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Barriers to invest in NFTs: An innovation resistance theory perspective

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A B S T R A C T

Investment in non-fungible tokens (NFTs) has decreased dramatically over the past two years, despite the financial value and potential importance of NFTs for the future of the economy and the current decentralized marketplaces. This study investigated the barriers influencing customers' resistance to investing in NFTs using the innovation resistance theory (IRT) components such as usage barriers, value barriers, risk barriers, tradition barriers, and image barriers. The data was gathered from 375 investors via an online questionnaire. To assess and evaluate the suggested model and its hypotheses, responses were investigated using a partial least square structural equation modeling approach (PLS-SEM). The findings indicate that the five resistance-related barriers are all substantial deterrents to investing in NFTs. The usage barrier was the most significant barrier, whereas the value barrier was the least significant. The study's findings have far-reaching implications for academics, NFTs' marketplaces, policymakers, and investors.

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1. Introduction

Non-fungible tokens (NFTs), which are tradeable digital assets, represent the latest addition to a series of innovative and unique assets enabled by blockchain technology (Chalmers et al., 2022). An NFT is "a unit of data stored on a blockchain that certifies a digital asset to be unique and therefore not interchangeable, while offering a unique digital certificate of ownership for the NFT" (Nadini et al., 2021). These digital assets are unique and cannot be duplicated or replaced, in contrast to fungible and interchangeable cryptocurrencies like Bitcoin and Ethereum (Dowling, 2022b). NFTs have been used to signify ownership of a variety of digital assets like artwork, music, collectibles, and virtual real estate (Chalmers et al., 2022) among others. NFTs act as virtual "certificates of ownership" that confirm and prove who the legitimate owner of a digital asset is (Chalmers et al., 2022; Wilson et al., 2021). NFTs provide a transparent and safe mechanism to confirm ownership and transfer ownership of digital assets without the need for intermediaries because they are maintained on a decentralized blockchain (Baker et al., 2022). Between 2021 and mid-2022, the NFT market witnessed rapid growth and increased interest. As reported in the NFT Market Quarterly Report for Q1 of 2022, the sales of NFTs in the first quarter of 2022 amounted to nearly $16.5 billion, showing an increase from the fourth quarter of 2021 when the sales were $14.5 billion (NonFungible.com, 2022a). The rise of online platforms and markets that allow for the creation, sale, and trade of NFTs has been one of the primary drivers of the NFT business (Nadini et al., 2021). These platforms provide a centralized marketplace for NFTs and make it easier for artists, creators, and collectors to participate in the NFT market as well as attracting financial investors to acquire and invest in NFTs (Ho & Song, 2023). Another key element driving the expansion of the NFT business is the growing interest in and acceptance of digital art (Chohan & Paschen, 2023). NFTs have enabled artists to sell their digital creations in a way that was not possible before (Brown, 2022), and this has led to a surge in investment and interest in NFTs as a new asset class (Rabaa'i, Zhu, & Jayaraman, 2022; Xiaodi Zhu et al., 2022). The NFT market has seen a number of high-profile sales, with some NFTs selling

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for millions of dollars. For example, the infamous digital artist Beeple's NFT piece "Everydays: The First 5000 Days" sold at Christie's in March 2021 for more than $69 million (Kastrenakes, 2021). Furthermore, three Cryptopunks were sold for $11.8, $7, and $7.6 million dollars, respectively (Nadini et al., 2021). This has enhanced the visibility and popularity of NFTs, attracting an increasing number of investors and collectors.

Since mid-2022, the NFT market suffered a decline, after a period of rapid growth and popularity. According to NFT Market Report (NonFungible.com, 2022b), a massive 77% drop was observed in terms of US $ traded between Q2 and Q3 of 2022 with a net quarterly loss of US$450M being recorded for the first time ever. A variety of causes contributed to the decrease of the NFT market, including: 1). NFT market saturation (Rabaa'i, Zhu, & Jayaraman, 2022; Xiaodi Zhu et al., 2022). The market got swamped with several comparable assets as more and more NFTs were produced and put up for sale, lowering their total worth and making it challenging for sellers to differentiate their products. Because of this saturation, there was less demand for NFTs, which led to a drop in their prices; 2). a general cooling in the overall cryptocurrency market (Ante, 2021; Dowling, 2022b). Because the NFT market and the cryptocurrency market are highly correlated, a collapse in the cryptocurrency market might have a big impact on the NFT market; 3). a number of high-profile scams and controversies (e.g., The Guardian, 2022; Yaffe-Bellany, 2022). In some cases, NFTs were developed and sold for thousands of dollars before it was discovered that they were fake or worthless. As a result, investors and collectors were more skeptical and cautious, which slowed the growth of the NFT business; 4). The NFT market was also impacted by increased scrutiny from regulators (Bloomberg Law, 2022). Regulators began to pay closer attention to the potential risks and challenges posed by NFTs, including issues related to intellectual property, money laundering, and tax evasion; 5). declining investor interest (Rabaa'i, Zhu, & Jayaraman, 2022; Xiaodi Zhu et al., 2022). As the market grew saturated with NFTs, many investors started to lose interest in the asset class since it became more and more challenging for them to find distinctive and valuable assets that were worthwhile investing in. This waning investor interest caused the demand for NFTs to fall, which in turn added to the market's downturn.

The NFT market is still relatively new, and there may be some ups and downs in the future (NonFungible.com, 2022b). As such, this study investigates customers' reluctance and resistance to invest in NFTs, arguing that in order to establish and maintain a sustainable NFTs market, it is imperative to comprehend the barriers that affect consumers' resistance to invest in this innovation (e.g., Baklouti & Boukamcha, 2023; Leong et al., 2021; Migliore et al., 2022; Rabaa'i, Zhu, & Jayaraman, 2022). This research study adopted the innovation resistance theory (IRT) (Ram & Sheth, 1989) as its theory base. The study's model was empirically validated with data collected through an online, self-administered survey. This research study in conducted in the State of Kuwait. Kuwait, a wealthy Middle Eastern country with a highly educated population and cutting-edge digital infrastructure (Rabaa'i, Al-lozi, et al., 2022). Kuwait stands out as a captivating market within the Middle East and North Africa region due to its significant impact on consumer spending within the Gulf Cooperation Council (GCC) countries (Rabaa'i, in press). Despite its modest size, Kuwait boasts one of the fastest rates of new technology adoption. According to the Kuwait Foundation for the Advancement of Sciences (KFAS) survey on the "Future of Financial Services" (KFAS, 2019), more than half of Kuwaitis between the ages of 15 and 39 felt comfortable adopting technological improvements. Approximately 80% of households in Kuwait are connected to the internet, while the remaining households without internet access rely on mobile phones to connect. Moreover, Kuwait boasts a strong mobile broadband coverage, reaching as high as 66.8%. The mobile network infrastructure is extensively developed, and it covers the entire geographical area and population.

This study has five main objectives. First, despite the potential importance of NFTs for the future of the economy and the decentralized markets of today, there is still little scholarly research on NFTs (Chohan & Paschen, 2023; Houser & Holden, 2022; Rabaa'i, Zhu, & Jayaraman, 2022; Radermecker & Ginsburgh, 2023; Taherdoost, 2023; Xiaodi Zhu et al., 2022); hence, this study aims at enriching the extant NFTs' literature. Second, although the innovation resistance theory (IRT) has been applied in different innovative contexts, this study is among the forefront of research efforts to empirically validate the applicability of IRT specifically in the realm of NFTs. Thirdly, whereas most behavioral intentions studies focus on the factors that positively affect users' intentions, inhibitory factors (i.e., barriers) have gotten less attention (e.g., Leong et al., 2020; Rabaa'i & Zhu, 2021). Therefore, this study fills up this gap by examining consumers' reluctance to invest in NFTs. Fourth, this study is the first to exclusively investigate behavioral intentions to invest in NFTs in Kuwait; hence, adding to the body of knowledge on the GCC region. Finally, this study offers insightful implications for NFTs' marketplaces, policymakers, and investors and it helps them comprehend the impediments to NFT investment.

The paper is structured as follows. The theoretical framework is described in Section 2 of this paper, together with a summary of earlier pertinent research. In Section 3, the proposed research model and hypotheses are presented. The research methodology, the data collection process, and the questionnaire design are all described in Section 4. The results of the analysis, the main findings, discussion and implications, including limitations and suggestions for future research are presented in Sections 5, 6, and 7, respectively.

2. Literature Review

2.1 Non-Fungible Tokens (NFTs)

In the era of digital advancement, non-fungible tokens (NFTs) present innovative approaches to combine, manage, transfer, encode, and store digital assets (Wilson et al., 2021). They introduce a new perspective on scarcity, enabling digital content

to possess both rarity and opulence (Baker et al., 2022). NFTs poses “unique characteristics, such as scarcity, nonfungibility, proven authenticity, proof of ownership, royalties, and direct distribution infrastructure” (Chohan & Paschen, 2023, p. 43), and they have the ability to represent various forms of creative works such as art, music, event tickets, collectibles, and in-game items (Chalmers et al., 2022).

NFTs are generated or "minted" on a blockchain, that serves as an electronic proof of ownership for a specific digital asset and is easily accessible to anyone (Chalmers et al., 2022; EU Blockchain, 2021). When a digital asset is created, it is assigned an ownership certificate in the form of a smart contract that is recorded on the blockchain. This process ensures that the asset cannot be duplicated or deleted (Houser & Holden, 2022). This digital certificate allows NFT owners to conveniently demonstrate the existence and ownership of their digital assets (Wang et al., 2021). An NFT minted on a blockchain can either store the actual file of the digital asset or a reference to it (Houser & Holden, 2022). While storing content directly in a decentralized blockchain provides property owners with complete control and enhanced security (Cointelegraph, 2021), it is a costly approach (Bodó et al., 2022), mainly due to limited storage capacity on the blockchain (Wang et al., 2021). Therefore, the recommended and most secure storage method for NFTs is offline cold-storage wallets (Gomezz, 2022).

Unlike fungible tokens such as cryptocurrencies or traditional currencies, which can be traded or exchanged like-for-like fashion (Dowling, 2022b), NFTs are referred to as “non-fungible tokens” because the tokens they represent are unique and cannot be traded for other NFTs (Houser & Holden, 2022). Fungibility is “the equivalence and distinguishability or uniqueness of an object (or lack thereof)” (Baker et al., 2022, p. 3). Tokens are referred to as “digitally scarce units of value the properties and circulation of which are prescribed via computer code” (Ferrari, 2020, p. 326). Freni et al., (2022, p. 2) stated that “tokenization represents a form of digitalization of value and, just like the Internet enabled free and fast circulation of digitized information, the blockchain is allowing the “almost free” and borderless flow of digitized value”. The tokenization process “specify the smart contract, the rules that govern it, the monetary policy, and the characteristics of the token that it issues” (Rabaa’i, Zhu, & Jayaraman, 2022, p. 98).

There are numerous online platforms available that facilitate the buying and selling (i.e., trading) of NFTs. These NFT marketplaces organize these digital assets into collections, which are groups of NFTs sharing similar traits. Collections can encompass various forms, such as packs of collector cards, selections of artwork, or virtual worlds within online games (Nadini et al., 2021). For example, OpenSea, which Wise (2022) states is the largest NFT marketplace, offers over 200 categories of digital assets. According to Rabaa’i et al. (2022), OpenSea had more than 1 million active users in Q1 of 2022. The authors report that the platform generated $243 million in revenue on the second day of 2022. Another notable NFT marketplace, NBA Top Shot, attracted tens of thousands of NBA enthusiasts worldwide. This platform focuses on trading short clips of NBA highlights and has accumulated more than 7.6 million remarkable clips, allowing fans to engage with both established and emerging basketball players (Wang et al., 2021, p. 3). NBA Top Shot's popularity soared in 2021, driven by newsworthy trades such as the LeBron James highlight (Baker et al., 2022).

Although NFTs hold significant financial value and possess potential importance for the future economy and decentralized marketplaces, there is a noticeable dearth of scholarly research on the subject. The existing body of academic literature on NFTs is still in its early stages and remains limited in scope (e.g., Chohan & Paschen, 2023; Rabaa’i, Zhu, & Jayaraman, 2022; Radermecker & Ginsburgh, 2023; Taherdoost, 2023). Current research on NFTs is either conceptual (Malik et al., 2022; Rabaa’i, Zhu, & Jayaraman, 2022) or primarily concerned with security issues and protocols (Wang et al., 2021), market analysis (Nadini et al., 2021), copyright considerations (Rehman et al., 2021), environmental implications (Truby et al., 2022), analysis of specific NFT marketplaces like Decentraland and NBA Top Shot (Dowling, 2022a; Zaucha & Agur, 2022), the impact of NFTs on various industries such as art, advertising, marketing, and sports management (Baker et al., 2022; Chohan & Paschen, 2023; van Haaften-Schick & Whitaker, 2022), as well as the pricing and correlation of NFTs with cryptocurrencies (Batchu et al., 2022). In a recent systematic review, Taherdoost (2023) was able to only identify 34 journal articles related to NFTs published between 2012 and 2022. In users’ behavioral intentions context, only the work of Ho and Song (2023) investigated consumers’ attitude towards purchasing NFTs. Findings of their work reaffirmed the validity of the Unified Theory of Acceptance and Use of Technology (UTAUT) constructs in influencing users’ behavioral intentions towards NFTs.

In summary, while existing studies offer insightful analysis of the NFTs phenomena, further study in this field is still in its infancy. Academic research has paid limited attention to understanding the reasons behind consumer resistance towards investing in NFTs. However, it is argued that in order to establish and sustain a viable NFT ecosystem, it is crucial to comprehend the barriers that influence consumers' reluctance to embrace this innovation (e.g., Baklouti & Boukamcha, 2023; Leong et al., 2021; Migliore et al., 2022; Rabaa’i, Zhu, & Jayaraman, 2022; Ram & Sheth, 1989). Thus, this study adopts the innovation resistance theory (IRT) (Ram & Sheth, 1989) to investigate the potential factors contributing to consumers' resistance towards NFT investment, aiming to partially address this research gap. The following sections provide an overview of the IRT and discuss why it is a suitable theoretical framework for the current study.

2.2 Innovation resistance theory (IRT)

The innovation resistance theory (IRT), initially introduced by Ram (1987) and later refined by Ram and Sheth (1989), offers insights into user behavior characterized by resistance. Tang and Chen (2022) argued that IRT views users’ resistance to innovations as a natural response to the accompanying changes and suggests that comprehending the psychological aspects of user resistance can facilitate the acceptance and dissemination of the innovation.

As per the findings of Sadiq et al. (2021), consumers' resistance to innovation arises from a logical assessment and evaluation of a new innovation that has the potential to disrupt the established norms and deviate from their existing worldview. In essence, consumers' resistance to a novel innovation can be defined as the reluctance exhibited by consumers to embrace change from a state of contentment or due to conflicts that might impact their belief system (Ram & Sheth, 1989). Hence, consumer resistance plays a pivotal role in determining the adoption of an innovation (Sadiq et al., 2021).

According to Ram (1989), a number of obstacles and barriers customers confront during the initial phases of acceptance and adoption of the new innovation, are to blame for consumers' resistance to innovation. But only after these barriers are abolished, consumers can accept and adopt the new innovation (Ram, 1987). Ram and Sheth (1989) categorized these barriers into two main types: functional barriers and psychological barriers. Within the functional barriers, they identified subcategories such as usage barriers, value barriers, and risk barriers. Conversely, within the psychological barriers, they identified traditional barriers and image barriers. Functional barriers can be seen as an active form of resistance that surfaces from the characteristics and features of the innovation itself (Heidenreich & Handrich, 2015). On the other hand, psychological barriers can be seen as a more passive form of resistance stemming from consumers' existing worldview (Yu & Chantatub, 2016).

In an extensive examination of 26 research studies, Leong et al. (2021) discovered that the five barriers linked to resistance (specifically usage, value, risk, tradition, and image) were highly impactful in elucidating individuals' resistance to innovation. For instance, Chen et al. (2022) recently demonstrated that these five resistance-related barriers accounted for over 54% of the variance in users' adoption intention within the context of mobile ticketing applications. Similarly, Sadiq et al. (2021) found that their model based on the five resistance-related barriers explained 37% of the variance in consumers' intention to purchase eco-friendly cosmetics. Additionally, the model of Kaur et al.'s (2020) explained more than 59% of the variance in users' intentions to use mobile payments. Finally, Talwar et al. (2020) showed that the five resistance-related barriers model could explain more than 36% of the variance in individuals' intention to make purchases from online travel agencies.

3. Model and hypotheses development

The primary objective of this research study is to investigate the barriers behind consumers' resistance to investing in a new innovation, specifically NFTs. To achieve this, the study adopts the innovation resistance theory (IRT) due to its comprehension of consumers' resistance towards innovation. The use of IRT in this study is justified for several reasons. Firstly, previous research has demonstrated the effectiveness of IRT in explaining customer resistance to new innovations (e.g., Kushwah et al., 2019; Leong et al., 2021), distinguishing it from other theoretical frameworks focused on technology acceptance and adoption, such as the unified theory of acceptance and use of technology (UTAUT), technology acceptance model (TAM), and diffusion of innovation (DOI). These frameworks do not directly address consumer resistance to innovations (Kaur et al., 2020). Thus, IRT is the most suitable framework for investigating this particular research objective. Second, IRT has been applied and validated in various user innovations contexts, such as mobile banking (Laukkanen, 2016), smart product and services (Mani & Chouk, 2018), eco-friendly cosmetics (Sadiq et al., 2021), organic food consumption (Kushwah et al., 2019), m-payment solutions (Migliore et al., 2022), m-ticketing applications (Chen et al., 2022), Internet of Things (Lee, 2020), online travel agencies (Talwar et al., 2020), digital device recycling platform (Tang & Chen, 2022), drone food delivery (Khalil et al., 2022), Internet banking services (Baklouti & Boukamcha, 2023), among others, This extensive application and validation of IRT in diverse contexts suggest its reliability and applicability in investigating consumer resistance towards NFTs' investment.

Aligned with prior studies, for example by Sadiq et al. (2021) and Chen et al. (2022), this research focuses on investigating functional barriers (usage, value, and risk) and psychological barriers (tradition and image) in relation to consumers' resistance to investing in NFTs. The proposed research model, depicted in Figure 1, aims to explore the influence of these five barriers on individuals' intentions to invest in NFTs.

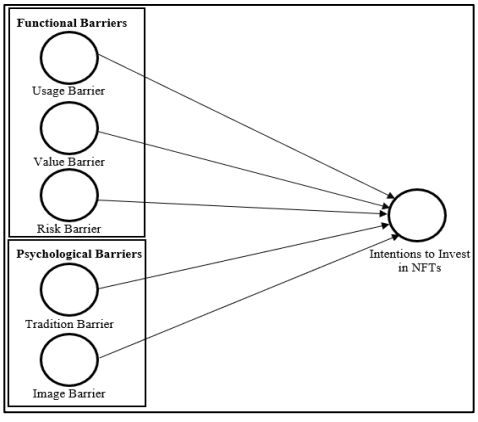

Fig. 1. The proposed research model

3.1 The Usage Barrier (UB)

The usage barrier (UB) emerges when a new innovation clashes with the established work processes, experiences, or habits of consumers, potentially disrupting their existing norms and routines (Ram & Sheth, 1989). UB is a commonly observed obstacle that hinders consumers from adopting new innovations (Chen et al., 2022). Joachim et al. (2018) argued that accepting a new innovation often involves unwelcome disruptions to users' current habits and procedures. Ram (1989) suggested that consumers typically respond negatively to new innovations that disrupt their equilibrium and stability. Numerous prior studies based on the innovation resistance theory (IRT) have demonstrated a significant negative association between UB and behavioral intentions across various innovation contexts (e.g., Chen et al., 2022; Kushwah et al., 2019; Laukkanen, 2016; Sadiq et al., 2021; Tandon et al., 2021). Investing in digital assets like NFTs represents a novel phenomenon, and investors may feel more at ease investing in conventional commodities such as currency, oil, real estate, and stocks due to their familiarity and greater information availability. Furthermore, investing in NFTs may require acquiring new skills related to cryptocurrencies, NFT marketplaces, blockchain technology, and registering on digital wallet platforms, which may not align with investors' preferred investment methods and needs (Joachim et al., 2018). Therefore, the UB is likely to be a significant obstacle when it comes to investing in unfamiliar products like NFTs (Tandon et al., 2021). Therefore, the following hypothesis is proposed:

H_1: *Usage barrier is negatively associated with the intentions to invest in NFTs.*

3.2 The Value Barrier (VB)

The value barrier (VB) emerges when a new innovation is contrasted to its alternative or predecessor in terms of performance and financial value and is perceived as inferior in these aspects (Ram & Sheth, 1989). VB arises from the perceived differences in value between a new innovation and its predecessor (Kushwah et al., 2019). In order for a new innovation to influence consumer behavior, it must offer superior performance (Ram & Sheth, 1989) and provide advantages that competing products do not offer (Joachim et al., 2018). In other words, consumers have little motivation to switch unless a new innovation delivers greater value than existing options (Migliore et al., 2022). Therefore, investors will only choose to invest in NFTs if they provide advantages over other investment methods such as currency, oil, real estate, and stocks. VB has been found to have a negative impact on the intention to purchase from online travel agencies (Talwar et al., 2020), the purchase of eco-friendly cosmetic products (Sadiq et al., 2021), and Internet banking services (Baklouti & Boukamcha, 2023). Consequently, the following hypothesis is formulated:

H_2: *Value barrier is negatively associated with the intentions to invest in NFTs.*

3.3 The Risk Barrier (RB)

The risk barrier (RB) refers to the degree to which uncertainty and risk are perceived as inherent in a new innovation or product (Ram & Sheth, 1989). Every new innovation or product carries a certain level of uncertainty and risk (Baklouti & Boukamcha, 2023), leading consumers to often delay adoption until ambiguity is resolved (Kushwah et al., 2019), resulting in a slower rate of adoption (Ram & Sheth, 1989). Sadiq et al. (2021) suggested that risk acts as a barrier and increases with the level of ambiguity surrounding a new innovation. Therefore, an innovation's acceptability is influenced by the level of uncertainty and risk it entails (Kaur et al., 2020). In the case of investing in NFTs, the risk barrier may arise from concerns related to fraud, financial loss, and reliability (NonFungible.com, 2022a; Rabaa'i, Zhu, & Jayaraman, 2022). Various studies based on the IRT framework have reported a negative association between RB and behavioral intentions in different innovation contexts (e.g., Baklouti & Boukamcha, 2023; Kaur et al., 2020; Sadiq et al., 2021; Talwar et al., 2020). Thus, the following hypothesis is proposed:

H_3: *Risk barrier is negatively associated with the intentions to invest in NFTs.*

3.4 The Tradition Barrier (TB)

The tradition barrier (TB) represents a psychological obstacle that emerges when consumers' established traditions, norms, and beliefs conflict with the adoption and experiences associated with a new innovation (Ram & Sheth, 1989). Consumers have established routines, habits, social conventions, and beliefs, and any deviations from these can lead to resistance towards a new innovation (Laukkanen, 2016). TB, in this study, refers to the degree to which a new innovation deviates from consumers' established traditions and norms (Chen et al., 2022). Previous research has demonstrated a negative association between TB and the intention to purchase eco-friendly cosmetic products (Sadiq et al., 2021), as well as the adoption of drone food delivery (Khalil et al., 2022) and Internet banking services (Baklouti & Boukamcha, 2023). Applying these findings to the context of NFTs' investment, the tradition barrier encompasses factors such as satisfaction with traditional investment products, lack of information, and unfamiliarity with NFTs' investment (NonFungible.com, 2022a; Rabaa'i, Zhu, & Jayaraman, 2022). Consequently, this study argues that consumer resistance to investing in NFTs is influenced by the traditional barrier, which contradicts their traditional investment norms and value beliefs. Hence, the following hypothesis is proposed:

H_4: *Tradition barrier is negatively associated with the intentions to invest in NFTs.*

3.5 The Image Barrier (IB)

The image barrier (IB) surfaces when consumers compare a new product or innovation with existing product offerings, and it refers to consumers' perception of the complexity associated with its usage or origin (Ram & Sheth, 1989; Sadiq et al., 2021). A new innovation often inherits certain characteristics from its origin, such as the type of innovation, the manufacturer, or the country of origin (Chen et al., 2022). Consequently, the image barrier can influence a user's behavioral intention towards adopting an innovation. Previous studies have consistently shown a negative association between image barrier and behavioral intentions in various innovation contexts, including mobile banking (Laukkanen, 2016), and Internet banking services (Baklouti & Boukamcha, 2023). In the case of investing in NFTs, image barriers may arise from investors' skepticism regarding the complexity of NFTs' investment and doubts about the authenticity of NFTs (NonFungible.com, 2022a; Rabaa'i, Zhu, & Jayaraman, 2022; Xiaodi Zhu et al., 2022). Based on these considerations, the following hypothesis is formulated:

H5: *Image barrier is negatively associated with the intentions to invest in NFTs.*

4. Methodology

4.1 Measures

In this study, the measurement scale items were adapted from prior literature and modified to align with the research topic. The Usage Barrier (UB) and Value Barrier (VB) constructs were assessed using 3-item scales adapted from Joachim et al. (2018). The Risk Barrier (RB) construct was assessed using a 3-item scale adapted from Kaur et al. (2020) and Sadiq et al. (2021). The Tradition Barrier (TB) construct was assessed using a 3-item scale adapted from Kaur et al. (2020) and Joachim et al. (2018). The Image Barrier (IB) construct was assessed using a 3-item scale adapted from Kaur et al. (2020) and Sadiq et al. (2021). Lastly, the Intentions to Invest (II) construct was assessed using a 3-item scale adapted from Joachim et al. (2018), Kaur et al. (2020), and Sadiq et al. (2021). All items were rated on a 5-point Likert scale ranging from "strongly disagree" to "strongly agree". Table 1 presents the study's constructs, measurement items, and the literature sources.

Table 1
The constructs, measurement items and literature sources

Variable Name	Items Code	Measurement Items	Adapted from
Usage Barrier (UB)	UB1	Investing in NFTs requires learning new skills.	Joachim et al. (2018)
	UB2	Investing in NFTs fits well with the way I like to invest (R)	
	UB3	Investing in NFTs is completely compatible with my investment needs (R)	
Value Barrier (VB)	VB1	NFTs offer advantages not offered by competing investment products (R)	Joachim et al. (2018)
	VB2	In my view, NFTs are superior to competing investment products (R)	
	VB3	Investing in NFTs solves a problem I cannot solve with competing investment products (R)	
Risk Barrier (RB)	RB1	I have some doubts about the NFTs' reliability.	Kaur et al. (2020) and Sadiq et al. (2021)
	RB2	I fear that while I am investing in NFTs, someone may hack my account	
	RB3	I fear that I am paying more money for NFTs	
Tradition Barrier (TB)	TB1	Traditional investments products are enough for me	Kaur et al. (2020) and Joachim et al. (2018)
	TB2	I find it difficult to get some information about NFTs investment	
	TB3	Investing in NFTs does not match my traditional investment methods	
Image Barrier (IB)	IB1	I have such an image that investing in NFTs is difficult.	Kaur et al. (2020) and Sadiq et al. (2021)
	IB2	I believe that NFTs currently sold in market are not really genuine (R)	
	IB3	In my opinion, investing in NFTs is often too complicated to be useful	
Intentions to Invest (II)	II1	I intend to invest in NFTs in the future	Joachim et al. (2018), Kaur et al. (2020), and Sadiq et al. (2021)
	II2	If I have an opportunity, I will invest in NFTs	
	II3	I will not consider investing in NFTs (R)	

The survey instrument was evaluated by three academic experts to ensure its quality. To further evaluate the measures' effectiveness, a pilot survey was conducted with a convenience sample of 18 participants. The participants found the questionnaire easy to understand and quick to complete. The reliability of the scales was assessed using Cronbach's alpha, and all constructs met the suggested threshold of 0.70, as recommended by Nunnally and Bernstein (1994). Subsequently, the questionnaire was deemed suitable for data collection, and the final data analysis did not include the pilot survey results.

4.2 Data collection and respondents' profile

The data for this study was obtained using an online survey, which was distributed through different online social networking platforms, including LinkedIn, Instagram, WhatsApp, and Facebook, within the State of Kuwait. Internet usage in Kuwait is prevalent, with a substantial majority of the population, approximately 97%, utilizing the internet (KFAS, 2019). Moreover, more than 95% of internet users in Kuwait are active social media users (Rabaa'i, in press). Given the widespread internet usage and active social media engagement, employing an online survey was deemed appropriate for gathering responses from users of social networking sites.

To ensure the accuracy and reliability of the collected data, only individuals with investment experience were included as participants in this study. A qualifier question, "Do you have any investment experience?", was utilized to filter out respondents who lacked this experience. Those who responded with a "no" were excluded from the study. A total of 564 surveys were initially collected, but after excluding the 189 surveys from respondents without investment experience, 375

valid questionnaire responses remained. This number of valid responses surpasses the recommended sample size for conducting structural equation modeling (SEM) analysis, which suggests having 10 to 15 cases per measurement item (e.g., 15 * 18-item = 270 responses) (e.g., Hair et al., 2019). Demographic data of the respondents reveals that 251 (67%) were male and 124 (33%) were female, with more than 85% aged between 18 and 44. Around 88 percent are employed. The majority of those surveyed (85.6%) had bachelor's degrees. Monthly income was between KD1,800 to KD4,000 (US$5,880 to US$13,080). Approximately, 93% of the respondents have indicated prior knowledge of NFTs.

4.3 Statistical analysis

The data and research model of this study were assessed using IBM SPSS 23 and SmartPLS 3.2.9 (Ringle et al., 2015). The collected data underwent evaluation for outliers, normality, and missing values. Additionally, common method bias was examined to ensure unbiased responses. Following the guidelines of Hair et al. (2017), the assessment of the model was conducted in two stages: the measurement model and the structural model.

5. Results

5.1 Descriptive statistics

Following the recommendation of Sadiq et al. (2021), this study initially performed an examination of the data before applying advanced statistical techniques. Firstly, a frequency test was employed to identify any missing values in the collected data. The results indicated that there were no missing values present. Secondly, Cook's distance was utilized to detect potential outliers in the data. It is conventionally recommended to consider any response with a distance greater than 1 as an outlier (Pituch & Stevens, 2015). The analysis revealed that there were no outliers identified in the data. Lastly, tests for skewness and kurtosis were conducted to assess the normality of the data. The findings indicated that all values fell within the suggested range of +3 and -3, indicating that the data approached a normal distribution.

5.2 Common method bias (CMB)

To mitigate the potential influence of common method bias (CMB) in self-reported surveys, this study adopted two approaches suggested by Podsakoff et al. (2003). Firstly, to ensure respondents' attentiveness to the survey questions, reverse-coded measurement items were included in the questionnaire. This helps to counteract response biases that may arise from acquiescence or inattentive responding. Secondly, Harman's single factor test was conducted to detect any data bias. The results revealed that the single factor accounted for only 32.29% of the total variance, which is below the standard cut-off threshold of 50% (Rabaa'i, Al-lozi, et al., 2022). This indicates that the common method bias is not a significant concern in the study.

5.3 Measurement model

Following the guidelines of Hair et al. (2017), the measurement model was assessed based on internal reliability, convergent validity, and discriminant validity. Internal reliability was assessed using composite reliability (CR) and Cronbach's alpha (CA) (e.g., Rabaa'i, in press a; Rabaa'i, Zhu, Jayaraman, et al., 2022).

Table 2
Items loading, p-value, Cronbach's alpha, Composite reliability, and AVE

Items	Loading	p-value	Cronbach's Alpha (CA)	Composite Reliability (CR)	AVE
Usage Barrier (UB)					
UB1	0.890	0.000	0.863	0.916	0.785
UB2	0.861	0.000			
UB3	0.906	0.000			
Value Barrier (VB)					
VB1	0.870	0.000	0.798	0.879	0.709
VB2	0.777	0.000			
VB3	0.876	0.000			
Risk Barrier (RB)					
RB1	0.856	0.000	0.835	0.901	0.752
RB2	0.865	0.000			
RB3	0.880	0.000			
Tradition Barrier (TB)					
TB1	0.932	0.000	0.899	0.937	0.832
TB2	0.896	0.000			
TB3	0.908	0.000			
Image Barrier (IB)					
IB1	0.859	0.000	0.805	0.885	0.719
IB2	0.822	0.000			
IB3	0.862	0.000			
Intentions to Invest (II)					
II1	0.910	0.000	0.863	0.916	0.785
II2	0.907	0.000			
II3	0.839	0.000			

As presented in Table 2, all constructs exhibited CA and CR values above 0.7 and 0.85, respectively, indicating strong internal consistency reliability (e.g., Henseler et al., 2016). Convergent validity was evaluated using the average variance extracted (AVE) and factor loadings (FL). As observed in Table 2, the AVE values for all constructs surpassed the threshold of 0.5 recommended by Hair et al. (2017), indicating that the constructs accounted for more than 50% of the variance in their respective indicators (Henseler et al., 2009). Furthermore, all FL values in this study exceeded the cutoff value of 0.7 (Hair et al., 2017), confirming the convergent validity of the model. The Heterotrait-Monotrait (HTMT) ratio was utilized to evaluate the discriminant validity of the constructs in the model. According to Hair et al. (2019, p. 9), the HTMT denotes "the mean value of the measurement item correlations across variables relative to the (geometric) mean of the average correlations for the measurement items measuring the same variable". As indicated in Table 3, all HTMT values in this study were below the recommended limit of 0.90 (e.g., Hair et al., 2017; Rabaa'i et al., 2021), confirming the discriminant validity of the constructs employed in this study.

Table 3
Hetrotrait–Monotrait ratio (HTMT) Test

	IB	II	RB	TB	UB	VB
Image Barrier (IB)						
Intentions to Invest (II)	0.685					
Risk Barrier (RB)	0.534	0.709				
Tradition Barrier (TB)	0.504	0.636	0.734			
Usage Barrier (UB)	0.554	0.759	0.705	0.640		
Value Barrier (VB)	0.475	0.629	0.699	0.592	0.673	

5.4 Structural model

Following the suggested guidelines of Hair et al.'s (2019), the structural model of this study (see Fig. 2) was assessed by the determination of coefficient (R^2), predictive relevance (Q^2), effect size estimates (f^2) and path coefficient estimates (β).

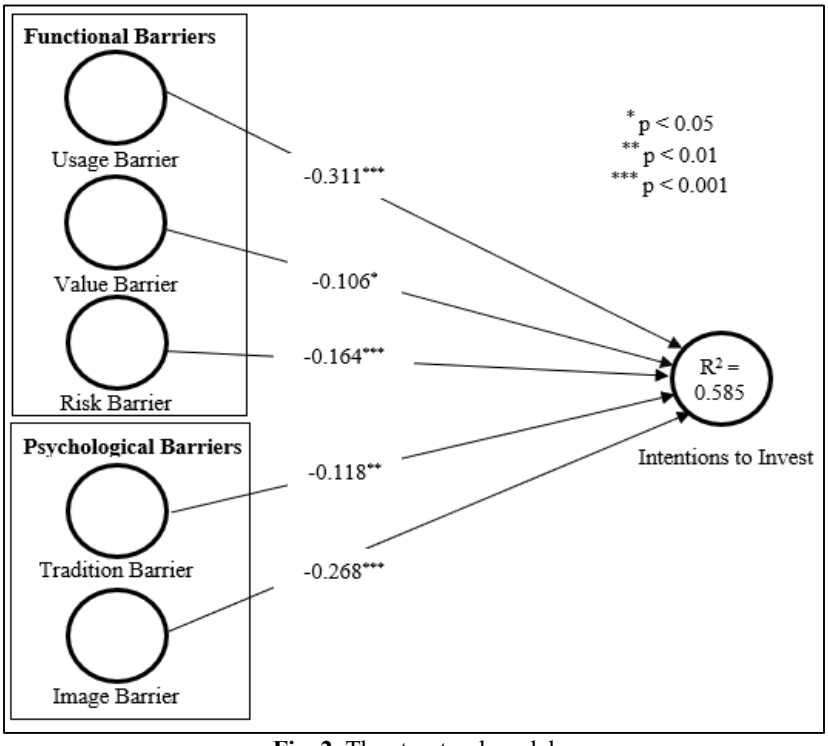

Fig. 2. The structural model

The research model employed in this study accounted for 58.5% of the variance (R^2) in intentions to invest in NFTs. To evaluate the predictive relevance (Q^2) of the model, a cross-validated redundancy approach was employed, specifically using the blindfolding procedure with an omission distance of 7. The results indicate that the Q^2 value of 0.429 exceeded zero, which aligns with the recommendation of Chin (2010).

Effect size estimates (f^2) were computed to determine the significance of the independent variables on the dependent variable. The results are presented in Table 4. Based on Kenny's (2018) classification of effect sizes as small, medium, and large (with values of 0.005, 0.01, and 0.025, respectively), the f^2 values for all the hypotheses in this study were within the suggested range, demonstrating adequate effect sizes. As depicted in Table 4, the risk barrier, tradition barrier, and image barrier exhibited negative associations with intentions to invest in NFTs (H3: $\beta = -0.164$, $p<0.000$; H4: $\beta = -0.118$, $p<0.01$; H5: $\beta =$

-0.268, p<0.000, respectively). Among the barriers, the usage barrier emerged as the strongest inhibitor (H1: β = -0.311, p<0.000), while the value barrier displayed the weakest inhibitory effect (H2: β = -0.106, p<0.05).

Table 4
Hypotheses' path coefficients, p-values, significance, and effect sizes

Path	Hypothesis No.	Path coefficient	p-values	Sig.	f^2	Decision
UB → II	H1	-0.311	0.000***	p<0.000	0.119	Supported
VB → II	H2	-0.106	0.017*	p<0.05	0.015	Supported
RB → II	H3	-0.164	0.000***	p<0.000	0.030	Supported
TB → II	H4	-0.118	0.009**	p<0.01	0.017	Supported
IB → II	H5	-0.268	0.001**	p<0.000	0.125	Supported

6. Discussion and implications

This study aimed at exploring the potential barriers contributing to consumers' resistance towards investing in NFTs within the specific context of Kuwait. The theoretical framework adopted for this investigation was the innovation resistance theory (IRT). The study took the necessary measures to establish the reliability and validity of the used constructs, and the model's fit indices and predictive relevance were also evaluated, as outlined in the previous section. Additionally, the study's findings confirmed the research model's ability to explain significant variance in investors' intentions to invest in NFTs (R^2=58.5%). Such R^2 value was above the suggested limit of 40% and fell within a highly acceptable range (Straub & Gefen, 2004). All study hypotheses, presented in Table 4, were supported with the results.

In terms of functional barriers, based on the study's findings within the Kuwaiti context, the most prominent functional barrier to investing in NFTs is the usage barrier (H1: Usage Barrier (UB) → Intention to Invest in NFTs, β = -0.311, p<0.000). When a new innovation, such as NFT investment, does not align with consumers' existing work processes, experiences, or habits, a usage barrier emerges as it disrupts the status quo. This finding aligns with prior studies conducted in various contexts (e.g., Baklouti & Boukamcha, 2023; Khalil et al., 2022; Laukkanen, 2016; Sadiq et al., 2021). The possible explanation for this outcome is that investing in NFTs is a relatively novel concept (e.g., Baker et al., 2022; Dowling, 2022b), and investors may feel more comfortable with traditional investments in commodities like money, oil, real estate, stocks, etc., as they are more knowledgeable and accustomed to them. Furthermore, investing in NFTs may require acquiring new skills, may not align with investors' preferred investment methods, and may not fulfill their investment needs (Joachim et al., 2018). Hence, the UB acts as a main obstacle to the intention to invest in NFTs. Additionally, although it is considered the least influential barrier in the Kuwaiti context, the study's findings demonstrate that the value barrier remains a significant obstacle to NFT investment (H2: Value Barrier (VB) → Intention to Invest in NFTs, β = -0.106, p<0.05). The VB arises when a new innovation is evaluated to alternative or precursor options in terms of performance and financial value and is deemed inferior based on these criteria. This result aligns with previous studies (e.g., Baklouti & Boukamcha, 2023; Sadiq et al., 2021). This suggests that, in comparison to more conventional investment choices such as currency, oil, real estate, stocks, etc., the respondents did not perceive the value of investing in NFTs, which consequently negatively impacts their intention to invest in NFTs. The last functional barrier is the risk barrier. The study's findings provide support for H3, as the risk barrier demonstrates a negative association with the intention to invest in NFTs (H3: Risk Barrier (RB) → Intention to Invest in NFTs, β = -0.164, p<0.000). The RB is primarily driven by perceptions rather than functional characteristics. Within the context of NFTs, these perceptions may be linked to concerns regarding fraud, financial loss, and lack of reliability. In contrast to the findings of Kushwah et al. (2019) and Migliore et al. (2022), this finding aligns with the results of Sadiq et al. (2021) and Kaur et al. (2020). This suggests that respondents may exhibit reluctance to invest in NFTs due to the considerable level of uncertainty, risk, and fraud associated with them (e.g., The Guardian, 2022; Yaffe-Bellany, 2022). Investors may lack confidence in investing in this innovation due to the ambiguity and risk involved with NFT investments, thus heightening their risk barrier.

Regarding the influence of psychological barriers on resistance to investing in NFTs, the study's findings confirmed a negative association between the tradition barrier and the intention to invest in NFTs (H4: Tradition Barrier (TB) → Intention to Invest in NFTs, β = -0.118, p<0.01). The TB acts as an obstacle that prevents consumers from adopting new innovations because they conflict with long-established customs, conventions, and beliefs. This finding aligns with previous studies (e.g., Baklouti & Boukamcha, 2023; Khalil et al., 2022), but disproves the findings of Kushwah et al. (2019) and Migliore et al. (2022). A possible explanation for this finding is the lack of information and familiarity with NFT investment, coupled with the satisfaction derived from conventional investment products. Deviating from traditional investment norms and values deterred investors from embracing NFT investments. Finally, the study confirmed that the image barrier is negatively associated with the intention to invest in NFTs (H5: Image Barrier (IB) → Intention to Invest in NFTs, β = -0.268, p<0.000). The IB arises when consumers perceive new innovations as complex in their usage or origin. This result aligns with findings reported in prior studies (e.g., Baklouti & Boukamcha, 2023; Sadiq et al., 2021). Several justifications can be considered for this finding: first, Kuwaiti investors may not view NFTs as superior investment products compared to conventional options; second, investors may perceive investing in NFTs as complicated and challenging; and lastly, confusion and skepticism among investors regarding the legitimacy and authenticity of NFTs (Yaffe-Bellany, 2022).

6.1 Theoretical Implications

This study makes various theoretical contributions. Firstly, the potential importance of NFTs in shaping the future economy and decentralized markets, there is currently a scarcity of academic research addressing this subject. (Chohan & Paschen, 2023; Houser & Holden, 2022; Rabaa'i, Zhu, & Jayaraman, 2022; Radermecker & Ginsburgh, 2023; Taherdoost, 2023; Xiaodi Zhu et al., 2022). Secondly, while the innovation resistance theory (IRT) has been utilized in diverse contexts, this study represents one of the pioneering research endeavors to empirically validate the relevance of IRT specifically in the context of NFTs. Thirdly, while the majority of behavioral intentions research tends to concentrate on factors that positively influence users' behavioral intentions, limited attention has been given to factors that hinder or inhibit these intentions. (e.g., Migliore et al., 2022; Rabaa'i & Zhu, 2021). Therefore, this research aims to fill this void by investigating consumer reluctance or resistance when it comes to investing in NFTs. Fourthly, this study is the first to investigate behavioral intentions to invest in NFTs exclusively in Kuwait, thereby contributing to the regional body of literature. Finally, the study's results demonstrate that the proposed model can be applied to other forms of digital assets, including cryptocurrencies, as evidenced by its strong predictive relevance (Q^2 = 42.9%) and variance explained (R^2= 58.5%) in the intention to invest in NFTs.

6.2 Practical Implications

Findings of this study hold value for various stakeholders, including NFT marketplaces, marketers, policymakers, and investors. First, the study highlights the significance of usage and value barriers as key obstacles within the Kuwaiti context. This indicates that investors perceive investing in NFTs as incompatible with their current investment experiences and practices. They may also believe that NFTs do not meet their investment needs, require acquiring new skills, and are inferior in terms of performance and financial value compared to alternative investment options. In light of these findings, marketers should focus their promotional campaigns on emphasizing the benefits, financial value, and user-friendliness of investing in NFTs, particularly in comparison to alternative investments such as money, oil, real estate, stocks, and other commodities. Second, findings of this study reveal that risk and image barriers are significant factors within the researched context. This indicates that investors have developed skepticism towards NFT investments, likely influenced by recent news stories highlighting risks, fraud, and uncertainties associated with NFTs (e.g., The Guardian, 2022; Yaffe-Bellany, 2022). In response, policymakers can propose guidelines and regulations to govern and oversee NFT investments, aiming to mitigate risks and provide a sense of security for investors. Additionally, marketers can collaborate with social influencers or opinion leaders to promote NFT investments (Sadiq et al., 2021). Such collaborations can help alleviate consumers' concerns regarding risk and image barriers by reducing skepticism and increasing trust in NFTs as viable alternatives to traditional investment options. Finally, the study's findings suggest that consumers' perceived intention to invest in NFTs contradicts with their traditional beliefs and norms, underscoring the significant role played by the tradition barrier in their resistance to NFT investment. To facilitate a shift towards NFT investment, marketplaces and regulators can raise awareness about the benefits associated with investing in NFTs. One approach is to offer free and simplified NFT investment accounts for training and exploration purposes. This would allow consumers to familiarize themselves with NFT investment and gradually modify their investment behavior (Migliore et al., 2022). Additionally, providing financial incentives such as lower fees (Leong et al., 2020). Such measures can promote NFT investment and help overcome the influence of the tradition barrier.

7. Conclusion, limitations, and directions for future research

There is a scarcity of scholarly research on NFTs, and this study makes a unique contribution by employing the innovation resistance theory (IRT) framework proposed by Ram and Sheth (1989) to investigate the barriers that influence customers' resistance to invest in NFTs. The study employed the PLS-SEM approach to analyze the data and found that its conceptual model was firmly grounded in established theory. The results demonstrated that all identified barriers had a significant impact on investors' resistance to NFTs' investment, with the model explaining 58.5% of the variation in customers' intention to invest in NFTs. The study thoroughly examined the barriers to NFT investment in Kuwait and discussed both theoretical and practical implications of the findings.

This research study has the following limitations: firstly, the study was conducted exclusively in Kuwait, which is a distinctive and affluent developing country, raising concerns about the generalizability of the results to other developed or developing nations. To address this limitation, future research should aim to replicate the study in a broader range of countries, encompassing both developed and developing regions, to ascertain the broader applicability of the findings. Secondly, convenience sampling was employed, which may introduce potential biases and limit the validity of the collected data. To enhance the accuracy and representativeness of future research, more rigorous sampling methods should be adopted. Thirdly, the study did not investigate the mediating effects of variables such as gender, age, and investment experience. To further understand the key barriers to NFTs' investment, future research should explore the potential influences of these factors. Lastly, it is crucial to note that this study solely focused on examining the five resistance-related barriers within the IRT model and did not address the potential impact of other barriers, such as the environmental impacts associated with NFTs. Considering the significant energy consumption and environmental effects of NFTs, particularly those built on proof-of-work blockchains (EU Blockchain, 2021; Idelberger & Mezei, 2022; Truby et al., 2022), future research should take into account the environmental barrier when exploring inhibitors of NFT investment. The growing concerns surrounding NFTs' potential energy consumption and environmental impact may also act as barriers to their investment (Rabaa'i, Zhu, & Jayaraman, 2022; Ramanathan & Ramanathan, 2022).

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