach for measuring interaction effects: Results from a Monte Carlo simulation study and an electronic-mail emotion/adoption study. *Information Systems Research*, *14*(2), 189–217. https://doi.org/10.1287/isre.14.2.189.16018

Chohan, U. W. (2024). Non-fungible tokens: Blockchains, scarcity, and value. In *Non-fungible tokens* (pp. 1–11). Routledge. https://doi.org/10.2139/ssrn.3822743

Choi, D., & Johnson, K. K. (2019). Influences of environmental and hedonic motivations on intention to purchase green products: An extension of the theory of planned behavior. *Sustainable Production and Consumption*, *18*, 145–155. https://doi.org/10.1016/j.spc.2019.02.001

Cleghorn, J., & Griffiths, M. D. (2015). Why do gamers buy "virtual assets"? An insight in to the psychology behind purchase behaviour. *Digital Education Review*, *27*, 85–104.

Colicev, A. (2023). How can non-fungible tokens bring value to brands. *International Journal of Research in Marketing*, *40*(1), 30–37. https://doi.org/10.1016/j.ijresmar.2022.07.003

Crypto.com. (2023, January). *The most expensive NFTs ever sold*. https://crypto.com/university/most-expensive-nfts#:~:text=The%20piece%20was%20a%20clock,NFT%20for%20US%2452.7%20million

Damodaran, A. (2024). From non fungible tokens to metaverse: Blockchain based inclusive innovation in arts. *Innovation and Development*, *14*(2), 383–402. https://doi.org/10.1080/2157930x.2023.2180709

Das, D., Bose, P., Ruaro, N., Kruegel, C., & Vigna, G. (2022). *Understanding security issues in the NFT ecosystem* [Paper presentation]. In Proceedings of the 29th Conference on Computer and Communications Security, Los Angeles, CA, USA (pp. 667–681). https://doi.org/10.1145/3548606.3559342

De Vries, L., Peluso, A. M., Romani, S., Leeflang, P. S., & Marcati, A. (2017). Explaining consumer brand-related activities on social media: An investigation of the different roles of self-expression and socializing motivations. *Computers in Human Behavior*, *75*, 272–282. https://doi.org/10.1016/j.chb.2017.05.016

Deci, E. L., & Ryan, R. M. (2013). *Intrinsic motivation and self-determination in human behavior*. Springer Science & Business Media.

Dwivedi, A., Nayeem, T., & Murshed, F. (2018). Brand experience and consumers' willingness-to-pay (WTP) a price premium: Mediating role of brand credibility and perceived uniqueness. *Journal of Retailing and Consumer Services*, *44*, 100–107. https://doi.org/10.1016/j.jretconser.2018.06.009

Efendioğlu, İ. H. (2023). The Rise of the Non-fungible token (NFT) market in Turkey: The effect of social media interaction and the need for uniqueness on NFT purchase intention. *Review of Marketing Science*, *21*(1), 1–16. https://doi.org/10.1515/roms-2022-0065

Erumban, A. A., & De Jong, S. B. (2006). Cross-country differences in ICT adoption: A consequence of culture? *Journal of World Business*, *41*(4), 302–314. https://doi.org/10.1016/j.jwb.2006.08.005

Faraji-Rad, A., & Pham, M. T. (2017). Uncertainty increases the reliance on affect in decisions. *SSRN Electronic Journal*, *44*(1), 1–21. https://doi.org/10.2139/ssrn.2715333

Fishbein, M., & Ajzen, I. (1977). *Belief, attitude, intention, and behavior: An introduction to theory and research*. Penn State University Press.

Formanek, R. (1991). Why they collect: Collectors reveal their motivations. *Journal of Social Behavior and Personality*, *6*(6), 275–286.

Fornell, C., & Larcker, D. F. (1981). *Structural equation models with unobservable variables and measurement error: Algebra and statistics*. Sage CA.

Fortagne, M. A., & Lis, B. (2024). Determinants of the purchase intention of non-fungible token collectibles. *Journal of Consumer Behaviour*, *23*(2), 1032–1049. https://doi.org/10.1002/cb.2264

Franke, N., & Schreier, M. (2008). Product uniqueness as a driver of customer utility in mass customization. *Marketing Letters*, *19*(2), 93–107. https://doi.org/10.1007/s11002-007-9029-7

Franque, F. B., Oliveira, T., Tam, C., & Santini, F. d O. (2020). A meta-analysis of the quantitative studies in continuance intention to use an information system. *Internet Research*, *31*(1), 123–158. https://doi.org/10.1108/intr-03-2019-0103

Fu, S., Hu, X., Zhang, C., & Li, Z. (2025). A study on the influence of production and environmental information transparency on online consumers' purchase intention of green agricultural products. *British Food Journal*, *127*(4), 1461–1479. https://doi.org/10.1108/bfj-09-2024-0889

Fuller, C. M., Simmering, M. J., Atinc, G., Atinc, Y., & Babin, B. J. (2016). Common methods variance detection in business research. *Journal of Business Research*, *69*(8), 3192–3198. https://doi.org/10.1016/j.jbusres.2015.12.008

Geman, H., & Velez, T. (2015). On rarity premium and ownership yield in art. *The Journal of Alternative Investments*, *18*(1), 8–21. https://doi.org/10.3905/jai.2015.18.1.008

Gerstenblith, P. (2011). Getting real: Cultural, aesthetic and legal perspectives on the meaning on authenticity of art works. *The Columbia Journal of Law & the Arts*, *35*(3), 321–356.

Griffiths, P., Costa, C. J., & Crespo, N. F. (2024). Behind the bubble: Exploring the motivations of NFT buyers. *Computers in Human Behavior*, *158*, 108307. https://doi.org/10.1016/j.chb.2024.108307

Gu, L., & Li, Y. (2022). Who made the paintings: Artists or artificial intelligence? The effects of identity on liking and purchase intention. *Frontiers in Psychology*, *13*, 941163. https://doi.org/10.3389/fpsyg.2022.941163

Guan, M. Y., Li, J., Hu, J., Gu, Z., Wang, Y., Lu, Z., & Wang, K. Y. (2025). From digital art to crypto art: The evolution of art brought by NFT. *International Journal of Human–Computer Interaction*, *41*(12), 7384–7403. https://doi.org/10.1080/10447318.2024.2395088

Guiso, L., Sapienza, P., & Zingales, L. (2006). Does culture affect economic outcomes? *Journal of Economic Perspectives*, *20*(2), 23–48. https://doi.org/10.1257/jep.20.2.23

Guo, Y., & Barnes, S. (2011). Purchase behavior in virtual worlds: An empirical investigation in Second Life. *Information & Management*, *48*(7), 303–312. https://doi.org/10.1016/j.im.2011.07.004

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2013). *Multivariate data analysis: Pearson new international edition PDF eBook*. Pearson Higher Ed.

Hair, J. F., Hult, G. T. M., Ringle, C. M., Sarstedt, M., Danks, N. P., & Ray, S. (2021). *Partial least squares structural equation modeling (PLS-SEM) using R: A workbook*. Springer Nature.

Hair, J. F., Matthews, L. M., Matthews, R. L., & Sarstedt, M. (2017). PLS-SEM or CB-SEM: Updated guidelines on which method to use. *International Journal of Multivariate Data Analysis*, *1*(2), 107–123. https://doi.org/10.1504/IJMDA.2017.087624

Hair, J. F., Ringle, C. M., & Sarstedt, M. (2013). Partial least squares structural equation modeling: Rigorous applications, better results and higher acceptance. *Long Range Planning*, *46*(1–2), 1–12. https://doi.org/10.1016/j.lrp.2013.01.001

Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European Business Review*, *31*(1), 2–24. https://doi.org/10.1108/ebr-11-2018-0203

Hamari, J. (2017). Do badges increase user activity? A field experiment on the effects of gamification. *Computers in Human Behavior*, *71*, 469–478. https://doi.org/10.1016/j.chb.2015.03.036

Hamari, J., & Keronen, L. (2017). Why do people buy virtual goods: A meta-analysis. *Computers in Human Behavior*, *71*, 59–69. https://doi.org/10.1016/j.chb.2017.01.042

Hamari, J., & Koivisto, J. (2015). 'Working out for likes': An empirical study on social influence in exercise gamification. *Computers in Human Behavior*, *50*, 333–347. https://doi.org/10.1016/j.chb.2015.04.018

He, Z., Wu, L., & Li, X. R. (2018). When art meets tech: The role of augmented reality in enhancing museum experiences and purchase intentions. *Tourism Management*, *68*, 127–139. https://doi.org/10.1016/j.tourman.2018.03.003

Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, *43*(1), 115–135. https://doi.org/10.1007/s11747-014-0403-8

Henseler, J., Ringle, C. M., & Sarstedt, M. (2016). Testing measurement invariance of composites using partial least squares. *International Marketing Review*, *33*(3), 405–431. https://doi.org/10.1108/imr-09-2014-0304

Hermawan, A., Bernarto, I., & Antonio, F. (2023). Video game engagement: A passkey to the intentions of continue playing, purchasing virtual items, and player recruitment (3Ps). *International Journal of Computer Games Technology*, *2023*(1), 1–13. https://doi.org/10.1155/2023/2648097

Higgins, E. T. (2012). Accessibility theory. *Handbook of Theories of Social Psychology*, *1*, 75–96.

Hirschman, E. C., & Holbrook, M. B. (1982). Hedonic consumption: Emerging concepts, methods and propositions. *Journal of Marketing*, *46*(3), 92–101. https://doi.org/10.1177/002224298204600314

Hofstede, G. (1984). *Culture's consequences: International differences in work-related values*. SAGE Publications.

Hofstede, G. (2001). *Culture's consequences: Comparing values, behaviors, institutions and organizations across nations*. SAGE Publications.

Hofstetter, R., de Bellis, E., Brandes, L., Clegg, M., Lamberton, C., Reibstein, D., Rohlfsen, F., Schmitt, B., & Zhang, J. Z. (2022). Crypto-marketing: How non-fungible tokens (NFTs) challenge traditional marketing. *Marketing Letters*, *33*(4), 705–711. https://doi.org/10.1007/s11002-022-09639-2

Holbrook, M. B. (1999). *Consumer value. A framework for analysis and research* (pp. 5–14). Routledge.

Homburg, C., Schwemmle, M., & Kuehnl, C. (2015). New product design: Concept, measurement, and consequences. *Journal of Marketing*, *79*(3), 41–56. https://doi.org/10.1509/jm.14.0199

Homburg, C., Wieseke, J., & Hoyer, W. D. (2009). Social identity and the service-profit chain. *Journal of Marketing*, *73*(2), 38–54. https://doi.org/10.1509/jmkg.73.2.38

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, *6*(1), 1–55. https://doi.org/10.1080/10705519909540118

Huang, M. H. (2003). Designing website attributes to induce experiential encounters. *Computers in Human Behavior*, *19*(4), 425–442. https://doi.org/10.1016/s0747-5632(02)00080-8

Huang, M., Ali, R., & Liao, J. (2017). The effect of user experience in online games on word of mouth: A pleasure-arousal-dominance (PAD) model perspective. *Computers in Human Behavior*, *75*, 329–338. https://doi.org/10.1016/j.chb.2017.05.015

Iansiti, M., & Lakhani, K. R. (2017). The truth about blockchain. *Harvard Business Review*, *95*(1), 118–127.

Jadil, Y., Jeyaraj, A., Dwivedi, Y. K., Rana, N. P., & Sarker, P. (2023). A meta-analysis of the factors associated with s-commerce intention: Hofstede's cultural dimensions as moderators. *Internet Research*, *33*(6), 2013–2057. https://doi.org/10.1108/INTR-10-2021-0768

Joo, M., Kim, S. H., Ghose, A., & Wilbur, K. C. (2023). Designing distributed ledger technologies, like Blockchain, for advertising markets. *International Journal of Research in Marketing*, *40*(1), 12–21. https://doi.org/10.1016/j.ijresmar.2022.08.004

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. https://doi.org/10.1002/jsc.2502

Kim, H. W., Chan, H. C., & Kankanhalli, A. (2012). What motivates people to purchase digital items on virtual community websites? The desire for online self-presentation. *Information Systems Research*, *23*(4), 1232–1245. https://doi.org/10.1287/isre.1110.0411

Kim, H. W., Gupta, S., & Koh, J. (2011). Investigating the intention to purchase digital items in social networking communities: A customer value perspective. *Information & Management*, *48*(6), 228–234. https://doi.org/10.1016/j.im.2011.05.004

Król, K., & Zdonek, D. (2022). Digital assets in the eyes of Generation Z: Perceptions, outlooks, concerns. *Journal of Risk and Financial Management*, *16*(1), 22. https://doi.org/10.3390/jrfm16010022

Kugler, L. (2021). Non-fungible tokens and the future of art. *Communications of the ACM*, *64*(9), 19–20. https://doi.org/10.1145/3474355

Kumar, S., & Goyal, N. (2016). Evidence on rationality and behavioural biases in investment decision making. *Qualitative Research in Financial Markets*, *8*(4), 270–287. https://doi.org/10.1108/qrfm-05-2016-0016

Kutner, M. H. (2005). *Applied linear statistical models*. McGraw Hill.

Lee, W., & Cha, M. K. (2024). Why do consumers buy NFTs?: Multi-path of attitude and the bandwagon effect. *Asia Pacific Journal of Marketing and Logistics*, *36*(6), 1374–1392. https://doi.org/10.1108/apjml-01-2023-0006

Lee, C. T., Ho, T. Y., & Xie, H. H. (2023). Building brand engagement in metaverse commerce: The role of branded non-fungible tokens (BNFTs). *Electronic Commerce Research and Applications*, *58*, 101248. https://doi.org/10.1016/j.elerap.2023.101248

Lee, Y., Kozar, K. A., & Larsen, K. R. (2003). The technology acceptance model: Past, present, and future. *Communications of the Association for Information Systems*, *12*(1), 752–780. https://doi.org/10.17705/1cais.01250

Lehdonvirta, V. (2009). Virtual item sales as a revenue model: Identifying attributes that drive purchase decisions. *Electronic Commerce Research*, *9*(1–2), 97–113. https://doi.org/10.1007/s10660-009-9028-2

Li, Y., & Li, J. (2022). The influence of design aesthetics on consumers' purchase intention toward cultural and creative products: Evidence from the palace museum in China. *Frontiers in Psychology*, *13*, 939403. https://doi.org/10.3389/fpsyg.2022.939403

Li, X., Si, W., & Chan, K. W. (2024). Virtual agents that flatter you: Moderating effects of self-esteem and customization target in e-customization services. *Psychology & Marketing*, *41*(2), 344–363. https://doi.org/10.1002/mar.21943

Loxton, M., Truskett, R., Scarf, B., Sindone, L., Baldry, G., & Zhao, Y. (2020). Consumer behaviour during crises: Preliminary research on how coronavirus has manifested consumer panic buying, herd mentality, changing discretionary spending and the role of the media in influencing behaviour. *Journal of Risk and Financial Management*, *13*(8), 166. https://doi.org/10.3390/jrfm13080166

Lyu, Z. (2024). State-of-the-art human-computer-interaction in metaverse. *International Journal of Human–Computer Interaction*, *40*(21), 6690–6708. https://doi.org/10.1080/10447318.2023.2248833

Ma, S., Ling, X., Zhang, C., & Li, Y. (2023). Does physical attractiveness facilitate customer citizenship behaviors? Cross-cultural evidence from the peer-to-peer economy. *International Journal of Information Management*, *70*, 102565. https://doi.org/10.1016/j.ijinfomgt.2022.102565

Maidin, S. S., Yang, Q., & Samson, A. S. (2025). Analyzing the evolution of AI generated art styles using time series analysis: A trend study on NFT artworks. *Journal of Digital Market and Digital Currency*, *2*(2), 205–229. https://doi.org/10.47738/jdmdc.v2i2.32

Malik, S., Chadhar, M., Vatanasakdakul, S., & Chetty, M. (2021). Factors affecting the organizational adoption of blockchain technology: Extending the technology–organization–environment (TOE) framework in the Australian context. *Sustainability*, *13*(16), 9404. https://doi.org/10.3390/su13169404

Mäntymäki, M., & Salo, J. (2015). Why do teens spend real money in virtual worlds? A consumption values and developmental psychology perspective on virtual consumption. *International Journal of Information Management*, *35*(1), 124–134. https://doi.org/10.1016/j.ijinfomgt.2014.10.004

Marcoulides, G. A., Chin, W. W., & Saunders, C. (2009). A critical look at partial least squares modeling. *MIS Quarterly*, *33*(1), 171–175. https://doi.org/10.2307/20650283

Marder, B., Gattig, D., Collins, E., Pitt, L., Kietzmann, J., & Erz, A. (2019). The Avatar's new clothes: Understanding why players purchase non-functional items in free-to-play games. *Computers in Human Behavior*, *91*, 72–83. https://doi.org/10.1016/j.chb.2018.09.006

Mardon, R., & Belk, R. (2018). Materializing digital collecting: An extended view of digital materiality. *Marketing Theory*, *18*(4), 543–570. https://doi.org/10.1177/1470593118767725

Marthews, A., & Tucker, C. (2023). What blockchain can and can't do: Applications to marketing and privacy. *International Journal of Research in Marketing*, *40*(1), 49–53. https://doi.org/10.1016/j.ijresmar.2022.09.001

Mattila, A. S. (1999). The role of culture and purchase motivation in service encounter evaluations. *Journal of Services Marketing*, *13*(4/5), 376–389. https://doi.org/10.1108/08876049910282655

Maxham, J. G. III, (2001). Service recovery's influence on consumer satisfaction, positive word-of-mouth, and purchase intentions. *Journal of Business Research*, *54*(1), 11–24. https://doi.org/10.1016/s0148-2963(00)00114-4

McIntosh, W. D., & Schmeichel, B. (2004). Collectors and collecting: A social psychological perspective. *Leisure Sciences*, *26*(1), 85–97. https://doi.org/10.1080/01490400490272639

Meade, A. W., & Craig, S. B. (2012). Identifying careless responses in survey data. *Psychological Methods*, *17*(3), 437–455. https://doi.org/10.1037/a0028085

Mei, J., & Moses, M. (2002). Art as an investment and the underperformance of masterpieces. *American Economic Review*, *92*(5), 1656–1668. https://doi.org/10.1257/000282802762024719

Mishra, A. K., Bansal, R., Maurya, P. K., Kar, S. K., & Bakshi, P. K. (2023). Predicting the antecedents of consumers' intention toward purchase of mutual funds: A hybrid PLS-SEM-neural network approach. *International Journal of Consumer Studies*, *47*(2), 563–587. https://doi.org/10.1111/ijcs.12850

Mishra, A., Shukla, A., & Sharma, S. K. (2022). Psychological determinants of users' adoption and word-of-mouth recommendations of smart voice assistants. *International Journal of Information Management*, *67*, 102413. https://doi.org/10.1016/j.ijinfomgt.2021.102413

Monroe, K. (1985). The effect of price on subjective product evaluations. *Perceived quality: How consumers view stores and merchandise*. Lexington Books.

Moon, J., Chadee, D., & Tikoo, S. (2008). Culture, product type, and price influences on consumer purchase intention to buy personalized products online. *Journal of Business Research*, *61*(1), 31–39. https://doi.org/10.1016/j.jbusres.2006.05.012

Moubarak, J., Filiol, E., & Chamoun, M. (2018). On blockchain security and relevant attacks. In *Proceeding of the Middle East and North Africa Communications Conference* (pp. 1–6). IEEE.

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), 20902. https://doi.org/10.1038/s41598-021-00053-8

Ng, M., Law, M., Wong, C. B., & Liang, M. (2025). Drivers of non-fungible token (NFT) investment intention: The roles of innovativeness, knowledge, subjective norms and perceived value. *Journal of Electronic Business & Digital Economics*, *4*(1), 112–131. https://doi.org/10.1108/jebde-11-2024-0043

Nunnally, J. (1994). *Psychometric theory*. McGraw-Hill Book Company.

Nusair, K., Karatepe, O. M., Okumus, F., Alfarhan, U. F., & Shi, F. (2024). Exploring the pivotal role of community engagement on tourists' behaviors in social media: A cross-national study. *International Journal of Information Management*, *74*, 102701. https://doi.org/10.1016/j.ijinfomgt.2023.102701

Park, A., Kietzmann, J., Pitt, L., & Dabirian, A. (2022). The evolution of nonfungible tokens: Complexity and novelty of NFT use-cases. *IT Professional*, *24*(1), 9–14. https://doi.org/10.1109/mitp.2021.3136055

Paschina, S. (2023). Challenging the Value of Authenticity: The consumption of counterfeit luxury goods in Morocco. *International Business Research*, *16*(11), 1–10. https://doi.org/10.5539/ibr.v16n11p1

Pavlou, P. A., Liang, H., & Xue, Y. (2007). Understanding and mitigating uncertainty in online exchange relationships: A principal-agent perspective. *MIS Quarterly*, *31*(1), 105–136. https://doi.org/10.2307/25148783

Peres, R., Schreier, M., Schweidel, D. A., & Sorescu, A. (2023). Blockchain meets marketing: Opportunities, threats, and avenues for future research. *International Journal of Research in Marketing*, *40*(1), 1–11. https://doi.org/10.1016/j.ijresmar.2022.08.001

Peterson, N. A., Speer, P. W., & McMillan, D. W. (2008). Validation of a brief sense of community scale: Confirmation of the principal theory of sense of community. *Journal of Community Psychology*, *36*(1), 61–73. https://doi.org/10.1002/jcop.20217

Pierce, J. L., Kostova, T., & Dirks, K. T. (2003). The state of psychological ownership: Integrating and extending a century of research. *Review of General Psychology*, *7*(1), 84–107. https://doi.org/10.1037/1089-2680.7.1.84

Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *The Journal of Applied Psychology*, *88*(5), 879–903. https://doi.org/10.1037/0021-9010.88.5.879

Polak, A., Kelman, T., Murray, P., Marshall, S., Stothard, D. J., Eastaugh, N., & Eastaugh, F. (2017). Hyperspectral imaging combined with data classification techniques as an aid for artwork authentication. *Journal of Cultural Heritage*, *26*, 1–11. https://doi.org/10.1016/j.culher.2017.01.013

Polenakis, I., Vouronikos, V., Kiafa, E., Chroni, M., & Nikolopoulos, S. D. (2024). *ProtAIN: Protecting the authenticity and integrity properties of NFT images* [Paper presentation]. In Proceedings of the 25th International Conference on Computer Systems and Technologies, Ruse, Bulgaria (pp. 16–23). https://doi.org/10.1145/3674912.3674931

Rajaguru, R. (2016). Role of value for money and service quality on behavioural intention: A study of full service and low cost airlines. *Journal of Air Transport Management*, *53*, 114–122. https://doi.org/10.1016/j.jairtraman.2016.02.008

Rao, A. R., & Monroe, K. B. (1989). The effect of price, brand name, and store name on buyers' perceptions of product quality: An integrative review. *Journal of Marketing Research*, *26*(3), 351–357. https://doi.org/10.2307/3172907

Razmus, W., Grabner-Kräuter, S., & Adamczyk, G. (2024). Counterfeit brands and Machiavellianism: Consequences of counterfeit use for social perception. *Journal of Retailing and Consumer Services*, *76*, 103579. https://doi.org/10.1016/j.jretconser.2023.103579

Reimann, M., Lünemann, U. F., & Chase, R. B. (2008). Uncertainty avoidance as a moderator of the relationship between perceived service quality and customer satisfaction. *Journal of Service Research*, *11*(1), 63–73. https://doi.org/10.1177/1094670508319093

Renneboog, L., & Spaenjers, C. (2013). Buying beauty: On prices and returns in the art market. *Management Science*, *59*(1), 36–53. https://doi.org/10.1287/mnsc.1120.1580

Safeer, A. A., & Liu, H. (2023). Role of corporate social responsibility authenticity in developing perceived brand loyalty: A consumer perceptions paradigm. *Journal of Product & Brand Management*, *32*(2), 330–342. https://doi.org/10.1108/jpbm-01-2022-3807

Sallaku, R., & Vigolo, V. (2024). Predicting customer loyalty to Airbnb using PLS-SEM: The role of authenticity, interactivity, involvement and customer engagement. *The TQM Journal*, *36*(5), 1346–1368. https://doi.org/10.1108/TQM-12-2021-0348

Sánchez-Fernández, R., & Iniesta-Bonillo, M. Á. (2007). The concept of perceived value: A systematic review of the research. *Marketing Theory*, *7*(4), 427–451. https://doi.org/10.1177/1470593107083165

Schepers, J., & Wetzels, M. (2007). A meta-analysis of the technology acceptance model: Investigating subjective norm and moderation effects. *Information & Management*, *44*(1), 90–103. https://doi.org/10.1016/j.im.2006.10.007

Schlimm, J., Mereu, S., & Breuer, C. (2024). Why do consumers buy sports NFTs?–Decoding consumer values and needs driving purchase intention. *International Journal of Sports Marketing and Sponsorship*, *25*(5), 1163–1184. https://doi.org/10.1108/ijsms-04-2024-0097

Sharma, K., Aswal, C., & Paul, J. (2023). Factors affecting green purchase behavior: A systematic literature review. *Business Strategy and the Environment*, *32*(4), 2078–2092. https://doi.org/10.1002/bse.3237

Sheth, J. N., Newman, B. I., & Gross, B. L. (1991). Why we buy what we buy: A theory of consumption values. *Journal of Business Research*, *22*(2), 159–170. https://doi.org/10.1016/0148-2963(91)90050-8
Siddique, S., & Rajput, A. (2022). Self-expressiveness and hedonic brand affect brand love through brand jealousy. *Future Business Journal*, *8*(1), 1–13. https://doi.org/10.1186/s43093-022-00136-6
Srite, M., & Karahanna, E. (2006). The role of espoused national cultural values in technology acceptance. *MIS Quarterly*, *30*(3), 679–704. https://doi.org/10.2307/25148745
Statista. (2024). *Target audience: Crypto and NFT enthusiasts in Canada*. https://www.statista.com/outlook/fmo/digital-assets/nft/canada
Statista. (2025a). *Metaverse virtual assets*. https://www.statista.com/outlook/amo/metaverse/metaverse-virtual-assets/worldwide
Statista. (2025b). *NFT*. https://www.statista.com/outlook/fmo/digital-assets/nft/worldwide?srsltid=AfmBOor2PfdTQG1haeiX3He5ahLBsz971tc4hsQFUWxZ9A6smwRrKV18
Sun, X., Foscht, T., & Eisingerich, A. B. (2021). Does educating customers create positive word of mouth? *Journal of Retailing and Consumer Services*, *62*, 102638. https://doi.org/10.1016/j.jretconser.2021.102638
Sung, E., Kwon, O., & Sohn, K. (2023). NFT luxury brand marketing in the metaverse: Leveraging blockchain-certified NFTs to drive consumer behavior. *Psychology & Marketing*, *40*(11), 2306–2325. https://doi.org/10.1002/mar.21854
Sweeney, J. C., & Soutar, G. N. (2001). Consumer perceived value: The development of a multiple item scale. *Journal of Retailing*, *77*(2), 203–220. https://doi.org/10.1016/s0022-4359(01)00041-0
Tan, T. M., & Saraniemi, S. (2023). Trust in blockchain-enabled exchanges: Future directions in blockchain marketing. *Journal of the Academy of Marketing Science*, *51*(4), 914–939. https://doi.org/10.1007/s11747-022-00889-0
Taylor, S., & Todd, P. (1995). Assessing IT usage: The role of prior experience. *MIS Quarterly*, *19*(4), 561–570. https://doi.org/10.2307/249633
Torres, P., Augusto, M., & Matos, M. (2019). Antecedents and outcomes of digital influencer endorsement: An exploratory study. *Psychology & Marketing*, *36*(12), 1267–1276. https://doi.org/10.1002/mar.21274
Trope, Y., & Liberman, N. (2010). Construal-level theory of psychological distance. *Psychological Review*, *117*(2), 440–463. https://doi.org/10.1037/a0018963
Valeonti, F., Bikakis, A., Terras, M., Speed, C., Hudson-Smith, A., & Chalkias, K. (2021). Crypto collectibles, museum funding and OpenGLAM: Challenges, opportunities and the potential of Non-Fungible Tokens (NFTs). *Applied Sciences*, *11*(21), 9931. https://doi.org/10.3390/app11219931
Van der Heijden, H. (2004). User acceptance of hedonic information systems. *MIS Quarterly*, *28*(4), 695–704. https://doi.org/10.2307/25148660
Velthuis, O. (2003). Symbolic meanings of prices: Constructing the value of contemporary art in Amsterdam and New York galleries. *Theory and Society*, *32*(2), 181–215. https://doi.org/10.1023/a:1023995520369
Vuong, Q. H., Ho, M. T., Nguyen, H. K. T., Vuong, T. T., Tran, K., & Ho, M. T. (2018). "Paintings can be forged, but not feeling": Vietnamese art—market, fraud, and value. *Arts*, *7*(4), 62. https://doi.org/10.3390/arts7040062
Wang, S., & Ahn, S. (2024). Exploring user behavior based on metaverse: A modeling study of user experience factors. In *International Conference on Human-Computer Interaction* (pp. 99–118). Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-61147-6_8
Wang, X. W., Cao, Y. M., & Park, C. (2019). The relationships among community experience, community commitment, brand attitude, and purchase intention in social media. *International Journal of Information Management*, *49*, 475–488. https://doi.org/10.1016/j.ijinfomgt.2019.07.018
Wang, Q., Li, R., Wang, Q., & Chen, S. (2021). Non-fungible token (NFT): Overview, evaluation, opportunities and challenges. arXiv Preprint arXiv:2105.07447 (pp. 1–22).
Widyastuti, W, Management Study Program, Universitas Negeri Surabaya. (2024). The role of augmented reality in improving brand attitude through perceived enjoyment. *Journal of Marketing and Consumer Behaviour in Emerging Markets*, *2024*(1), 56–68. https://doi.org/10.7172/2449-6634.jmcbem.2024.1.4
Wilson, K. B., Karg, A., & Ghaderi, H. (2022). Prospecting non-fungible tokens in the digital economy: Stakeholders and ecosystem, risk and opportunity. *Business Horizons*, *65*(5), 657–670. https://doi.org/10.1016/j.bushor.2021.10.007
Winata, N., Bako, D. S., Ongowarsito, H., & Ramadhan, W. R. (2022). Perceived value model analysis on video games cosmetics purchase and continued use intention. In *Proceedings of the 1st International Conference on Information System & Information Technology* (pp. 25–30). IEEE.
Winn, W. (2013). Cognitive perspectives in psychology. In *Handbook of research on educational communications and technology*., 90–123.
Xie, Q., Muralidharan, S., & Edwards, S. M. (2024). Who will buy the idea of non-fungible token (NFT) marketing? Understanding consumers' psychological tendencies and value perceptions of branded NFTs. *International Journal of Advertising*, *43*(6), 987–1015. https://doi.org/10.1080/02650487.2023.2262859
Yang, H., Song, H., Ding, Q. S., & Wang, H. (2022). Transparency, authenticity and purchase intentions: Chinese independent restaurants. *International Journal of Contemporary Hospitality Management*, *34*(11), 4245–4265. https://doi.org/10.1108/ijchm-10-2021-1290

Yang, X., Xi, N., & Hamari, J. (2024). What motivates metaverse consumers to purchase virtual assets? A study on the perceived value of NFT art. In *Proceedings of the Pacific Asia Conference on Information Systems* (pp. 1–17). Association for Information Systems.

Yilmaz, T., Sagfossen, S., & Velasco, C. (2023). What makes NFTs valuable to consumers? Perceived value drivers associated with NFTs liking, purchasing, and holding. *Journal of Business Research*, *165*, 114056. https://doi.org/10.1016/j.jbusres.2023.114056

Yoo, B., Donthu, N., & Lenartowicz, T. (2011). Measuring Hofstede's five dimensions of cultural values at the individual level: Development and validation of CVSCALE. *Journal of International Consumer Marketing*, *23*(3–4), 193–210. https://doi.org/10.1080/08961530.2011.578059

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. https://doi.org/10.1177/002224298805200302

Zhang, Z. J. (2023). Cryptopricing: Whence comes the value for cryptocurrencies and NFTs? *International Journal of Research in Marketing*, *40*(1), 22–29. https://doi.org/10.1016/j.ijresmar.2022.08.002

Zhou, L., Wang, W., Xu, J. D., Liu, T., & Gu, J. (. (2018). Perceived information transparency in B2C e-commerce: An empirical investigation. *Information & Management*, *55*(7), 912–927. https://doi.org/10.1016/j.im.2018.04.005

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