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Bridging the Adoption Gap for Cryptocurrencies: Understanding the Affordances that Impact Approach–Avoidance Behavior for Potential Users and Continuation Usage for Actual Users

Abstract

Purpose: With the rise of cryptocurrency and its influence on the financial industry, this paper explores cryptocurrency affordances that lead to approach–avoidance behavioral intentions for non-users (potential) and the intention to continue use for users (actual), drawing upon affordance theory and chasm theory.

Design/Methodology/ Approach: We collected data from 480 potential and actual users in Germany and used maximum likelihood structural equation modelling (ML-SEM) to analyze it. In particular, the data consisted of 301 cryptocurrency users in Germany, and we used ML-SEM to test the post-adoption model. Additionally, logistic regression was utilized to determine the dominant actual usage method (store of value or medium of exchange) for various cryptocurrency coins.

Findings: According to the study's results, the perceived value benefits have a positive impact on the behavioral intention of potential users to adopt cryptocurrency, and they influence the intention of actual users to continue using it. However, both perceived volatility and financial risk tolerance are the most crucial factors hindering cryptocurrency adoption, whether in the pre-adoption or the post-adoption stage.

Originality/Value: This is the first study to reveal cryptocurrency affordances and examine their effect on behavioral intentions toward cryptocurrency adoption based on the differences between non-users (potential) and users (actual). Furthermore, we explore how cryptocurrency holders perceive and invest in different coins (e.g., NFTs), which sheds light on factors such as financial risk tolerance that affect their decision making.

Keywords: cryptocurrency adoption; affordances; crossing the chasm; store of value; payments; Bitcoin; altcoins.

1. Introduction

Cryptocurrencies are proliferating and becoming mainstream. However, no boom is fulfilled without volatility along the way. The total market value of all cryptocurrencies had seen tremendous turbulence from $0.25, when Bitcoin emerged in 2011, to almost $3 trillion in late 2021 (PWC, 2022; European Central Bank, 2019) – but market volatility at the beginning of 2022 drained nearly a third of this value. This fall, mainly driven by macroeconomic (e.g., post-COVID interest rate) and geopolitical concerns (e.g., Ukraine crisis) rather than problems with crypto applications, may have given crypto minimalists a rough ride. However, a crypto market cap of "just" $2 trillion is approximately ten times larger than it was at the beginning of 2020 (PWC, 2022).

Despite the relative maturity of cryptocurrency studies, research in this field is limited to initial adoption/rejection (e.g., Bhimani *et al.,* 2022; Chen *et al.,* 2022; Treiblmaier *et al.,* 2021). Furthermore, previous research has specified the factors that affect cryptocurrency pricing, highlighting macroeconomic fluctuations, technological factors, and investment theories, such as *The Greater Fool* (Aalborg *et al.*, 2019; Bouoiyour and Selmi, 2016; Kjærland *et al.,* 2018a, b). Given such hypothetically risky scenarios, why would current users invest? And do non-users hesitate to consider the application of cryptocurrencies? Do actual users perceive cryptos as a store of value (investment) or a method of payment? Is there any difference between crypto holders, such as Bitcoin holders and new emergent coins holders (e.g., NFTs)? What uncertainties and incentives do non-users consider in a proposed perceived approach and avoidance behaviors? There is still very little scientific understanding in the existing literature, and a vast gap exists in cryptocurrency research that will need to be addressed before these questions can be answered.

In particular, it is still unknown how cryptocurrency adoption reaches mainstream users and how the industry is impacted by moving the adoption to mass adoption. To fill this gap, we provide a novel conceptual model that explains how technological affordances derived from cryptocurrencies can differ in the adoption process between non-users and actual users using the lens of affordance theory and chasm theory.

Therefore, our study is one of the few that diverges from the mainstream use of standard TAM and UTAUT2 models, which are deployed to capture the (pre-)adoption phase of technology adoption. Instead, we use affordance and chasm theory to evaluate the factors that capture both phases of cryptocurrency adoption concurrently, using affordance factors to bridge the chasm in the market.

On this basis, we make an initial assessment of the affordances of cryptocurrencies. Specifically, we propose a conceptual framework that illustrates the affordances of cryptocurrencies for potential users [non-users] and current users [actual users]. The proposed affordances are perceived volatility, information privacy risk, anonymity, value benefits, and financial risk tolerance. This study is important for two reasons. First, we identify vital antecedents of affordances regarding cryptocurrencies. Our findings add to the consumer behavior research and IS literature by developing an understanding of the affordances that impact approach–avoidance behavior for potential users and continuation usage for actual users. Second, previous studies confirm that consumers' intentions to use cryptocurrencies are impacted by their cost-benefit analysis, such as cross-border payments (Arli *et al.,* 2020; Steinmetz *et al.,* 2021). A means of payment or a means of investment are two condensed domains of cryptocurrency usage. Nevertheless, it should be noted that previous studies predefine cryptocurrency as a whole [behavioral intention/ usage], mainly focusing on intention/usage as a mean of payment when analyzing the intention of potential users to use cryptocurrencies. At the same time, existing studies do not sufficiently distinguish a variety of other potential use cases, such as the store of value. Hence, we contribute by

studying how the actual usage of cryptocurrencies is extended – in other words, which coins in our sample are used not only as a means of payment but also as a store of value.

2. Literature Review

2.1. Overview of Cryptocurrency

Cryptocurrency is "the broad name for digital currencies that use blockchain technology to work on a peer-to-peer basis" (Nakamoto, 2008, p.10). Bitcoin, Ethereum, Binance, Solana, and others are just a few examples of cryptocurrencies that utilize blockchain technology uniquely (Murtazashvili *et al.,* 2022). In addition, there are alternatives to Bitcoin known as altcoins, such as Dogecoin (Lacity, 2022). These currencies are fungible assets in that they consist of tokens of the same type. At the same time, non-fungible tokens (NFTs), such as those representing land or art, do not represent a single asset and are called NFTs (Lacity, 2022). NFTs are a type of decentralized finance (DeFi) application evolving together with DeFi platforms providing decentralized financial services (Schwiderowski *et al.,* 2023).

Cryptocurrency utilizes cryptography to simplify, encrypt, secure, and authenticate transactions, and to manage the creation of new digital currency. These cryptographic algorithms are directly related to security. Apart from security, cryptocurrencies provide the fundamental features of a currency, which are exchangeable, measurable, and valuable (Rehman *et al.,* 2019). Moreover, blockchain technology, which is the basis of cryptocurrency, eliminates the issue of double spending by removing third parties, such as banks and payment methods. Using this transformative technology, cryptocurrencies are able to provide a working solution for the electronic payment industry (Quamara and Singh, 2022).

2.2. What is in it for users and non-users of cryptocurrency? A store of value or a medium of exchange?

Perceptions of cryptocurrencies vary from potential users to current users. The functions of currencies are commonly acknowledged and categorized, but the number of distinguished functions may vary (Kubát, 2015). For example, the book, "Money and the Mechanism of Exchange" by Jevons (1875), identified four fundamental functions of money: a medium of exchange, a common measure of value, a standard of value, and a store of value. Today's theory of money includes additional functions, such as information and investment functions, as stated by Jedlinský (2014, p. 49-51). In the case of cryptocurrency, its function varies from a common value measure (e.g., Tönnissen *et al.,* 2020) to a store of value (e.g., Baur and Dimpfl, 2021; Kubát, 2015).

More recently, Steinmetz *et al.* (2021) stated that there is some inconsistency between how actual users and non-users perceive cryptocurrencies, highlighting the phenomenon's dichotomy. Several industry reports surveyed potential and existing users on how cryptocurrencies are perceived (e.g., Civey, 2017; English *et al.,* 2020; Exton and Doidge, 2018). For example, Exton and Doidge (2018) conducted a study on European users, showing that approximately 16% of users saw Bitcoin as solely an investment tool, whereas a quarter of the survey thought of cryptocurrency as a tool for income and an alternative payment method. In addition to its role as an investment tool, cryptocurrency could be considered for different uses, such as a payment method, given the high speed of transactions (Alzahrani and Daim, 2019). Steinmetz *et al.* (2021) noted how cryptocurrency could be used for payments and financial transactions, although they stressed that cryptocurrency as a means of payment was not currently widespread. Nevertheless, the advent of crypto enables people to use all their assets, including Bitcoin, as a currency that can be transferred instantly (Legters, 2021). Heaslip (2021) stated that merchants use cryptocurrencies to avoid paying international fees.

On the other hand, Steinmetz *et al.* (2021) demonstrated that industry-based surveys focus only on the two modes of usage: payment and investment. On the other hand, they found that accessing utilities and services is one of the essential uses of cryptocurrency, along with assets and payments. Steinmetz *et al.* (2021) have not yet investigated with any thoroughness the behavior relating to cryptocurrency usage. However, they have called for research on differentiations in the usage of cryptocurrency, which could be helpful in cryptocurrency adoption.

2.3. Studies related to Cryptocurrency Adoption

The number of studies on cryptocurrency has been growing dramatically over the last two years (Casino *et al.,* 2019; Steinmetz *et al.,* 2021; Yuan and Wang, 2018; Mashatan et al., 2022). Miau and Yang (2018) highlighted that, after 2015, the use of Bitcoin and other cryptocurrency words has increased significantly in research. Research on cryptocurrency has focused on the related financial literature field, examining mostly the functional role of cryptocurrencies (e.g., Ante *et al.,* 2021; Corbet *et al.,* 2019; Grobys and Sapkota, 2019; Sun *et al.,* 2021) Our case study represents change by focusing not only on the functional and technological role of cryptocurrencies, but also their social and economic role.

Most cryptocurrency adoption studies concentrate on actual or potential users (see Table I). Often, the survey is unrelated to a specific coin. Where this is so, the focus is on Bitcoin. The technology acceptance model (TAM) is most often used with technology adoption theories, followed by the unified theory of acceptance and use of technology model (UTAUT). The studies by Arias-Oliva *et al.* (2019) and Ter Ji-Xi *et al.* (2021) employed UTAUT, revealing the critical determinants of cryptocurrency that affect the behavioral intentions of potential users and actual users. They noted that perceived risk and social influence do not affect behavioral intention. On the other hand, performance expectancy, effort expectancy, and facilitating conditions were critical factors in cryptocurrency acceptance.

Salcedo and Gupta (2021) applied their investigation to different cultural contexts, unlike other studies, and demonstrated that cultural values influence individuals' willingness to use cryptocurrencies. They drew on Hofstede's theory, which highlighted the values of collectivism, power distance, masculinity, weak uncertainty avoidance, and long-term orientation. More recently, the theory of reasoned action aims to understand users' post-adoption behaviors relating to cryptocurrency – a theory that Huang *et al.* (2022) applied. They proposed that perceived, legal, operational, and security risks can intensify users' discontinuance intentions. In contrast, the perceived benefits, driven by seamless transactions, usefulness, and convenience, might weaken these discontinuance intentions. From a different perspective, Tavera-Mesías *et al.* (2022), using the technology acceptance model and the technology readiness index, investigated the acceptance of digital money's mobile payments. Their findings showed that perceived usefulness is the primary direct factor influencing the intention to use.

According to studies summarizing the research (Casino *et al.,* 2019), various methodologies from different jurisdictions have been applied to investigate behavioral intention to use cryptocurrency. Despite the increasing number of studies, as some scholars have noted (e.g., Arpaci and Bahari, 2023; Albayati *et al.,* 2020, Chen *et al.,* 2022, Ku-Mahamud *et al.,* 2019; Salcedo and Gupta, 2021; Mashatan et al., 2022), the cryptocurrency system is still in its infancy. A few studies on cryptocurrency adoption have confined their investigation to factors derived from the main technology adoption models (e.g., TAM) to understand the process. This would suggest considerable uncertainty concerning the factors that trigger users' cryptocurrency affordances. Moreover, the literature review shows a lack of studies examining the difference between non-user and user cryptocurrency adoption behaviors and exploring actual user behavior.

TABLE I

3. Theoretical Background

3.1. Affordance Theory

Affordances are "the possible behaviours associated with achieving an immediate concrete outcome and emerging from the relation between an object" (Volkoff and Strong, 2013, p. 823). More generally, affordances, as defined by various scholars (Evans *et al.,* 2017; Hogan, 2009; Rice *et al.,* 2017; Ronzhyn *et al.,* 2022), encompass a range of characteristics. They are relational, perceptual cues, contextual, and potentials for action. In addition, it is important to note that affordances involve constraints, which should be viewed as complementary rather than opposing factors (Giermind *et al.,* 2018). Hutchby (2001) was the first scholar to propose applying affordance theory to information technology (Pozzi *et al.,* 2014; Wang *et al.,* 2018). He postulated that affordances are considered a logical mechanism for understanding the limited impact of technology on user action. In subsequent years, affordance technology theory set about determining how technology is associated with an actor's intentions and describing how individuals observe technology differently (Lei *et al.,* 2019; Piccoli, 2016). Majchrzak and Markus (2012) contended that technological affordance is crucial to investigating the relationship between technology and humans.

In a similar vein, it is acknowledged that affordances enhance the relationship between the user and the technology (Gholizadeh *et al.,* 2022) and that they are specified to help understand the effect of this relationship on the outcomes of information system artefacts (Tang and Zhang, 2020). Affordance theory has been incorporated into different contexts, such as mobile apps and mobile social platforms (e.g., Benitez *et al.,* 2022; Gholizadeh *et al.,* 2022; Lei *et al.,* 2019; McCarthy *et al*., 2021; Shao and Pan; 2019; Vo-Thanh *et al.,* 2021). In particular, research has

been undertaken on technology affordance on digitalization and AI usage (e.g., Trocin *et al.,* 2021), evaluation of service experience (e.g., Piccoli, 2016), the effect of digital innovation on company profit (e.g., Liu *et al.,* 2022), consumers' innovative decision making in live streaming e-commerce (e.g., Wang *et al.,* 2022), and social-media and Internet-of-things contexts (e.g., Naik *et al.,* 2020; Ng and Yee, 2020; Nivedhitha and Manzoor, 2020; Song *et al.,* 2021; Zhao and Wagner, 2022). Furthermore, Shin and Hwang (2020) have explored affordance theory by categorizing technological, emotional, and affective affordances in blockchain technology.

All the studies mentioned above have demonstrated that the theory of affordances can be applied to different contexts. In each context, distinct affordances are used to comprehend the relationship between technology usage and user. Although some of the studies cited have focused on the use of affordance theory in the realm of technology and digital applications, very little research has applied this theory to the newest technology, such as blockchain, with the exception of Shin and Hwang's study (2020). In addition, Anderson and Robey (2017) have specified the need for further research to refine affordances theory across various fields. Despite its significance, relevance, and popularity, affordance theory requires further explanation because it can vary according to subject context. It is essential to understand user expectations of cryptocurrencies, how they validate them, and how the confirmation process affects intentions because cryptocurrencies provide various sophisticated features. As demonstrated by Rozas et al.'s (2018) study, utilizing the affordance approach can be advantageous in exploring how cryptocurrencies are incorporated into daily routines and how this incorporation impacts future behavioral patterns. To fill this gap, we selected cryptocurrency affordances based on existing studies and considered the relevance of the nature of cryptocurrency. While most studies focus on technology adoption theory constructs, such as perceived usefulness and ease of use (see Table I), some essential affordances, such as perceived volatility and

perceived anonymity, have been ignored. In short, we selected affordance frameworks because they represent a useful perspective for understanding how user motivations and cryptocurrency features are interrelated in this research. Hence, our objective is to reveal the cryptocurrency affordances that have been less examined to understand the chasm between non-users and users.

3.2. Chasm Theory

According to the chasm theory proposed by Moore (2014), the adoption of every technology looks exactly like the life cycle. Moore (2014) suggested that a chasm can exist (because of such barriers) throughout the adoption cycle. He referred principally to the chasm between early adopters and the early majority as "a chasm" in technology adoption. The crossing of the chasm is a concept depicting how technology is adopted over time, from early adopters to the mainstream market, as they become resistant to new technology (Sridharan, 2017). More specifically, from Moore's theory, five categories have been identified to correspond to different technology adoption behaviors. Innovators, early adopters, early majority, late majority, and laggards are the components of this technology adoption lifecycle. Each group in this cycle has a different reason, motivation, and expectation for each other in purchasing technology products (Brown and Venkatesh, 2005). Since innovators pursue new technologies vigorously, they are most likely the first group to adopt new products in the market. Early adopters and innovators purchase a novel product concept early in this process. Nevertheless, unlike innovators, they are not technology experts. The rest of the groups create the “mainstream market”, which has references, shares ideas, and has in-depth information about the product. Of these three groups, laggards do not intend to buy a novel technology (Bruin, 2020).

The chasm theory (Moore, 1999, 2006) has become a popular strategic approach to connecting technology with potential customers (Li and Deng, 2017). Furthermore, Moore's chasm model is considered a crucial instrument to explore high-tech users and high-tech marketing (Sawng *et al.,* 2010). Therefore, research on the chasm has shown considerable variety and the existing literature has greatly expanded. Some scholars have used chasm theory to explain firm internalization (e.g., Easingwood *et al.,* 2006; Li and Deng, 2017), innovative products (e.g., Lin and Hong, 2011), environmental concerns during the new product design process (e.g., Sroufe *et al.,* 2000), the conflict between telehealth innovations' potential adoption and the diffusion of telehealth innovations (e.g., Cho *et al.,* 2009), the difficulties during the process of innovation generation at the organization level (Bernstein and Singh, 2008), the diffusion of smart wearable technologies (Dehghani, 2016), and the adoption of Airbnb in China – and which factors cross the chasm (e.g., Huang *et al.,* 2021).

3.3. Conceptual Framework

Different affordances provide an understanding of the mechanism underpinning the relationship between technology usage and the user. Moreover, Anderson and Robey (2017) stated that affordance theory needs to be improved in future research in various fields. Furthermore, the affordances of emerging technologies, such as cryptocurrencies, that use blockchain technology should be explored in depth. Ronzhyn et al. (2022) found that our understanding of affordances can vary depending on the specific situation. That is to say, the context in which affordances occur influences how we perceive them. Similarly, Stoeckli *et al.* (2020) noted that the level at which we study affordances depends on the goals and objectives of our research. Therefore, when defining and examining affordances, researchers need to consider the context and purpose. To gain a deeper understanding of affordances, researchers employ different methods. Some researchers – for example, Cabiddu et al. (2014) and Stoeckli

et al. (2020) – conduct interviews to gather information directly from people. Others, such as Lin and Kishore (2021), conduct thorough reviews of the existing literature. These methods allow researchers to explore and explain the various aspects of affordances. Furthermore, Bernhard *et al.* (2013) maintained that multiple factors impact the perception of affordances. In our study, we adopt an extensive literature review approach to investigate all potential factors used in the context of cryptocurrency literature [see Table 1]. After reviewing the main factors used in fourteen shortlisted papers, we explore lesser known but significant factors that contribute to our understanding of the nature of cryptocurrencies. Rather than relying solely on common factors found in models (e.g., ease of use in TAM), we delve into specific elements, such as perceived volatility, to provide a more comprehensive understanding. In short, we aim to explore the mechanism underlying the affordances of cryptocurrency usage, which is now one of the most crucial blockchain technology applications. Our purpose is to understand non-users' behavioral intentions and users' post-adoption behaviors, drawing on affordance theory in different phases of adoption. In other words, we aim to utilize affordance theory to explore how cryptocurrency usage is affected by technological affordances.

At the same time, we aim to show that affordances can be varied based on non-users and users of cryptocurrencies. To achieve this, we draw on chasm theory and affordance theory. According to Moore's technology adoption life cycle (1998), cryptocurrency adoption is at a stage where it must cross the chasm between early adopters and the early majority in order to start mainstream adoption in the market. In our case, although cryptocurrency adoption is becoming popular, there is still a lack of research because its progress and adoption is still in the early stage (Ku-Mahamud *et al.,* 2019; Ramachandran and Stella, 2022; Nam *et al.,* 2021). In particular, the way cryptocurrency adoption is transmitted to mainstream users is not well explained, nor how the industry will move implementation to a mass adoption phase. To fill this gap in the existing

literature, we draw on affordance theory and chasm theory to propose a theoretical framework that demonstrates how technological affordances of cryptocurrencies can vary in the adoption process between non-users and actual users. In other words, we aim to reveal how cryptocurrency adoption's technological affordances (e.g., perceived volatility) differ between early adopters and the early majority, with specific reference to crossing the chasm. The following tables present the hypotheses related to two conceptual models.

TABLE II

TABLE III

4. Research Methodology

4.1. Research Context

The Index of Economic Freedom, which was developed by the Heritage Foundation (www.heritage.org), suggests that, in a regulatory and financial context, Germany is one of the most open economies in the European Union in terms of capital flows, regulatory intervention and compliance, taxation, and links to the financial systems of other countries.

Germany's high level of openness, along with its leading role in financial technology worldwide, offers fertile ground for the adoption and use of cryptocurrencies. Specifically, German technology start-up companies are the most central sources of cryptocurrency (Park and Park, 2020). According to Coincub's most recent report[1], Germany is the most crypto-friendly country in the world in the first quarter of 2022. Gemini's 2022

[1] https://coincub.com/crypto-ranking-guide-for-2022-q1/

Global State of Crypto report[2] shows that 53% of Germans consider themselves "crypto curious," while 43% of high-income Germans own crypto assets. Approximately 17% of all Germans own cryptocurrency, while the country's 46% female crypto adoption rate is among the highest worldwide. Moreover, Náñez *et al.* (2021) find that, among the European economies, Germany is one of the most sustainable countries for cryptocurrency mining.

4.2. Data Collection

Our primary data are derived from a survey of German participants and are designed, inter alia, to determine to what extent participants felt that a range of potential variables were influential in their decision to use and/or continue to use cryptocurrencies. Participants were invited to participate in our research as members of online groups, communities, and forums dealing with finances or cryptocurrencies (e.g., kryptonauten, bitcoin2go). In addition, carrier networks and other social media groups were used. A link to the survey was sent to participants by email. They were asked to complete the survey online using the link provided. The survey remained open from January 2022 to the end of April 2022. In total, 745 participants received the survey, and 480 provided complete responses with no missing information. Thus, they were reliable for the purposes of our research. The final number of survey responses constitutes a random sample of individuals of different gender, educational background, occupational status, and monthly income. Specifically, 64.2% self-declared as males, whilst 34.8% self-declared as females. Most of the participants hold a bachelor's and/or a master's degree (55.6%), followed by those holding an

[2] https://www.gemini.com/state-of-crypto

advanced school leaving certificate (18.9%) and those having completed vocational training (17%) Few individuals hold only an intermediate school leaving certificate (4.9%) and even fewer hold a PhD (2.5%). Most participants are self-declared as either employee/government employees (45.6%) or students (41.7%), followed by self-employed (7.7%) and retired (1.9%). Finally, 27% of the participants claim that they earn less than 1500€ a month, followed by those who earn more than 3500€ (23.6%) and those with 1500€ to 2500€ (23.4%). Finally, 19.1% of individuals earn an amount between 2500€-3500€ a month.

The data collection used in the study took place during the first four months of 2022, when there was volatility in the market of cryptocurrencies. This can be seen in Figures 1.A and 1.B, which illustrate the volatility in the crypto market by looking at two alternative measures – namely, the market cap[3] and the crypto volatility index[4] (CVI) for 2022. The CVI is defined as a measure of the 30-day future fluctuation of the price of the entire cryptocurrency market (Nguyen et al., 2023), and it is consistent with the market fear index (Xu *et al.,* 2023). In addition, the information on the volatility of verified users[5] of crypto assets is included in Figure 1.C.

FIGURE 1.A
FIGURE 1.B and FIGURE 1.C

As can be seen in the figures, smooth volatility took place during the first four months of 2022 whilst, around mid-April, there was a crash in the crypto market that lasted until mid-July when it seemed that the market had stabilized. Moreover, the number of verified users of crypto

[3] https://www.statista.com/statistics/730876/cryptocurrency-maket-value/
[4] https://www.investing.com/indices/crypto-volatility-index-historical-data
[5] https://www.statista.com/statistics/1202503/global-cryptocurrency-user-base/

assets across 2022 slightly increased, implying that the market crash had not significantly impacted the behavior of crypto asset users as a whole. A correlation analysis reveals that the market cap negatively correlates with the number of verified users (i.e., -0.83). Since our sample was collected during the first four months of 2022, we cannot directly control for the impact of the market crash on the behavior of users. However, the existence of a negative correlation between market cap and verified users allows us to make a rational assumption that cryptocurrency users may have developed a more long-term investment strategy, which is not significantly affected by sporadic volatility in the cryptocurrency market. Therefore, we believe that, despite lacking data to control for market crashes, the results of this study will remain relatively robust.

4.3. Measures

According to the theoretical framework, we have eight overall constructs; perceived volatility, perceived information privacy risk, financial risk tolerance, perceived value benefits, perceived anonymity, avoidance behavioral intention, approach behavioral intention, and intention to continue use. The measurements per construct were adapted or borrowed from current studies in the existing literature. A seven-point Likert scale was used to measure each construct. Specifically, the items on perceived information privacy risk are based on those by Dinev and Hart (2006, p. 64). They describe the "perceived risk of opportunistic behaviour related to the disclosure of personal information" in paying with cryptocurrency. The four items to capture perceived anonymity follow Hirte *et al.* (2014, p. 23) and focus on "the state of being unidentified or unknown" when making a payment with cryptocurrency. To measure financial risk tolerance concerning uncertain investment decisions, we included items from Grable and Joo (2004) and Jacobs-Lawson and Hershey (2005). The item of perceived value benefits was adapted from Walton and Johnston (2018). The measures of avoidance behavioral intention and approach behavioral intention included four statements and were adapted from Tang

and Zhang (2020). The three items on mapping the intention to continue to use rely on Alalwan *et al.* (2018) and Shahzad *et al.* (2018). We developed four items to measure perceived volatility using insights from Walton and Johnston (2018) and Dehghani *et al.* (2022). The context was the same as in our study. We tested the reliability and validity of the construct.

5. Data Analysis and Results

In our analysis, we follow a two-stage integrated research methodology, studying two behavioral models – namely, (1) a behavioral cryptocurrency adoption model and (2) a behavioral cryptocurrency post-adoption model. In the first stage, we validated the measurement items used in our study by considering measures such as Cronbach's alpha coefficient, composite scale reliability (CSR), and average variance extracted (AVE). We estimated and validated the proposed cryptocurrency adoption and post-adoption models in the second stage by applying robust maximum likelihood, and the Satorra-Bentler corrected standard errors method (Satorra and Bentler, 1994). The maximum likelihood technique is generally more confirmative than other estimation methods, such as the partial least squares (PLS) design, which is more predictive (Barroso *et al*., 2010). Furthermore, the classical PLS method provides biased estimates of model parameters (Dijkstra and Henseler, 2015a). In its classical form, it does not offer model-fit measures, which might be useful to support or discard the proposed theoretical models. Despite efforts to overcome these classical PLS limitations (Bentler and Huang, 2014; Dijkstra and Henseler, 2015b), maximum likelihood estimates are more accurate than PLS for a sample size of 50 and above (Jannoo *et al.,* 2014).

5.1. Measurement Model

The measurement scales for the latent constructs used in our study are developed from existing studies in the literature, and they have been discussed analytically in previous sections. The convergent and discriminant validity of the measurement items is confirmed through the values of factor loadings, Cronbach's alpha coefficient, the composite scale reliability (CSR), and the average variance extracted (AVE). The convergent and discriminant validity is confirmed by satisfying the following threshold values; factor loadings greater than 0.5 (Hair *et al.,* 2014), CSR values above 0.70 (Hair *et al.,* 2014; Gefen *et al.,* 2000), and average variance extracted (AVE) values above 0.50 (Hair *et al.,* 2014; Fornell and Larcker, 1981).

Cronbach's coefficient alpha is considered the most frequently reported index for assessing the reliability of a scale (Trinchera *et al.,* 2018). Its sampling distribution has been extensively discussed in several studies, including those by Feldt (1965), Feldt and Brennan (1989), Kristof (1963), Lord (1974), Raykov and Marcoulides (2015), and Trinchera *et al.* (2018), with the approach presented by Feldt (1965) being the most popular. Since Cronbach's alpha is always a lower bound of reliability (Guttman, 1953), a one-sided confidence interval can be easily computed (Kristoff, 1963; Feldt, 1965) using STATA software. The results of our measurement model are presented in Table IV.

TABLE IV

Table IV shows that the factor loading values for the measurement items are higher than the threshold value of 0.50 (Hair *et al.,* 2014). In addition, the CSR values are above the threshold of 0.70 establishing adequate internal consistency of the measurement items (Gefen *et al.,* 2000). The AVE values for all constructs are higher than the threshold of 0.50 (Hair *et al.,* 2014). Similarly, the values of Cronbach's alpha, as the one-sided 95% confidence interval suggests, are above the threshold of 0.70 that many studies indicate is preferred (Cortina, 1993; Cho and Kim, 2015;

Cho, 2016; Taber, 2018). To further guarantee the validity of our data, we tested for the potential existence of common method bias (CMB) (Podsakoff *et al.,* 2003), using Harman's single factor test (Harman, 1960). CMB refers to the "variance attributable to the measurement method rather than the constructs the measures represent" (Podsakoff et al., 2003, p. 879). We found that the percentage of variance associated with the first factor is 0.32, which is less than the threshold of 0.5 (Harman, 1960), indicating that common method bias is not present in our data. Therefore, we can conclude there is no response bias in the answers provided by both early and late participants in our survey.

5.2. Structural Models

Structural equation modelling (SEM) combines factor and multiple regression analyses to examine the structural relationship between measured variables and latent constructs (see Acock, 2013; Hoyle, 2012; Markus, 2012). The SEM technique entails two main steps. In the first step, we validate the factors defining the latent variables; in the second step, we evaluate the structural model's fit by studying the model's statistical relevance (Jenatabadi, 2015).

Through analytical consideration of the previous theoretical and empirical studies in the field of cryptocurrencies, we validate the following structural models. The first model (Figure 2) represents non-users of cryptocurrencies and has been deployed to study factors affecting the adoption of cryptocurrencies in Germany. The second model (Figure 3) denotes cryptocurrency users and has been developed to study the post-adoption of cryptocurrencies in Germany.

FIGURE 2

FIGURE 3

The one-directional arrows describe the structural relationship between the latent variables; βs and γs denote the path coefficients. Specifically, β_i^{nu} and γ_i^{nu} denote the path coefficients for non-users whilst β_i^{u} denotes the path coefficients for users. We validate the proposed structural models using STATA software by considering robust maximum-likelihood estimation and the Satorra-Bentler corrected standard errors method (Satorra and Bentler, 1994). In both models, we control for a set of socio-economic variables, including participants' age, gender, educational level, and the level of monthly income. Moreover, we control for different coin types, market return, and volatility by considering the crypto volatility index as a control variable. The results we obtained are presented analytically in the following section.

5.3. Quantitative Results

By estimating the proposed structural models presented in Figure 2 and Figure 3, we obtain the path coefficients βs and γs, respectively. The following tables illustrate the standardized estimated coefficients along with their standard errors in parenthesis. Specifically, Table V shows the results of the estimation of the SEM model presented in Figure 2 for non-users.

TABLE V

Regarding the cryptocurrency adoption model estimated for German non-users, we found evidence that supports our initial hypotheses. Specifically, *Perceived Value Benefits* are identified as the most influential variable, with a positive impact on the *Approach Behavioral Intention* (0.64) and a negative impact on *Avoidance Behavioral Intention* (-0.52). Moreover, our study reveals that the variables *Perceived Volatility*,

Perceived Information Privacy Risk, and *Financial Risk Tolerance* play an essential role in cryptocurrency adoption. Specifically, they negatively influence *Approach Behavioral Intention*, whilst the impact on *Avoidance Behavioral Intention* is positive. *Perceived Anonymity* does not affect cryptocurrency adoption since its estimated coefficient is not statistically significant. Therefore, we found no evidence to support this hypothesis.

By following the guidelines from the findings of simulation studies conducted by Hu and Bentler (Hu and Bentler, 1998, 1999) concerning the comprehensive evaluation of the cutoff criteria of fit indices, we find that all the goodness-of-fit indices obtained indicate that the model fits satisfactorily. Specifically, the value of Satorra–Bentler RMSEA (i.e., root mean square error_SB) is low and equals 0.05, Satorra–Bentler CFI (i.e., comparative fit index) and Satorra–Bentler TLI (i.e., Tucker-Lewis index) are 0.93 and 0.92, respectively. Table VI shows the results of the estimation of the SEM model presented in Figure 3 for users.

TABLE VI

Regarding the cryptocurrency post-adoption model estimated for German users, we found evidence to support our initial hypotheses. Specifically, *Perceived Value Benefits* are identified as the most influential variable, positively impacting *Intention to Continue Use* (0.53). Moreover, our study reveals that the variable *Perceived Volatility* (-0.24) is the most negatively influential variable, followed by *Financial Risk Tolerance* (-0.16). In contrast to the results obtained by estimating the previous model for non-users, our analysis shows that *Perceived Information Privacy Risk* does not play an essential role in cryptocurrency post-adoption. Similarly, *Perceived Anonymity* has no impact on *Intention to Continue Use*, since its estimated coefficient is not statistically significant. Regarding the impact of *Intention to Continue Use* on *Actual Usage,*

we find that it is positive in both cases – that is, when cryptocurrencies are used as a store of value (i.e., investment) (0.18), and when they are used as a payment method (0.22).

Concerning the comprehensive evaluation of the cutoff criteria of fit indices, we find that all the goodness-of-fit indices obtained indicate that this model fits satisfactorily. Specifically, the value of Satorra–Bentler RMSEA (i.e., root mean square error_SB) is low and equals 0.042, Satorra–Bentler CFI (i.e., comparative fit index) and Satorra–Bentler TLI (i.e., Tucker-Lewis index) are 0.90 and 0.88, respectively.

5.4. Supplementary Analysis

In this section, we conduct a supplementary analysis by utilising information concerning different coins and types of coin to provide further insights to assist future research on the topic. First, we only consider the sample of 301 cryptocurrency users. We run logistic regressions to analyse the relationships in the actual usage of crypto assets, as captured by the variables *Actual Usage (Store of Value*) and *Actual Usage (Payment Method)* with respect to different types of cryptocurrencies. Most cryptocurrency users hold *Bitcoin* (189) and *Ethereum* (182). It follows the category of *Stablecoin* (43), whilst cryptos in the remaining categories are held by approximately the same number of users – namely, *Memecoin* (75), *DeFi* (88), and *NFTS* (72). For each coin and type of coin – namely, *NFTS*, *Stablecoin*, *DeFi*, *Memecoin, Bitcoin* and *Ethereum* – we consider the following logistic model:

$$log(p_k/(1-p_k)) = \beta_{0k} + \beta_{1k} * Store\ of\ Value_k + \beta_{2k} * Payment\ Method_k + Controls_k$$

where $k = \{Ethreum, NFTs,\ Bitcoin, Stablecoin, Defi, Memecoin\}$; p_k is the probability of holding a specific coin and $1 - p_k$ is the probability of not holding it.

Moreover, we control for a set of socio-economic variables, including age, gender, educational level, the level of the monthly income of users, and volatility. To control for volatility, we consider trading volumes[6] as a proxy (Aalborg *et al.,* 2019; Naeem *et al.,* 2020; Yousaf and Yarovaya, 2022). Specifically, for *Bitcoin* and *Ethereum*, we calculate the average trading volumes five days before the submission day of the survey for each participant. Similarly, for the different types of coin – namely, *NFTs*, *DeFi*, *Stablecoin*, and *Memecoin* – we consider the average trading volumes for the top five coins of each type. An analytical table considering the top coins by each type is included in the appendix. To further study the robustness of our results, we control for volatility by considering (i) the three-day average of trading volumes before the submission day, and (ii) the five-day average market cap price before the submission day. In all cases, the obtained results presented in Table VII remain robust.

TABLE VII

Interestingly, our analysis reveals that, when users hold cryptocurrencies as a means of storing value (i.e., investment), they are more likely to be willing to continue holding all the above coin types. However, when users prefer to have crypto assets as a payment method, they are more

[6] The data was collected from https://coinmarketcap.com/

likely to continue holding coins in *NFTs* and *Memecoin*. At the same time, there is no statistically significant evidence of using the remaining types of coin (i.e.,, *Ethereum*, *Bitcoin*, *Stablecoin*, and *DeFi*) as a payment method.

Second, we advance our analysis by considering non-parametric Mann-Whitney U tests to identify potential differences between users and non-users across the above categories of cryptocurrency. Non-users do not hold any cryptocurrency. Nevertheless, they were asked what type of cryptocurrency they would have chosen if they had a chance to purchase one.

In contrast to the SEM model used in the main part of the analysis, we calculate affordance as the average value of its items, measured by a Likert scale between 1 and 7. Since there are no direct observations for affordances, we proceeded with their calculation by utilizing their items. Then, we proceed by applying Mann-Whitney U tests for these two groups. Our results are illustrated in Table VIII.

TABLE VIII

As observed, for all studied cryptocurrencies, the results are largely the same. Specifically, *Perceived Information Privacy Risk*, and *Perceived Volatility* are significantly higher for non-users than users. On the contract, our analysis reveals that *Perceived Value Benefits* are more significant for users than non-users. We identify no difference between the two groups for *Perceived Anonymity*, across any type of coin. However, *Financial Risk Tolerance* is higher for users only in the two types serving as payment (i.e., *Memecoin* and *NFTs*).

6. Discussions and Implications

6.1. Discussion of Results

Considering the importance of cryptocurrencies, this research focuses on the affordances of cryptocurrencies in relation to the views of potential users and actual users' concerning adoption. We categorized the antecedents of cryptocurrency adoption into five affordances – *perceived information privacy risk*, *perceived volatility*, *perceived anonymity*, *perceived value benefits*, and *financial risk tolerance*. Drawing on affordance theory and chasm theory, we hypothesized that the affordances of cryptocurrencies impact the avoidance–approach behavioral intention of non-users. Using similar approaches, we assume that the affordances of cryptocurrencies impact the intention to continue to use them as either a store of value or a payment method by actual users.

Regarding the intentions of non-users toward the cryptocurrency, all hypotheses are supported as expected, except for *perceived anonymity*. Although the content is different, and perceived affordances are identified differently in the study of Tang and Zhang (2020), our findings are logically consistent with their findings. Our results demonstrate that negative affordances (*perceived volatility*, *perceived information privacy risk*, and *financial risk tolerance*) have a negative effect on *approach behavioral intention*, whilst they positively affect *avoidance behavioral intention*. On the other hand, *perceived value benefits* has a positive impact on *approach behavioral intention*, whereas it has a negative impact on *avoidance behavioral intention*. As stated by Tang and Zhang (2020), the magnitude of the effects of each affordance on behavioral intention differs. For instance, *perceived volatility* is determined as the most vital antecedent with a positive impact on *avoidance behavioral intention*. This shows that potential users who believe cryptocurrency is highly volatile will avoid usage.

From the perspective of actual users, we uncovered slightly different findings from those of potential users. One of the interesting findings is that there is no *perceived information privacy risk* effect on the *intention to continue using* cryptocurrencies. The reason may be that actual users

know the cryptocurrency system and how it works, and they are sure that the system is reliable in terms of privacy. In a similar vein, *perceived anonymity* has no impact on the *intention to continue use*. The reason may be that regulatory oversight cannot provide anonymity, which is a crucial motive (Baur *et al.,* 2015). This might have a similar explanation to *perceived information privacy risk*. Actual users are likely to have extensive information about the cryptocurrency system already. Hence, they may not attach importance to privacy information and anonymity issues.

Additionally, *perceived volatility* and *financial risk tolerance* are essential for both potential and actual users. Both affordances have a negative impact on the *intention to continue use*. On the other hand, *perceived value benefits* positively impacts the *intention to continue use*, as expected. This finding is consistent with other studies in different contexts (e.g., Wang *et al.,* 2020).

Moreover, we have focused on the type of cryptocurrency that actual users own, seeking to understand the purpose behind their usage. Our findings demonstrated that existing users mostly hold Bitcoin and Ethereum. Interestingly, Ethereum, Bitcoin, and Stablecoin are held for investment purposes. At the same time, Memecoins and NFTs are used for both purposes, including a store of value (investment) and a payment method by actual users. Existing users recognized the potential of NFTs as stores of value in the form of digital collectables, such as art, coupons, and tickets, but also as a method of payment. NFTs can be stored in a digital wallet, which can be connected to a payment gateway with conventional digital transactions, or a DeFi platform with decentralized services. As unique, non-exchangeable digital identifiers, they ensure ownership rights based on Blockchain (Zhao and Si, 2021). NFTs, together with DeFi platforms, offer new possibilities to fractionalize digital assets and create new liquidity pools (Chu et al., 2022). Additionally, risk-averse consumers can convert fungible assets into NFT format and use

them for savings, reducing the risk of NFTs being hacked or stolen (Fairfield, 2022). On the other hand, assessing the value of NFTs may also be necessary (Sopi et al., 2023). Memecoins were explicitly designed for payment and specifically for quick tipping. They are increasingly rolled out for payment, for example, by Tesla. In particular, they offer cheap and fast transactions, but their volatility is high due to an uncapped supply (Arslanian, 2021).

Concerning the affordances pertaining to different types of cryptocurrencies, the results showed largely the same findings: users perceive that *Information Privacy Risk* and *Volatility* are significantly lower than non-users. In contrast, the opposite occurs with *Value Benefits* – no significant differences were identified between the two groups on *Perceived Anonymity*. Finally, users' *Financial Risk Tolerance* was considerably higher than non-users for the two coin types that also serve as methods of payment (i.e., Memecoin and NFTs).

6.2. Implications of Research

This research contributes in various ways to the literature on consumer behavior and IS. This study integrates affordance theory with chasm theory to determine the antecedents of cryptocurrency affordances. Although both theories are fundamental to an understanding of potential and actual users' attitudes and behaviors, they are relatively less used in the research community. Hence, this study is the first to use affordance theory and chasm theory in blockchain technology/cryptocurrency literature. Additionally, this study is the first to combine *perceived volatility*, *perceived anonymity*, and *financial risk tolerance* with the pre-adoption and post-adoption literature in the cryptocurrency context. Whilst most studies have investigated potential users of cryptocurrency, using mainly TAM and UTAUT models that capture the pre-adoption phase of technology adoption (see Table I), our study is one of the first studies to evaluate the factors capturing both phases of cryptocurrency adoption, concurrently using

affordances factors that can be applied to cross the chasm in the market. As far as the authors are aware, in the context of mixed sample analysis (users vs non-users), the study by Steinmetz *et al.* (2021) is the only paper that has investigated cryptocurrencies' knowledge and cryptocurrency trustworthiness from the perspectives of both users and non-users using limited constructs. Hence, the application of affordance theory and chasm theory can offer valuable insights into the adoption of emerging technologies, – in our case, cryptocurrencies/digital tokens. While affordance theory focuses on designing intuitive interfaces that open new liquidity pools and foster variety types of intermediaries (Schwiderowski *et al.*, 2023), chasm theory guides market segmentation, positioning, and overcoming adoption barriers. Combining these theories can contribute to a holistic approach to technology adoption, which addresses both user experience and market dynamics.

Moreover, this study facilitates an understanding of the purpose of cryptocurrency usage among actual users. This makes a unique contribution to the existing literature since no other research examines cryptocurrency's actual usage. By providing supplementary analysis, this study illustrates which type of cryptocurrency is used based on user purposes.

6.3. Implications for Practice

In the dynamic context of the financial sector, the advent of cryptocurrency has brought about a profound transformation, significantly altering individuals' perceptions and interactions with financial frameworks. Consequently, the findings of this study carry certain implications for managers, stakeholders, traders, cryptocurrency developers, and policy makers. Moreover, the lens of chasm theory can carry important implications for companies to better position themselves for success in the market. Chasm theory suggests that early adopters of new technology are often enthusiasts with a greater willingness to take risks and try new things. If so, companies may need to develop marketing campaigns that

target this group. In cryptocurrency, the perception of affordances has a vital role. Similar to the interaction dynamics with the affordances of chatbots (Stoeckli et al., 2020), users engaging with cryptocurrencies rely heavily on the available information to identify potential actions and functionalities. As digital assets, cryptocurrencies are particularly unique in this respect. For example, the affordances of cryptocurrencies come with complexities. Information about their functionalities is less accessible than traditional financial instruments. Users must explore functionalities of specific digital assets. The high volatility and evolving market add to the challenge. Yet, there are instances where affordances are clear. For example, confirmed blockchain transactions are visible to all participants. Tools like blockchain explorers offer insights into transaction history. These affordances are crucial for navigating the dynamic financial environment, highlighting the need for user-centric design and accessible information.

From the "store of value" outlook, potential and new investors view cryptocurrency as a way to diversify their investment portfolios because it often has a low correlation with traditional asset classes such as stocks and bonds. By including cryptocurrencies in their investment strategy, investors aim to reduce risk through diversification. The high volatility of cryptocurrencies can be enticing for speculative investors. Many early adopters have witnessed substantial profits, leading others to enter the market exercising hopes of similar gains. Hence, whilst speculative investment can lead to significant profits, it can also carry significant risk. It should further be noted that speculative investment in cryptocurrencies can be driven by FOMO (Fear of Missing Out).

Thus, educational materials, such as the factors that influence different cryptocurrency values, can help investors make informed decisions, avoid being swayed by emotions, and assist them in better understanding the risks of speculative investment. This could benefit potential users by helping

them shift from avoidance behavior to approaching behavior. Furthermore, adopters must assess whether the selected crypto aligns with their investment goals and financial risk tolerance. Besides, for current crypto traders, impulsive trading can lead to poor outcomes. Developing a disciplined approach to trading and diversification across different asset classes can mitigate the risk of any single investment adversely affecting the overall portfolio.

Notwithstanding, the cryptocurrency market is highly volatile and navigating it can be challenging. To successfully cross the chasm in the cryptocurrency market, it is essential to distinguish the market's dynamics and the technology behind the coins with real-world applications and strong fundamentals. One strategy is to feature a solution to a specific problem or pain point in the market and create a compelling use case for your cryptocurrency. This will help attract early adopters who are interested in technology and are willing to take risks. A further solution is to focus on user experience and make the product user friendly and accessible to a broader audience. Another critical factor is establishing partnerships with established companies to gain credibility and reduce the potential risk. For instance, a collaboration between Visa[7] and the Solana project provided a new ecosystem for digital assets, increasing the penetration of cryptocurrency in the finance market. Additionally, emphasizing the cryptocurrency's real-world applications and use cases can help gain traction in the mainstream market. Combining these strategies allows a cryptocurrency market to cross the chasm and achieve widespread adoption.

[7] https://cryptoslate.com/visa-onboards-first-solana-project-to-its-fintech-fast-track-program/

Regarding technological affordances, our results showed that the perceived value benefit is one of the most critical antecedents for initial use and post-adoption usage of cryptocurrency. In light of this finding, managers should promote the benefits of cryptos to potential users by giving examples of actual users. They may also work on reducing the adverse effects, such as perceived volatility and financial risk tolerance of cryptocurrency adoption, which negatively affect potential and actual cryptocurrency users. Although there is no effect of perceived information privacy risk on both types of users, a lack of user anonymity and privacy issues results in users impeding user intentions to adopt cryptocurrency. Hence, we recommend that managers, stakeholders, and traders build a secure environment in blockchain technology to increase cryptocurrency usage (Dehghani et al., 2022). Our findings, therefore, offer practical insights for those working in the cryptocurrency sector to understand the potential users' and actual users' perceptions of the adoption of cryptocurrency and to enhance their marketing strategies. To reach mainstream users, the industry should consider fast transactions and low transaction fees, as is the case with Memecoin, and connections to conventional payment gateways, as with NFTs. In addition, practice should consider mobile gateways that provide ease of use for cryptocurrencies to buy and pay. The same holds for young people, who are typically more enthused by new technologies. In addition, practice should focus on the ease of use and purchasing-power stability of sending payments in cryptocurrency without relying on the use of third-party mobile gateways (Kamvar *et al.,* 2019; Kim and Kim, 2020; Mercan *et al.,* 2021). Whilst payment gateways facilitate financial transactions, they run counter to one of the fundamental principles of cryptocurrencies (Bezovski *et al.,* 2021). Recent market turbulences, such as the crash of Terra Luna (May 2022) or the decline of FTX (November 2022), point to centralization tendencies among fintech companies and regulatory uncertainty. This has led to U.S. Securities and Exchange Commission (SEC) cryptocurrency enforcement actions in the first months of 2023 (Chohan, 2023; Vidal-Tomás et al.,

2023). Even NFTs and DeFi services cannot be managed without new types of intermediaries (Schwiderowski et al., 2023). Therefore, an optimal decentralized solution is still missing.

The results of our study can be of interest to national bodies looking to regulate the market of cryptocurrencies since the widespread use of crypto assets without regulation may potentially drive financial instability, market manipulation, and financial crime. In addition, the technology used in producing crypto assets needs enormous quantities of electricity, resulting in a high environmental footprint. In this direction, there has been a recent focus globally on developing new regulatory schemes. This is reflected most notably in EU initiatives that are developing new rules to boost the potential of crypto assets and curb the potential threats[8]. Similarly, the US. Treasury has encouraged new laws to address crypto regulation gaps, which may mitigate the financial stability risks of digital assets whilst realizing the potential benefits of innovation[9]. Our research can, therefore, provide key insights for national policy makers, facilitating future policy decisions on the promotion and encouragement of technologies related to cryptocurrencies. Here, developing a new regulatory scheme can provide legal certainty, support innovation, protect consumers and investors, and ensure financial stability.

6.4. Limitations and Future Research

This research, as with many others, has its limitations. First, we used a limited number of affordances of cryptocurrency, aiming to focus on the most critical issues that were associated with cryptocurrency. Therefore, future studies may wish to focus on other types of perceived affordance

[8] https://www.europarl.europa.eu/news/en/headlines/economy/20220324STO26154/cryptocurrency-dangers-and-the-benefits-of-eu-legislation
[9] https://www.reuters.com/technology/us-treasury-encourages-new-laws-address-crypto-regulation-gaps-2022-10-03/

(such as technology readiness or regulation/legal environment) and extend the current model. Second, we confined our focus to one country sample (Germany). Focusing on different samples and examining more than one country could offer a future research avenue, especially comparing the results of the current study with those from countries with the highest adoption of cryptocurrencies and its correlations with devalued fiat currencies (e.g., Turkey). Third, Tang *et al.* (2020) have stated that, although ethical cases of cryptocurrencies and their payment methods are discussed, there is still a lack of understanding of the ethics underpinning the entire blockchain-related technology. Hence, future scholars could delve further into the ethics of crypto payment methods. Fourth, to control for the market crash, an additional survey could have been conducted to cover the period of May to July 2022. Unfortunately, this could not be predicted by the authors. However, for reasons discussed analytically in previous sections, we believe our results are quite robust, even though our data are restricted to the first four months of 2022.

Lastly, the study by Dowling (2022) concluded: "NFTs do appear to be a distinct (and exciting) new asset class". Hence, while the NFT market appears to rely on the cryptocurrency market – in particular, BTC – it may well mature over time (Ante, 2022). On this issue, Ko et al. (2022) argued that investors can diversify their traditional asset-based portfolios by including NFTs in their investment baskets. Given these debates in the existing literature, we considered the entire gamut of cryptocurrency with NFTs included, based solely on total market value and generic perspectives by adopters in the market. Further study could explore the categorization of different assets to make a holistic distinction between different classes of assets in the cryptocurrency market.

7. Conclusion

Some cryptocurrencies, such as Bitcoin, were in the first instance designed as a store of value, with the benefit of being decentralized and scarce. The aim was to provide a decentralized and secure alternative to traditional payment systems, given their limited supply and their potential value to appreciate over time. Other cryptocurrencies are actively used as a medium of exchange, such as Ethereum. These cryptocurrencies are accepted by a growing number of merchants and businesses around the world, and their use as a means of payment continues to increase. However, its volatile nature and limited acceptance as a form of payment can make it less practical as a medium of exchange compared to traditional fiat currencies. Furthermore, the high transaction fees and slow transaction processing times associated with Ethereum can make it less practical as a medium of exchange than other digital currency forms. Nevertheless, other cryptocurrencies, such as stablecoins, are specifically designed to function primarily as a medium of exchange, aiming to provide a stable and secure means of payment without the volatility often associated with other cryptocurrencies. They are often pegged to a fiat currency or other asset to maintain a stable value.

In this research, we took two perspectives - the affordance and the chasm theory perspective - on cryptocurrencies, which helped us to identify important factors influencing affordance perception and investigate the adoption behaviour of consumers. Since perceived volatility and financial risk tolerance are the most important affordance factors for both potential and actual users, practice should focus not only on easy payment, uninterrupted service, and high transaction success but also on reducing volatility risks (Dehghani et al., 2022). For example, this can be achieved through fast transactions across different time zones or by offering stable cryptocurrencies pegged to major fiat currencies, the oil price, or a basket of goods in a specific country/region. In addition, NFTs together with DeFi services open new liquidity pools not only for digital, but also for fungible assets. Wrapping NFTs to fungible assets increases the control of ownership and diminishes the danger of hacking. Given the

differences between different groups of individuals, the chasm theory perspective points to the need for a new distinction between newcomers and more traditional investors/traders who enter the cryptocurrency market. These individuals are highly sensitive to financial risk. However, they would be willing to take greater risk when investing in cryptocurrency. Most newcomers are likely to adopt more differentiated coins, such as NFTs and Memecoins, than those whose portfolios are mostly limited to Bitcoin. Moreover, these two types of coin offer interesting linkages with conventional digital systems to use cryptocurrencies for payment, which has the benefit of increasing financial risk tolerance. While the results of the study are not entirely surprising, we consider it unexpected that *perceived anonymity* as one of the main principles of cryptocurrency is not seen as important. In contrast, third-party gateways seem to be the preferred payment rail. However, cryptocurrencies are themselves an innovative payment rail (Ang *et al.*, 2021), calling for DeFi solutions that, in addition to offering stable value, make "sending a payment (…) as easy as sending a text message" (Kamvar *et al.,* 2019, p. 2), keying in cell phone numbers (Kamvar *et al.,* 2019, p. 2) or using encrypted QR codes (Kim and Kim, 2020). From the behavioral perspective, the willingness to continue to use is lower than market price volatility, which fast and cheap transactions can mitigate. However, the closeness of users who stopped owning cryptocurrencies to non-users shows that the chasm is still not easy to cross and needs further investigation of early adopters of cryptocurrencies and mainstream consumers. Hence, its primary use case may depend on individual user preferences and market conditions and the distinction for existing users in the market.

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***Figure 1.A**. Market-cap 2022 (Source: Author's own creation)*

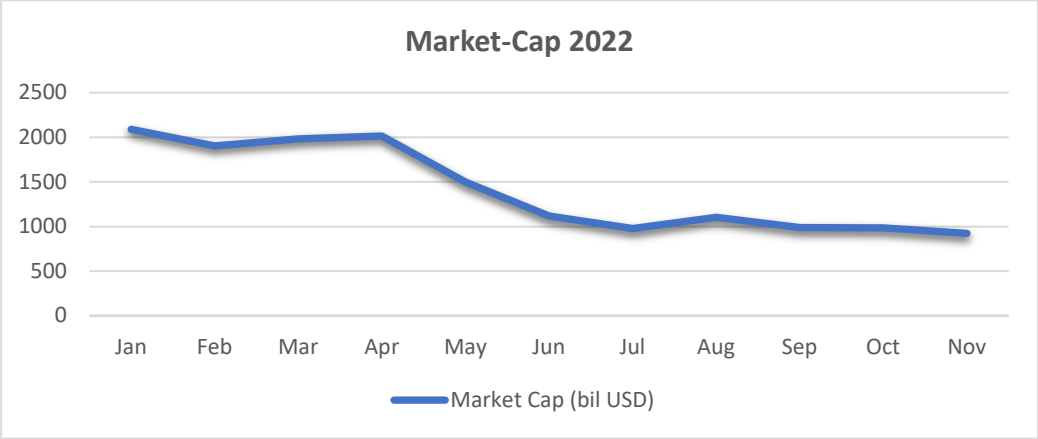


***Figure 1.B**. CVI 2022*

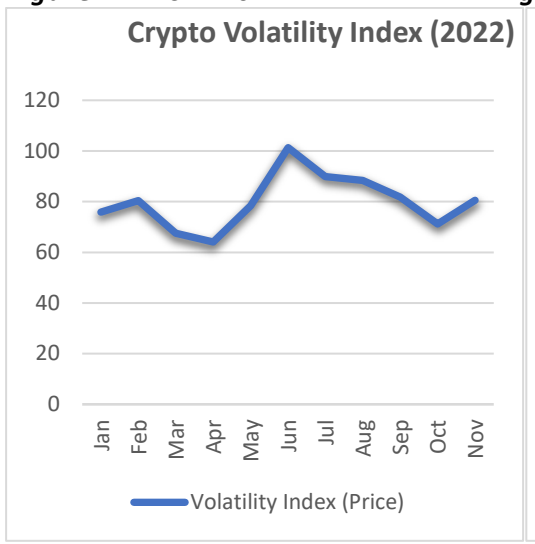
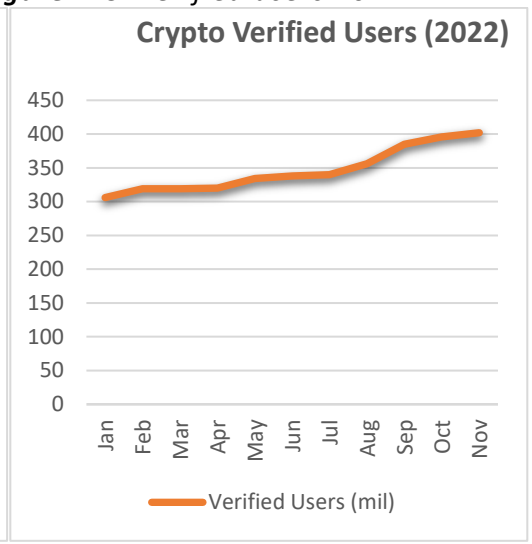


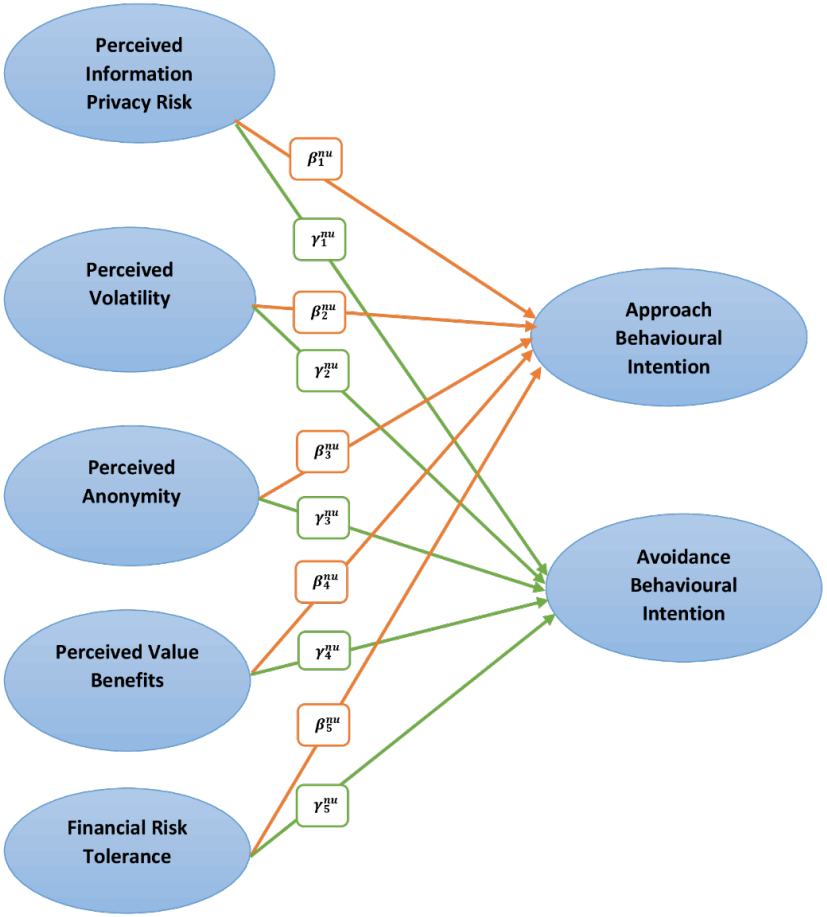
***Figure 1.C**. Verified users 2022*



(Source: Author's own creation)

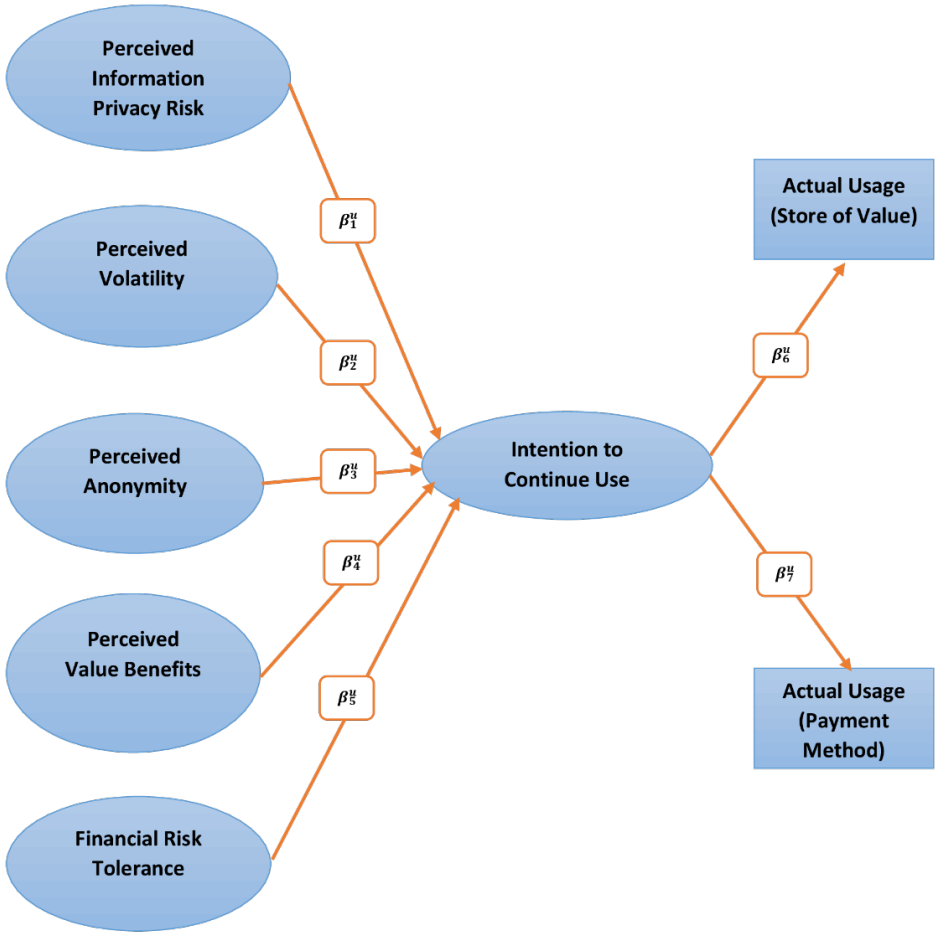
***Figure 2**.*

Cryptocurrency Adoption Model for Non-Users



(Source: Author's own creation)

Figure 3.
Cryptocurrency Post-Adoption Model for Users



(Source: Author's own creation)

Table I
Key Studies on Cryptocurrency Adoption (in chronological order)

Authors	Research approach	Context (country)	Theoretical basis	Type of Cryptocurrency	Type of User	Main factors
Shahzad et al. (2018)	Survey with 376 individuals	China	TAM	Bitcoin	Potential User	Awareness, perceived ease of use, perceived usefulness, perceived trustworthiness
Albayati et al. (2019)	Survey with 251 individuals	NA	TAM	NA	Potential User	External variables: social influence, design, regulatory support, experience, trust, TAM variables
Arias-Oliva et al. (2019)	Survey with 402 individuals	Spain	UTAUT	NA	Potential User	Performance expectancy, effort expectancy, social influence, facilitation conditions, perceived risk, financial literacy
Jonker (2019)	Survey with 768 retailers	Netherlands	Technology Adoption Theories	NA	Potential User	Perceived ease of use, perceived compatibility
Kim (2021)	Survey with 395 individuals	USA	TPB	Bitcoin	Potential User	Perceived behavioural control, subjective norm, financial self-efficacy, money attitudes (power-prestige, retention-time, distrust, quality, anxiety)
Nadeem et al. (2021)	Survey with 385 individuals	China	TAM	Bitcoin	Potential User	Perceived ease of use, perceived usefulness, security and control, transaction processing
Salcedo and Gupta (2021)	Survey with 449 individuals	USA, India	Theory of culture	Mock coin	Potential User	Collectivism, power distance, masculinity, uncertainty avoidance, long-term orientation
Steinmetz et al. (2021)	Survey with 3.864 individuals	Germany	NA	NA	User + Non-User	Knowledge and awareness, ownership, trust, motives, usage domains, socio-economics
Ter Ji-Xi et al. (2021)	Survey with 233 individuals	Malaysia	UTAUT	NA	Potential -User	Performance expectancy, effort expectancy, social influence, facilitation conditions, perceived risk

Treiblmaier et al. (2021)	Survey with 161 travellers	Asia-Pacific Region	Technology Adoption Theories	NA	Potential User	Technological contingency factors, positive and negative antecedents, satisfaction
Huang et al.(2022)	Survey with 343 individuals	Taiwan	Net Valence Framework	Any	Actual User	Perceived risk (financial, legal, security, operational), perceived benefit (perceived usefulness, seamless transaction, convenience)
Koroma et al. (2022)	Survey with 421 individuals	Mano River Union States, Africa	Trust Transfer Theory	NA	Potential user	Technology attachment, blockchain transparency, trust in cryptocurrency
Tavera-Mesías et al. (2022)	Survey with 625 individuals	Columbia	TAM, Technological Readiness	NA	Potential User	Technological readiness (negative: discomfort, insecurity, positive: innovation, optimism), perceived ease of use, perceived usefulness
Arpaci and Bahari (2023)	Survey with 450 individuals	Turkey	Confidentiality, Integrity, and Availability" Triad +Theory Reasoned Action	NA	Actual User	Confidentiality, integrity, availability, authenticity, possession/Control, Utility

(Source: Author's own creation)

Table II
Hypothesis (Non-Users)

Hypotheses	**For Non-Users**
Hypothesis 1a Hypothesis 1b	Perceived information privacy risk is negatively associated with approach behavioral intention. Perceived information privacy risk is positively associated with avoidance behavioral intention.
Hypothesis 2a Hypothesis 2b	Perceived volatility is negatively associated with approach behavioral intention. Perceived volatility is positively associated with avoidance behavioral intention.
Hypothesis 3a Hypothesis 3b	Perceived anonymity is negatively associated with approach behavioral intention. Perceived anonymity is positively associated with avoidance behavioral intention.
Hypothesis 4a Hypothesis 4b	Perceived value benefit is positively associated with approach behavioral intention. Perceived value benefit is negatively associated with avoidance behavioral intention.
Hypothesis 5a Hypothesis 5b	Financial risk tolerance is negatively associated with approach behavioral intention. Financial risk tolerance is positively associated with avoidance behavioral intention.

(Source: Author's own creation)

Table III
Hypothesis (Non-Users)

Hypotheses	**For Actual Users**
Hypothesis 1c	Perceived information privacy risk is negatively associated with approach behavioral intention.
Hypothesis 2c	Perceived volatility is negatively associated with approach behavioral intention.
Hypothesis 3c	Perceived anonymity is negatively associated with approach behavioral intention.
Hypothesis 4c	Perceived value benefit is positively associated with approach behavioral intention.
Hypothesis 5c	Financial risk tolerance is negatively associated with approach behavioral intention.

(Source: Author's own creation)

Table IV

Measurement Model

Instrument Items	Loadings	Cronbach's alpha (95% CI)	CSR	AVE
Perceived Information Privacy Risk		0.92 (>= 0.90)	0.92	0.73
PIPR1	0.86			
PIPR2	0.92			
PIPR3	0.91			
PIPR4	0.72			
Perceived Volatility of Value		0.76 (>= 0.73)	0.77	0.53
PV2	0.65			
PV3	0.80			
PV4	0.73			
Perceived Anonymity		0.83 (>= 0.81)	0.83	0.62
PA1	0.82			
PA2	0.71			
PA4	0.82			
Perceived Value Benefits		0.84 (>= 0.82)	0.84	0.64
PVB1	0.76			
PVB3	0.78			
PVB4	0.86			
Avoidance Behavioural Intention		0.86 (>= 0.84)	0.86	0.61
ABI1	0.75			
ABI2	0.75			
ABI3	0.88			
ABI4	0.73			
Approach Behavioural Intention		0.93 (>= 0.92)	0.93	0.76
ApBI1	0.89			
ApBI2	0.84			
ApBI3	0.92			
ApBI4	0.83			
Intention to Continue Use		0.91 (>= 0.90)	0.91	0.78
BI1	0.81			
BI2	0.86			
BI3	0.97			
Financial Risk Tolerance		0.84 (>= 0.83)	0.85	0.58
FRT2	0.70			
FRT3	0.72			
FRT4	0.80			
FRT5	0.82			

***Note**: in column of Cronbach's alpha, the values in the parenthesis stand for the lower bound of the 95% CI.*
(Source: Author's own creation)

Table V

Estimated path coefficients for non-users

Constructs	Approach Behavioural Intention (β_i^{nu})	Avoidance Behavioural Intention (γ_i^{nu})	Results
Perceived Information Privacy Risk	-0.19***	0.28***	H1a -Supported H1b-Supported
Perceived Volatility	-0.21***	0.31***	H2a -Supported H2b-Supported
Perceived Anonymity	0.032	-0.034	H3a -Rejected H3b-Rejected
Perceived Value Benefits	0.64***	-0.52***	H4a -Supported H4b-Supported
Financial Risk Tolerance	-0.19***	0.20***	H5a -Supported H5b-Supported
Obs	179		

* p ≤ 0.1; ** p ≤ 0.05; *** p ≤ 0.01

(Source: Author's own creation)

Table VI

Estimated path coefficients for users

Constructs	Intention to Continue Use (β_i^u)	Actual Usage (Store of Value) (β_6^u)	Actual Usage (Payment Method) (β_7^u)	Results
Perceived Information Privacy Risk	-0.044			H1c-Rejected
Perceived Volatility	-0.24***			H2c-Supported
Perceived Anonymity	0.028			H3c-Rejected
Perceived Value Benefits	0.53***			H4c-Supported
Financial Risk Tolerance	-0.16***			H5c-Supported
Intention to Continue Use		0.18***	0.22***	
Obs	301			

* p ≤ 0.1; ** p ≤ 0.05; *** p ≤ 0.01

(Source: Author's own creation)

Table VII

Results of logistic regressions

	Ethereum	**NFTS**	**Bitcoin**	**Stablecoin**	**Defi**	**Memecoin**
Actual Usage (Store of Value)	**.67*** **	**.59*** **	**.55** **	**.53*** **	**.42*** **	**.38*** **
Actual Usage (Payment Method)	**.12**	**.37** **	**.20**	**.11**	**-.09**	**.36** **
Gender	-.03	-.20	-.68	.63	.48	.04
Age	.06	.16	-.03	.07	.34**	-.12
Education	-.07	-.07	-.08	.10	-.05	.06
Income	-.15	-.07	.14	.08	-.01	.15
lvolume5	.69	-0.14	-1.44	-1.15	-.44	-.78**
cons	-2.04	-2.8*	5.87	-2.32	-3.62***	-3.43**
Pseudo R^2	0.07	0.10	0.07	0.09	0.06	0.09
obs	301	301	301	301	301	301

* p ≤ 0.1; ** p ≤ 0.05; *** p ≤ 0.01

Note: lvolume5 denotes the log of 5 days average trading volumes before the submission day.

(Source: Author's own creation)

Table VIII

Mann-Whitney U test for differences across users and non-users

	Ethereum	**NFTs**	**Bitcoin**	**Stablecoin**	**DeFi**	**Memecoin**
	Affordance is relatively more important for:					
Perceived Information Privacy Risk	Non-Users***	Non-Users***	Non-Users***	Non-Users***	Non-Users***	Non-Users***
Perceived Volatility	Non-Users***	Non-Users***	Non-Users***	Non-Users***	Non-Users***	Non-Users***
Perceived Anonymity	–	–	–	–	–	–
Perceived Value Benefits	Users***	Users***	Users***	Users***	Users***	Users***

Financial Risk Tolerance	–	Users***	–	–	–	Users***

* p ≤ 0.1; ** p ≤ 0.05; *** p ≤ 0.01
(Source: Author's own creation)