

Bitcoin Adoption Intention, The Three Additional Contextual Variables – Hedonic Motivation, Price Value and Habit: The UTAUT2 Model

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Keywords

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Abstract

E-retailers continue to introduce the use of Bitcoin cryptocurrency for e-commerce purchases. They require understanding the factors influencing consumers' behavioural intentions to adopt Bitcoin cryptocurrency. This paper makes a new contribution to the study area that entails Venkatesh et al. (2012) extended UTAUT measuring the additional three contextual variables – hedonic motivation (HM), price value (PV) and habit, thus creating the UTAUT2 model. Further, the moderating effect of social influence was tested in the theoretical framework. An online survey recruited a convenient sample of 200 consumers of online retailers in South Africa. Upon processing data into AMOS 28 for Structural Equation Modeling (SEM), the results show that hedonic motivation (HM) and habit (H) have a significant positive impact on consumers' behavioural intentions to use Bitcoin for e-commerce. Surprisingly, price value (PV) did not significantly impact behavioural intentions to use Bitcoin for e-commerce. Nevertheless, the effects of hedonic motivation and habit on the behavioural intentions of Bitcoin users were not significantly moderated by social influence as was expected. The study offers theoretical and practical implications for understanding consumers' behavioural intentions to use Bitcoin cryptocurrency in the e-commerce industry.

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1. Introduction

Blockchain emerged as a new system of information technology that could revolutionise the technology and commerce industry (Lee & Pilkington, 2017). The blockchain-based applications facilitate e-commerce transactions, financial services, user credits, supply chain finance, product traceability, trust systems, new energy, etc. (Zhu & Wang, 2019). Blockchain is defined as “a digital, distributed transaction ledger, with identical copies maintained on multiple computer systems controlled by different entities” (Schatsky & Muraskin, 2015, p. 2). The World Economic Forum (2015) predicts that blockchain will store 10% of GDP by 2027 (World Economic Forum, 2015) and generate a 62.1% average annual growth rate until 2025 (BusinessWire, 2017). Overall, the business value-add of a blockchain is expected to grow to more than \$176 billion by 2025 and surpass \$3.1 trillion by 2030 (ConsenSys Media, 2019). Blockchain and Bitcoin cryptocurrency originated in 2008 from the pseudonymous developer – Satoshi Nakamoto – who published a paper entitled “Bitcoin: A Peer-to-Peer Electronic Cash System” in a cryptography forum (Nakamoto, 2008). Today, more than 4000 crypto coins circulate the cryptocurrency market, with over 800 trades per second and 280 exchanges (Lorenzo & Arroyo, 2022). The total market cap of all cryptocurrencies trading reached over USD 1.5 trillion by June 2022 (Gupta & Chaudhary, 2022).

Cryptocurrency is a novel digital currency that is neither established by central banks nor governed by any financial institution (Bommer et al., 2023). Therefore, cryptocurrencies represent alternative payment solutions in contexts where distrust in banks and the financial system are more significant and in countries experiencing inflation crises, as they bring forth the promise of reducing financial distress and providing more control over personal finances (Dabbous et al., 2021). Cryptocurrencies represent significant advances in cryptography and distributed systems since they embody the disruptive innovation of establishing trust between unknown entities without needing a third party to clear the transactions while maintaining the confidentiality of the participants’ identities (Mendoza-Tello, 2019).

Despite the variety of cryptocurrencies (e.g., Ethereum, Bitcoin, Dogecoin, etc.), each cryptocurrency is suitable for specific application contexts and types of users (investors, speculators, consumers, etc.). Of course, some will be suitable for e-commerce payments, others will be used as other types of assets, and still others will disappear (Mendoza-Tello, 2019). The oldest decentralised digital currency without any central bank as a controller among all the cryptocurrencies is Bitcoin (Gupta & Chaudhary, 2022). In this study, Bitcoin denotes the actual currency, while Bitcoin may comprise the entire Bitcoin system (Sallal et al., 2022). Bitcoin was traded in January 2009 as the first cryptocurrency (Arias-Oliva et al., 2019; Jariyapan et al., 2022). By 2010, the first retail purchase was made with Bitcoins.

Laszlo Hanyecz paid 10,000 Bitcoins for two pizzas (Bort, 2014). Today, you can hire a lawyer, buy a car, or pay for a doctor’s appointment with Bitcoins at 5,040 businesses worldwide (Coinmap, 2018). South Africa’s most prominent online retailer merchant Takealot.com accepts Bitcoins through an alliance with PayFast (Nieman, 2015). Asplund et al. (2018) note that while the possibility of in-store payments would further increase the potential usefulness of cryptocurrencies, however, it would require much faster transaction verification than current solutions offering (one hour for Bitcoin) since customers are likely not

prepared to wait a very long time for their purchase to be accepted by a store. Palos-Sanchez et al. (2021) concluded that there is a need for companies, especially businesses and shops, to be prepared to receive payment in Bitcoin and for financial institutions to be ready to offer their customers services, including cryptocurrency. In a study examining retailers' intentions to adopt cryptocurrency considering the mediation of technostress and technology involvement, Wu et al. (2022) found the proposed non-cognitive attributes critical in determining retailers' technostress (emotional state). Moreover, technostress was seen among e-retailers as significantly influencing their intentions to adopt cryptocurrency in a business context.

As Bitcoin is currently gaining its share in the e-commerce industry (Mendoza-Tello et al., 2018), it is estimated that the number of people who own and use cryptocurrency, as a percentage of global ownership, reached 4.2 in 2022 (Bommer et al., 2023). The worldwide transactional value in the category of Digital Payments is expected to increase at a 12.24% annual rate (CAGR 2021 – 2025), reaching a total sum of US\$10,715,390 million by 2025 (Jariyapan et al., 2022). However, to ensure higher transaction security in e-commerce, Xie et al. (2018) suggest that a robust connected algorithm (ECA) can be introduced.

Mukabi and Vu (2019) examined cryptocurrency as a payment method in the retail industry. According to the results, the adoption of Bitcoin relies heavily on positive relative advantages to other payment methods, compatibility and simplicity of its use. At the same time, negative characteristics that pull it back from being adopted include the complexities in understanding the technology behind it and damaging outcomes varying from the expected. In research that implements the Theory of Planned Behavior (TPB) to examine the use of cryptocurrencies for electronic commerce across the USA and China among people already using cryptocurrencies for electronic commerce, Cristofaro et al. (2021) found that while attitude, subjective norms, perceived behavioural control and herding behaviour positively influence the intention of these consumers to use cryptocurrencies for electronic commerce, financial literacy has no influence. Pilatin and Dilek (2023) used the Decomposed Theory of Planned Behavior to show the dimensions affecting attitude, subjective norms, perceived behavioural control variables and the effect of intention on the behaviour of investors, namely crypto asset investment.

Nevertheless, as researchers have developed a keen interest in investigating individuals' intention to adopt cryptocurrency and aim to explore the significant drivers that predict individuals' behaviour towards cryptocurrency adoption, there are remaining questions in this study area. The literature review shows that most of the existing research concerning Bitcoin focus on developed countries, with a few of the papers examining perceptions of users in Sub-Saharan Africa, where Bitcoin is a topic of interest in the virtual community (Fosso-Wamba et al., 2019; Mazambani & Mutambara, 2019; Walton & Johnston, 2018). The usage rates around the world vary significantly, with substantial proportions of crypto users or investors reported in Vietnam (21%), South Africa (17.8%), the Philippines (19%), Peru (16%), Turkey (16%), Colombia (15.3%), Argentina (14.3%), Indonesia (13%) (Wu et al., 2022), Kenya (11.6%), and Nigeria (10.3%) being representative of a broader sample of cryptocurrency's use penetration around the world, compared to 16% of United States (US) adults who own cryptocurrency (Bommer et al., 2023). According to Fosso-Wamba et al. (2019), on January 10, 2017, Google trends showed that the most searched Bitcoin-

related topics in Nigeria, South Africa, Ghana, Singapore and Slovenia, as the countries most interested in Bitcoin, include Bitcoin as a payment system, price, USD, Bitcoin network (software) and Bitcoin value. This shows a need for scholarly work probing drivers predicting individuals' intention to adopt cryptocurrency in online retailing and testing the moderating effect of social influence in South Africa.

Walton and Johnston (2018) explored the factors (enablers and barriers) that affect Bitcoin adoption in South Africa, a Sub-Saharan country with a high potential for adoption. Their study contributed to the body of knowledge in information systems by providing insights into factors that affect Bitcoin adoption in South Africa and raising awareness of incentives and barriers to Bitcoin adoption at a time when financial literacy is a crucial issue both in South Africa and worldwide. Nonetheless, these authors did not measure the factors of the Unified Theory of Acceptance and Use of Technology (UTAUT), which remains a knowledge gap in the current literature. Çabuk and Ceenzi (2021) point out that the Consumer Adoption Report – the core of the cryptocurrencies in retail – is based on a customised version of the Technology Acceptance Model 2 (TAM2), adapted from the work of Venkatesh and Davis (2012). By using the TAM2 model, these authors covered the experience of users regarding purchasing goods and services using blockchain-based currencies to a great extent.

In another study, Rahman et al. (2017) assessed the utility of TAM, TPB, and UTAUT for advanced driver assistance systems (ADAS). They reported that each model successfully predicted driver acceptance regarding behavioural intention. While all models performed better than UTAUT in the context of driver acceptance of ADAS, the original TAM model was the best-performing model. Despite this, extensive research in the literature (Abbasi et al., 2021; Arias-Oliva et al., 2019; Francisco & Swanson, 2018; Sfenrianto, 2015; Kumar, 2022; Mensah & Mwakapesa, 2022; Njinu, 2021) investigated the UTAUT (Venkatesh et al., 2003) and its extension UTAUT2 (Venkatesh et al., 2012) as models that explain how organisations and people accept new technology. Prior studies echoed the relevance of the extended UTAUT2 factors in the literature on technology adoption.

The UTAUT2 model extends UTAUT by adding three more constructs: hedonic motivation, price value, and habit. For a South African context, it is essential to know the influence of hedonic motivation, price value, and habit precisely as factors influencing consumers' intention to use Bitcoin cryptocurrency for online payments in e-commerce. The study further assesses whether the effects of hedonic motivation, price value, and habit on the behavioural intentions of Bitcoin users are significantly moderated by social influence. This theoretical framework measures these factors in the context of Bitcoin cryptocurrency adoption for online retail purchases, thus contributing valuable knowledge in the literature and practice in multiple ways.

First, Dabbous et al. (2021) recommended that factors not covered in their work, such as trust or hedonic motives, could be essential for future research. Hedonic motivation is defined as the fun or pleasure derived from using technology, and it has been shown to play a crucial role in determining technology acceptance and use (Brown & Venkatesh, 2005). Mahomed (2017) indicates that UTAUT2 is the most appropriate adoption theory directly dealing with consumer context, whereby behavioural intention was predicted most

strongly by hedonic motivation, followed by perceived trust and social influence. In a study that extends the post-acceptance model of information systems (IS) continuance, which is widely used to explain users' satisfaction and IS continuance intentions, Mishra et al. (2023) believe that their extended model can serve as a foundation for future work in technology acceptance and continuance, especially for technologies that are used personally and fulfill users' hedonic gratifications. The reason for including hedonic motivation (HM) in this study is supported by its strong effect on technology adoption and use in prior research (Mahomed, 2017).

Second, other researchers, Yeong et al. (2022) and Bommer et al. (2023), focused on the factors that impact consumers' intentions to use cryptocurrencies. The results showed price value as one of the critical factors in the adoption of cryptocurrencies. Price value (PV) is defined as "the cognitive trade-off between the perceived benefits of the applications and the monetary costs of using them" (Venkatesh et al., 2012). In a meta-analysis of what we know about the intention to use cryptocurrency, Bommer et al. (2023) show that certain variables (i.e., attitudes toward the behaviour, performance expectancy, price value, and facilitating conditions) play a strong influential role than others (i.e., social influence, effort expectancy, and perceived behavioural control). Thus, attitudes toward the behaviour, performance expectancy, and price value were the most critical factors that explain whether an individual will use cryptocurrency, explaining 55% of the variance in the intention to use cryptocurrency.

Yeong et al. (2022) showed that factors such as performance expectancy, social influence, facilitating condition and price value appreciably influence the individual's adoption behaviour of Malaysian individuals whose intention towards cryptocurrency adoption is high. Roos (2015) studied the motivation and factors driving cryptocurrency adoption in SMEs and found that among the UTAUT2 constructs, performance expectancy, price value and habit are essential. Third, habit, on the other hand, refers to how past experiences with a technology related to automatic behaviour as distinct from intention (Venkatesh et al., 2012). The habitual entertainment-seeking motive is one reason people use digital technology (Park & Kim, 2023). Almarashdeh (2018) insisted that future studies could focus on why users use Bitcoins sparingly. Huang et al. (2020) note that factors such as expectation disconfirmation, regret, stress, satisfaction and habit have been proposed to affect IS/IT discontinuance. However, they need to be measured to address the issue of cryptocurrency discontinuance usage. Research in Mobile Banking by Kwateng et al. (2018) shows that Habit (H), hedonic motivation (HM), and social influence (SI) were significant for consumers with three to four years of m-banking experience.

These three additional constructs, namely hedonic motivation, price value, and habit, in the UTAUT2 model, an extension of UTAUT (Venkatesh et al., 2012), are moderators in the literature on the behavioural intention to use new technologies. Selem et al. (2023) showed the habit-moderating relationship between perceived usefulness and purchase intention. Salimon et al. (2017) verified the mediating role of hedonic motivation on the relationship between adopting e-banking and its determinants. Nonetheless, the research question in this study is: What is the moderating role of social influence (SI) in the theoretical framework of the three additional contextual variables – hedonic motivation, price value and habit: the UTAUT2 model

(Venkatesh et al., 2012), which is a new contribution in the literature. Research showed that social influence positively affects the intention to use electronic payment systems (Sfenrianto, 2015). Dabbous et al. (2021) confirmed the critical role of social influence in decreasing the perceived risk and increasing the willingness to use cryptocurrencies.

Cryptocurrency adoption studies based on the TPB, subjective norms (social influence) and perceived behavioural control (how easy or difficult it is to use cryptocurrencies) are significant (Schaupp & Festa, 2018), as people who perceive cryptocurrencies as easy to use and people receiving a positive social influence regarding their use are more likely to use them. In essence, this study's objective is to measure the moderating effect of social influence on the relationship between the three additional contextual variables – hedonic motivation, price value and habit: the UTAUT2 model (Venkatesh et al., 2012) and intentions to use Bitcoin in e-commerce. To the extent of the existing literature, no study has measured the impact of social influence in moderating customers' intentions to adopt cryptocurrencies. The literature showed studies examining the moderating effect of social influence on travel experience (Sedera et al., 2017), e-payments adoption among Indian millennials (Kumari & Lodha, 2021), consumer's intention to shop online (Lee et al., 2011), and on mobile commerce (Yang et al., 2021). Accordingly, social perception will also be crucial to cryptocurrency development (Arias-Oliva et al., 2019).

Social influence (SI) is the level to which end users consider significant people (e.g., family and friends) to think that they should make use of a particular technology (Venkatesh et al., 2003). Social influence reflects family, friends and influencers' opinions and positively relates to electronic commerce intentions (Pavlou & Chai, 2002). Cristofaro et al. (2021) agree that undeniably, other scholars can reinforce their research by examining how family, friends and the media represent the preeminent influence that affects investors' willingness to use cryptocurrencies for electronic commerce markets. Therefore, this study measures the influential factors that might mitigate a citizen's ambiguity regarding using Bitcoin as a mode of exchange in a developing country. This aligns with Janssen et al. (2020), who studied a framework for analysing blockchain technology adoption and suggested that future research can focus on citizens' adoption of blockchain technologies.

The paper is organised as follows: it will present the problem investigated, followed by a review of extant literature, show the proposed model, describe the research context, and discuss the chosen methodology. The paper further discussed the results and presented their discussions, thus clarifying theoretical and practical implications. The last section concludes and gives the limitations and future research directions.

2. Problem investigated

Since the world health organisation declared the Covid-19 pandemic a global health emergency, the world economy has been drastically affected. Sales declined, consumers changed their behaviour, production was reduced, companies suffered severe financial burdens, and unemployment rates increased worldwide. Such extreme shifts in business and economy worldwide are expected to affect equities and alternative investments such as cryptocurrency markets (Lahmiri & Bekiros, 2020). However, the traditional modes of financial systems feel reluctant to acknowledge Bitcoin because it is not owned, regulated, or supported by most governments (Hern, 2013).

Baur and Dimpfl (2021) found that Bitcoin only works as a currency. Another problem with these currencies is their high level of volatility, losses, and a lack of widespread acceptance among the general public, which could indicate their inefficiency (García-Corral et al., 2022). This raises many issues about the usage barriers of Bitcoin as a currency used in e-commerce. First, due to the large price fluctuations, the function of Bitcoin as a store of value, commodity, and transaction payment function as a currency has been questioned (Chen, 2023). This is due to the scarcity of knowledge about Bitcoin's price value (PV), defined as "the cognitive trade-off between the perceived benefits of the applications and the monetary costs of using them" (Venkatesh et al., 2012).

Second, very few studies are objective-based on other usage barriers, such as a tradition barrier related to a habit of how things have been done so far and a value barrier representing the comparative performance of the substitutes in terms of performance-to-price value (Laukkanen et al., 2007; Talwar et al., 2020). It shows how the traditional barrier related to a Bitcoin's habit, referring to how past experiences with a technology related to automatic behaviour as distinct from intention (Venkatesh et al., 2012), is also relevant to understand. Third, the acceptance rate of Bitcoin continues to rise due to the active involvement of merchants in paying their obligations directly or through service providers (Neroth, 2013; Nadeem et al., 2021). However, despite this rise, Bitcoin remains blurred, and the lack of knowledge regarding the usage of Bitcoin among citizens has received scholarly attention (Shahzad et al., 2018). However, objective insights regarding Bitcoin usage among citizens may require knowing if consumers experience fun or pleasure from using this technology, a concept defined as hedonic motivation (Brown & Venkatesh, 2005). Lastly, while cryptocurrencies open up many opportunities, such as fast, efficient, traceable, and secure transactions, but also have drawbacks, such as their inherent risk, the technological and financial difficulty of using them, and the uncertain social perception of owning them (Arias-Oliva et al., 2019). These issues formulate the objective to examine the moderating effect of social influence (SI) on the relationship between the three additional contextual variables – hedonic motivation, price value and habit: the UTAUT2 model (Venkatesh et al., 2012), and the intentions of Bitcoin adoption in e-commerce. Investigating these issues offers a unique contribution to the Bitcoin literature and practice.

3. Research objectives

The objective of this paper is to examine the impact of the additional three contextual variables – hedonic motivation (HM), price value (PV) and habit, thus creating the UTAUT2 model (Venkatesh et al., 2012), on behavioural intention to use Bitcoin for online payments in e-commerce. Moreover, the study measures the moderating effect of social influence on the relationships between the paths in the theoretical framework.

4. Specify the hypotheses

To measure the stated objective, the study estimates the following hypotheses:

- H₁: Hedonic motivation (HM) significantly impacts behavioural intentions to use Bitcoin in e-commerce.
- H₂: Price value (PV) positively impacts behavioural intentions to use Bitcoin in e-commerce.
- H₃: Habit (H) positively impacts behavioural intentions to use Bitcoin in e-commerce.

- H₄: Social Influence (SI) moderates the relationship between the additional three contextual variables – hedonic motivation (HM), price value (PV), and habit – and behavioural intentions to use Bitcoin in e-commerce.

5. Theoretical development of conceptual model

5.1 UTAUT2 model

Before UTAUT2, Venkatesh et al. (2003) developed the original UTAUT model, which integrated constructs across eight models, including innovation diffusion theory, technology acceptance model, and theory of reasoned action to explain user acceptance and usage behaviour from an organisational perspective (Alomari & Abdullah, 2023; Ter Ji-Xi et al., 2021). It includes constructs such as performance expectancy, social influence, facilitating conditions, and effort expectancy that impact behaviour intentions, ultimately leading to user behaviour (Venkatesh et al., 2003). Age, gender, voluntariness of use, and experience are incorporated as moderating factors. The empirical validation of the UTAUT model found that it explains 56% of user behaviour intentions and 40% of technological use to adopt new technology (Venkatesh et al., 2003). In the cryptocurrency and blockchain context, several previous studies by scholars such as Alazab et al. (2021) conducted in Australia, Milosavljevic et al. (2019) in Croatia, Sham et al. (2023) in Malaysia, and Radic et al. (2022) in China and South Korea have employed the original UTAUT model to determine its adoption in organisational as well as consumers standpoint. They found that social influence, performance expectancy, and effort expectancy positively influence using cryptocurrency for online payments.

To reduce the original UTAUT model limitations, Venkatesh et al. (2012) formulated the UTAUT2 model to study the adoption and use of new technology from a consumer's perspective, unlike employee acceptance of new technology in the workplace (Bommer et al., 2023). The original UTAUT model (i.e. performance expectancy, social influence, facilitating conditions, effort expectancy) was extended by adding three predictor constructs of Hedonic Motivation (HM), Habit (HB), and Price Value (PV) to assist in expanding the scope and enhance the understanding of consumer technology acceptance (Yeong et al., 2022). In the same light, UTAUT2 surpasses the original UTAUT as it has the explanatory power of 74% for behavioural intention and 52% for technology use (Venkatesh et al., 2012). The UTAUT2 model has been utilised in prior empirical research by several scholars, such as Afifa et al. (2022) implemented in Vietnam, Queiroz and Wamba (2019) in the USA and India, and Yeong et al. (2022) in Malaysia. The empirical findings showed performance expectancy, facilitating conditions, and price value as strong predictors of behavioural intention, whilst social influence has a lower impact on adopting cryptocurrency such as Bitcoin for online payments. In addition, prior studies have confirmed that moderators such as experience, gender and age are not essential to be tested as they show no significance in the cryptocurrency acceptance context.

Based on the above, our current study will focus on measuring the additional three contextual variables – hedonic motivation (HM), price value (PV) and habit, thus creating the UTAUT2 model (Venkatesh et al., 2012) in South African e-commerce settings. From an organisation and consumer's perspective, most

existing cryptocurrency adoption studies have been conducted in developed countries such as the USA, Canada, Spain, Poland, and Greece, with the momentum moving towards Asian countries such as China, Indonesia, Oman and recently Malaysia (Yeong et al., 2022). In South Africa, research focused on other theories, such as TAM and TPB, on its behavioural intention to adopt Bitcoin payments (Mazambani & Mutambara, 2019; Walton & Johnson, 2018). In addition, to the extent of the current literature, no existing studies have focused on adopting Bitcoin as an online e-commerce payment method nor even measured the three new constructs of the UTAUT2 model (HM, H and PV). Therefore, this study is a pioneer undertaking to determine the impact of the three new UTAUT2 variables in driving behavioural intention to use Bitcoin in online payments. This approach contributes new insights to the UTAUT2 model applied in the cryptocurrency acceptance context.

6. Literature Review

6.1 Analysis of behavioural intention to Adopt Bitcoin Cryptocurrency in E-commerce

According to Albayati et al. (2020), behavioural intention refers to the probability that a consumer might indulge in a specific behaviour, such as the willingness to use Bitcoin as a form of online payment. Globally, the tech giants such as Amazon and Microsoft allow consumers to buy their services or products using Bitcoin online transactions (Arias-Oliva et al., 2019; Ter Ji-Xi et al., 2021). Locally, online retailers such as Takealot (South Africa's biggest online retailer) have also started to accept Bitcoin payments facilitated using PayFast as the most prominent transactional platform (Mthombeni, 2021). Despite other traditional retailers such as Pick-n-Pay and Luno – the most prominent Bitcoin Trader accepting Bitcoin as a mode of payment in South Africa, knowledge of factors predicting consumers' intention to use Bitcoin in purchases remains minimum (Greeff, 2019; Mazambani & Mutambara, 2019; Nasdaq, 2023). Research by Jonker (2018) confirms that lack of demand is a severe barrier to Bitcoin adoption in e-commerce as most do not use it for online transactions or payments. Therefore, it is paramount to identify factors that drive or deter Bitcoin payment adoption in e-commerce from consumers' perspective because its survival depends on it (Greeff, 2019).

Few studies have focused on determining factors that impact behavioural intention to adopt Bitcoin cryptocurrency in South Africa's e-commerce context. For instance, Mazambani and Mutambara's (2019) study looked at financial innovation such as cryptocurrency adoption, Bommer et al. (2023) determined factors that lead to the intention to use cryptocurrency, while a study by Yeong et al. (2022) assessed the sustainability of cryptocurrency adoption. The present study fills this gap by concluding that the three UTAUT2 model (i.e. H, PV, HM) plays a critical role in adopting Bitcoin cryptocurrency in e-commerce. This study aims to measure a theoretical framework moderated by social influence on the relationship between the additional three contextual variables of UTAUT2 and consumer behavioural intentions to use Bitcoin for e-commerce transactions. The theoretical framework primarily examines the importance of incorporating three additional contextual variables – hedonic motivation (HM), price value (PV) and habit into the UTAUT2 model (Venkatesh et al., 2012).

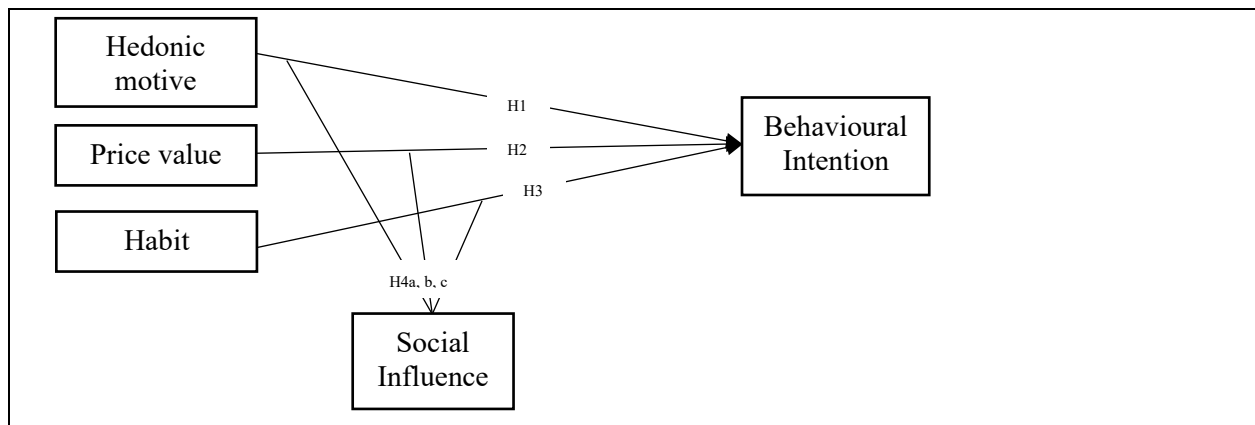


Figure 1: The theoretical framework

6.2 The impact of hedonic motivation, price value and habit on consumers' behavioural intentions to adopt Bitcoin

6.2.1 Hedonic motivation (HM)

According to Bommer et al. (2023, p.3), hedonic motivation denotes a consumer's enjoyment of utilising a new technology. From a Bitcoin perspective, it can be described as the level of happiness a consumer gets after experiencing online payment using Bitcoin in an online shopping environment. Venkatesh et al. (2012) argued that retailers should highlight the hedonic benefits of using a specific technology to its consumers to increase its adoption. Existing evidence from numerous studies in different fields, such as education, mobile payments, and the banking sector, suggests that hedonic motivation affects consumers' acceptance of new technology (Gupta & Arora, 2020; Nikolopoulou et al., 2021; Win et al., 2021). In cryptocurrency, other studies by Al-Amri et al. (2019) and Paschalie and Santoso (2020) have demonstrated that hedonic motivation positively influences consumer willingness to invest in cryptocurrency such as Bitcoin. In the same light, a more recent study by Yeong et al. (2022) confirmed that hedonic motivation positively impacts behavioural intention to use Bitcoin. Subsequently, the following hypothesis is formulated;

H₁: Hedonic motivation (HM) significantly impacts behavioural intentions to use Bitcoin in e-commerce.

6.2.2 Price value (PV)

Price value can be defined as the functional value an individual derives from accepting to use new technology (Bommer et al., 2023) and compared to an organisational setting, an individual bears all the financial costs related to adopting new technology, also categorised as price value (Yeong et al., 2022). In this light, empirical research has proven that price value significantly and positively influences behavioural intention in the mobile Internet sector (Nikolopoulou et al., 2021). An individual's probability of adopting new technology is high when he or she believes the benefits outweigh the monetary costs (Yeong et al., 2022). In a cryptocurrency context, when an individual perceives that using Bitcoin for online payments in e-commerce is more advantageous than the financial costs involved, he or she is more likely to adopt it. This is further supported by prior studies that elucidate that price value significantly impacts behavioural

intention to use cryptocurrency such as Bitcoin (Bakri et al., 2022; Chen et al., 2022; Joshi et al., 2023). In this regard, the present study puts forward the below hypothesis;

H₂: Price value (PV) positively impacts behavioural intentions to use Bitcoin in e-commerce.

6.2.3 Habit (H)

Habit refers to the degree an individual perceives that partaking in a particular behaviour comes automatically because of learning (Nikolopoulou et al., 2021). Habit refers to automating behaviour from initial learning to regular use of technology (Limayem et al., 2007). Yeong et al. (2022) further explain that habit is a crucial predictor for consumers to adopt and use new technology. In a cryptocurrency context, hardly any existing literature focuses on consumers' habits and behavioural intentions to adopt Bitcoin in online payments because most researchers consider cryptocurrency to still be in its infancy phase (Bakri et al., 2022; Yeong et al., 2022). Habit influences technology use regarding its prior use (Kim and Malhotra, 2005) toward BI and moderates the effect of intention on technology's actual use (Limayem et al., 2007). As a prior use, habit strongly predicts future technology use (Kim and Malhotra, 2005). It is based on the notion that consumers have not learned enough about Bitcoin online payments to consider it habitual.

On the contrary, a recent study by Sham et al. (2023) identified that consumers have adequate knowledge regarding Bitcoin as an easy online payment method that enhances productivity. Research shows that habit, directly and indirectly, affects BI to use of technology, indicating that increased experience in usage leads to habitual technology use (Venkatesh et al., 2012). In mobile banking, habit has been identified as the driving factor to behavioural intention amongst consumers (Win et al., 2021). From a Small Medium Enterprises (SME) perspective, prior research by Roos (2015) found that habit is one of the essential variables that lead to behavioural intentions to allow Bitcoin as a mode of payment. Therefore, as per the above arguments, the following hypothesis is developed;

H₃: Habit (H) positively impacts behavioural intentions to use Bitcoin in e-commerce.

6.2.4 Moderating variable: Social Influence (SI)

Social influence refers to the extent to which an individual believes using new technology will be necessary for others, such as family or friends (Venkatesh et al., 2012). In a cryptocurrency context, it can be described as an individual's unintended or unintentional thoughts, actions, or feelings to alter the behaviour of others to adopt Bitcoin as a mode of payment (Chen et al., 2022). Previous studies have suggested that the preferences of society and opinions from close friends, family members, or even colleagues who are existing users of the new technology strongly affects an individual's behaviour in accepting or using that specific technology (Chen et al., 2022; Nikolopoulou et al. 2022; Yeong et al., 2022). The literature showed studies examining the moderating effect of social influence on travel experience (Sedera et al., 2017), e-payments adoption among Indian Millennials (Kumari & Lodha, 2021), consumer's intention to shop online (Lee et al., 2011), and on mobile commerce (Yang et al., 2021). Thus, social perception will also be crucial to cryptocurrency development (Arias-Oliva et al., 2019).

Empirical studies on social influence and acceptance of new technology have produced similar results. For example, social influence strongly moderates the relationship between perceived utilitarian value, perceived hedonic value, and impulse buying behaviour in mobile commerce (Yang et al., 2021). In an e-commerce context, social influence has positively moderated the relationship between attitudes and intention to purchase online (Lee et al., 2011). Therefore, as the current study focuses on the role of social influence for consumers to adopt Bitcoin online payment in e-commerce, it is justified to formulate the following hypothesis;

H_{4a, b, c}: Social influence (SI) moderates the relationships between the three additional contextual variables – (a) hedonic motivation, (b) price value, and (c) habit: the UTAUT2 model and the intentions of Bitcoin adoption in e-commerce.

7. Research Methodology

7.1 Sampling and data collection

This study aimed to reveal unique contributions in the Bitcoin literature and practice by targeting consumers of online retailers in South Africa. Female and male respondents aged 18 to 65 years, who spend an average of R1 000 to R6 000 Rands per month in online shopping and use desktop, laptop, mobile, and tablet computers, were targeted in this study. The objective was to understand how their perception of the three additional contextual variables – hedonic motivation, price value and habit of the UTAUT2 model influence their intentions of Bitcoin adoption in e-commerce with an expectation that social influence (SI) moderates these relationships when considering the use of Bitcoin new technology for online payments in online retailing. Therefore, the purposive sampling method was applied to recruit the legible elements. Questionnaire distribution was done in an online survey using a Google form link.

Only respondents with valid identifiable profiles were invited to participate by sending WhatsApp and Facebook Messenger messages. A purposive sample technique ensured that the respondents met the screening questions' standards and offered consent before participating in the study. The list was developed to ensure that the same person did not complete the questionnaire twice. Similar research methods were applied in the questionnaire's pilot test comprising 50 respondents. The feedback helped improve this study's research methodology, thus enabling the main survey to be free from respondents' and measurement errors. Data were collected from July to September 2020. An online survey registered 200 consumers of online retailers in South Africa, and only 174 questionnaires were completed and valid. Incomplete questionnaires containing outliers were discarded. To determine the required sample size, researchers relied on power analyses to account for the model structure, the expected significance level and the anticipated effect sizes (Hair et al., 2019). Pallant (2010, p. 150) noted a formula given by Tabachnick and Fidell (2007, p. 123) for calculating the requirements of sample size that accounts for the number of independent variables used in the study: $N > 50 + 8m$ (where m = number of independent variables). For example, five independent variables will require 90 cases, although more cases will be required if a skewed value represents the dependent variable. Pallant suggests that a ratio of 40 cases for every independent variable is required for stepwise regression. Based on the example of stepwise regression, it suggests that for three

independent variables, a ratio of 120 cases is acceptable). All items were measured on a 5-point Likert scale coded on the questionnaire from 1, “strongly disagree,” to 5, “strongly agree.”

7.2 Measurement Instrument

The measurement instrument measured the scale items adapted from Venkatesh et al. (2012) extended UTAUT measuring the additional three contextual variables – hedonic motivation (HM), price value (PV) and habit, thus creating the UTAUT2 model. The study aimed to evaluate a theoretical framework measuring the impact of these factors on customers’ behavioural intentions to use Bitcoin for online payments in online retailing, moderated by social influence also adapted from Venkatesh et al. (2012). The questionnaire involved demographic variables, e.g., age and gender. All instructional guidelines and ethics, e.g., consent for participation, data privacy disclosed, confidentiality of participation, etc., were included. The study was offered the Ethical Clearance Certificate by the university’s unit of research ethics committee.

7.3 Analysis Strategy

Data were collected, captured and analysed using Structural Equation Modeling on Amos 28. The SEM approach was conducted due to its ability to simultaneously account for the linkage between all latent variables while identifying measurement errors (Anderson & Gerbing, 1988). Therefore, SEM was determined as appropriate for the analysis of the objectives of this study. As a two-step analytical method, SEM evaluates the measurement model independently before assessing the structural model. SEM is a method for analysing multivariate data. It is most frequently employed in social science research since it can evaluate additive and linear causal models that are theoretically justified (Selem et al., 2023). The moderation of social influence was tested using PROCESS Procedure for SPSS Version 4.1 (Hayes, 2013). SPSS 28 was used to measure the demographic profiles of the respondents.

8. Results and Findings

Respondent profile. Table 1 shows the sample characteristics. Out of 174 respondents, 93 (53.4%) were female. Most respondents were between 18 and 24 years old 104 (59.8%), while 74 (42.5%) had an average monthly online payment of R1 000. The majority of respondents, 155 (89.1%) frequently used Mobile devices for online shopping, and 81 (46.6%) indicated that they were not very informed about Bitcoin. When asked whether they would like to use Bitcoin for online payments, the majority 122 (70.1%) said yes.

Table 1: Sample Table

Variable	Category	Frequency	Per cent
Would you like to use Bitcoin for online payments?	I do not know	3	1.7
	No	49	28.2
	Yes	122	70.1
Gender	Female	93	53.4
	Male	81	46.6
Age	18 – 24	104	59.8
	25 – 29	41	23.6
	30 – 34	20	11.5
	35 – 39	5	2.9
	40 – 45	2	1.1
	50 – 65	2	1.1
Average monthly online payments	R4 000 pm	6	3.4
	R5 000 pm	9	5.2
	R1 000 pm	29	16.7
	R1 000 pm	74	42.5
	R2 000 pm	19	10.9
	R3 000 pm	13	7.5
	R6 000 pm	24	13.8
The device do you frequently use	Desktop	8	4.6
	Laptop	10	5.7
	Mobile	155	89.1
	Tablet	1	0.6
How informed are you about Bitcoin?	I do not	7	4.0
	Not at a	18	10.3
	Not very	81	46.6
	Somewhat	48	27.6
	Very well	20	11.5
Would you like to use Bitcoin for online payments?	I do not know	3	1.7
	No	49	28.2
	Yes	122	70.1

Source: Own compilation

8.1 Measurement model

A confirmatory factor analysis (CFA) was conducted, applying a Maximum Likelihood Model (Anderson & Gerbing, 1988). The assessment of the reflective measurement model evaluated the composite reliability (CR) to determine the internal consistency of the indicators measuring the scale and construct reliability. Convergent validity was assessed using the average variance extracted (AVE). In contrast, the discriminant validity was evaluated following the Fornell–Larcker criterion of 0.5 (Fornell & Larcker, 1981) and factor loadings above 0.7 (Hair et al., 2019).

Composite reliability (Pc) measured the internal consistency reliability and indicated the indicator variables' outer loadings. Although the composite reliability values range from 0 and 1, greater values between 0.60 – 0.70 are acceptable in exploratory research. However, in this study, Pc values between 0.70 and 0.90 were considered satisfactory regarding internal consistency reliability (Nunnally & Bernstein, 1994). Discriminant validity was assessed to determine the extent to which measures of an unobservable variable could differ significantly from another latent variable in the theoretical framework. The goal is to discover the uniqueness of each latent variable from different constructs in the framework. According to Hair et al.

(2014), an observed variable's outer loadings on related latent variables are expected to be higher when compared to other unobserved variables' outer loadings.

The Fornell–Larcker criterion 0.5 is the second and more conservative approach to assessing discriminant validity. Furthermore, comparing the AVE values square root with construct correlations, discriminant validity is achieved when the square root of each construct's AVE is more significant when compared to the highest correlation of any construct. Thus, the composite reliability values for all the constructs exceeded the 0.70 suggested by Churchill (1979). The average variance extracted (AVE) for each factor was higher than 0.5 (Fornell & Larcker, 1981). The factor loadings of all latent constructs showed convergent validity (Hair et al., 2019). The results indicated that the study met the thresholds for measures of composite reliability (assessing the internal consistency reliability), indicator reliability, convergent validity, AVE and discriminant validity (Hair et al., 2014).

Table 2: Measurement model evaluation

Code	Items	β	t	CR	AVE
BI1	I worry about fraud when I use Bitcoin.	0.840	13.382	0.887	0.723
BI2	I worry about losing the value of money when I use Bitcoin.	-	-		
BI3	I do not feel totally safe if I use Bitcoin for online payments.	0.845	Fixed		
BI4	I worry that electronic devices may not work well when I use Bitcoin.	0.866	13.971		
H1	The use of Bitcoin has become a habit for me.	0.899	17.141	0.926	0.806
H2	I am addicted to using Bitcoin.	0.905	17.392		
H3	I must use Bitcoin.	0.890	Fixed		
H4	Using Bitcoin has become natural to me.	-	-		
HM1	Using Bitcoin will be fun for me.	0.899	Fixed	0.929	0.814
HM2	Using Bitcoin will be enjoyable for me.	0.944	20.079		
HM3	Using Bitcoin will be very entertaining for me.	0.861	16.383		
PV1	Bitcoin is reasonably priced.	0.827	12.477	0.869	0.688
PV2	Bitcoin is a good value for money.	0.835	12.621		
PV3	At the current price, Bitcoin has a good value.	0.826	Fixed		
SI1	The people who are important to me think that I should use Bitcoin.	0.875	Fixed	0.915	0.783
SI2	The people who influence my behaviour think that I should use Bitcoin.	0.862	15.050		
SI3	People whose opinions I value would like me to use Bitcoin.	0.917	16.633		

The results of the measurement model showed a good data fit ($\chi^2 = 166.522 / 80 = 2.082$, $p < 0.01$; $\chi^2/df = 2.082$; CFI = 0.962; TLI = 0.943; IFI = 0.963; NFI = 0.930; RMSEA = 0.079). The next step was to analyse the structural model using Amos 28. According to Bentler (1990), the results of the model fit indices indicate appropriate model fit. RMSEA cut-off point recommendations have been considerably reduced in the last fifteen years. Until the early nineties, an RMSEA in the range of 0.05 to 0.10 indicated fair fit, and values above 0.10 indicated poor fit (MacCallum et al., 1996). It was then thought that an RMSEA of between 0.08 to 0.10 provides a mediocre fit, and below 0.08 shows a good fit (MacCallum et al., 1996). However, more recently, a cut-off value close to 0.06 (Hu & Bentler, 1999) or a stringent upper limit of 0.07 (Steiger, 2007) seems to be the consensus amongst authorities in this area, also see Sheikhalizadeh Heris and Mahboub (2021).

Table 3: Discriminant validity

Constructs	SI	H	HM	BI	PV
SI	0.885				
H	0.610	0.898			
HM	0.690	0.491	0.902		
BI	0.688	0.742	0.743	0.850	
PV	0.682	0.630	0.828	0.753	0.829

Note 1. (CR) Composite reliability, (AVE) Average Variance Extracted, and ($\sqrt{\text{AVE}}$) bold values.

8.2 Testing the structural model: Direct effects

The hypothesised relationships were tested on Amos 28 using Maximum Likelihood Model (Anderson & Gerbing, 1988). Examination of the structural model – the specified relationships among the latent variables in the model – evaluated the proposed model’s predictive capabilities in empirical tests. Coefficients of determination (R^2) values and the t -values of the path coefficients are the primary evaluation criteria to assess SEM results. The other measures to assess are effect size (f^2), effect size (q^2), and predictive relevance (Q^2). To examine this study’s objective, the structural model hypothesised that three additional contextual variables – hedonic motivation (HM), price value (PV) and habit (H) of the UTAUT2 model significantly impact behavioural intentions to use Bitcoin for online payments in online retailing. The study investigated and described the moderation effect of social influence (SI) on the direct relationship paths. Results of the structural model are reported in Table 4 and Figure 2. The structural model showed that data fit the model well ($\chi^2 = 94.107 / 48$, $p < 0.01$; $\chi^2/\text{df} = 1.961$, CFI = 0.974, TLI = 0.957, IFI = 0.974, NFI = 0.949; RFI = 0.917; RMSEA = 0.075), according to Bentler (1990).

Direct effects estimation. The direct effects of the structural model are presented in Table 4. The findings show a highly significant positive impact of habit (H) ($\beta = 0.463$, $t = 6.112$, $p < 0.001$) on behavioural intentions to use Bitcoin for online payments in online retailing, implying that H3 is accepted. Hedonic motivation (HM) had a significant positive effect ($\beta = 0.422$, $t = 3.753$, $p < 0.001$) on behavioural intentions to use Bitcoin for online payments in online retailing, implying that H1 is accepted. One of the UTAUT2 model factors, e.g., price value (PV), did not have a significant positive effect ($\beta = 0.113$, $t = 0.866$, $p < 0.386$) on behavioural intentions to use Bitcoin for online payments in online retailing, implying that H2 is rejected.

Table 4. Results of the hypothesised model

Hypothesis	Independent	Dependent	Estimate (β)	t -value	p -value	Result
H1	HM	BI	0.422	3.753	***	Accepted
H2	PV	BI	0.113	0.866	0.386	Rejected
H3	H	BI	0.463	6.112	***	Accepted

Note. $p < 0.001$ ***

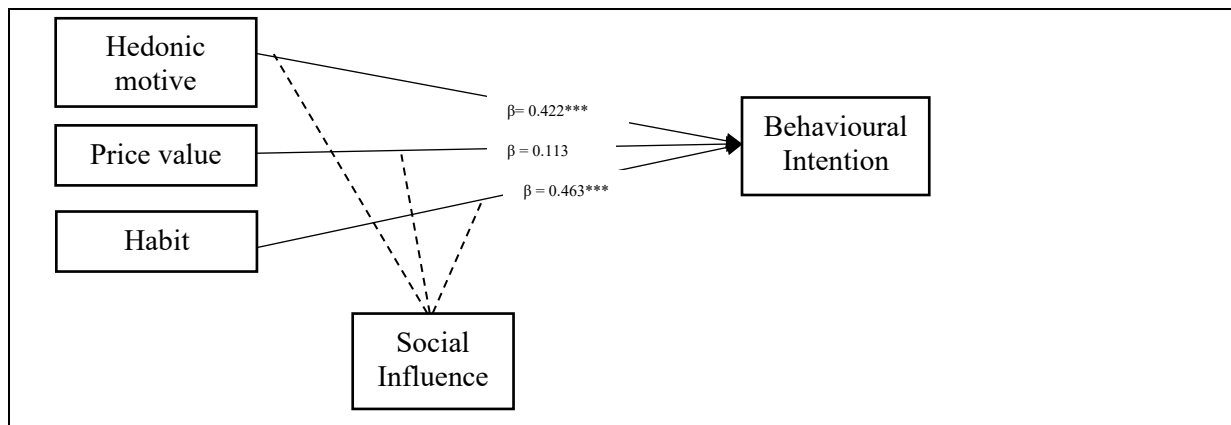


Figure 2: Results of the structural model

Moderation analysis. The importance of the moderation of Social Influence (SI) in the structural model was tested on SPSS 28 using PROCESS Procedure for SPSS Version 4.1 (Hayes, 2013). The Johnson-Neyman technique measured the moderation of SI on the relationships between Hedonic Motivation (HM), Habit (H), and Behavioural Intentions. Results are shown in Table 5 and Table 6.

Table 5 shows that Social Influence (SI) did not significantly moderate ($\beta = -0.0429$, $t = -0.9386$, $p < 0.3493$) (LLCI = -0.1331 ; ULCI = 0.0473) the relationship between Hedonic Motivation (HM) and behavioural intentions (BI) to use Bitcoin for online payments in online retailing. The mean of the bootstrapping was insignificant ($\beta = -0.0435$, BootLLCI = -0.1477 ; BootULCI = 0.0506) at 95% confidence intervals implying that H4a is rejected. The $R^2 = 0.5592$ shows that the moderation effect accounts for 55.92% of the variance in the intention to use Bitcoin for online payments in online retailing. Figure 3 illustrates the visualisation of the conditional effect of SI (i.e. focal predictor), showing that the higher the moderation of SI on the relationship between Hedonic Motivation and Behavioural Intentions, the more insignificant its effect.

Table 5. The moderation of SI between Hedonic Motivation and Behavioural Intentions

	Coeff	se	<i>t</i>	<i>p</i>	LLCI	ULCI	R^2
Constant	0.0767	0.3486	0.2199	0.8262	-0.6117	0.7650	0.5592
Hedonic Motivation	0.6437	0.1192	5.3993	0.0000	0.4083	0.8791	
Social	0.4347	0.1692	2.5696	0.0111	0.1006	0.7687	
Int 1	-0.0429	0.0457	-0.9386	0.3493	-0.1331	0.0473	
Bootstrap results for regression model parameters							
	Coeff	BootMean	BootSE	BootLLCI	BootULCI		
Constant	0.0767	0.0718	0.3039	-0.5494	0.6427		
Hedonic Motivation	0.6437	0.6440	0.1127	0.4221	0.8709		
Social	0.4347	0.4386	0.1940	0.0652	0.8249		
Int 1	-0.0429	-0.0435	0.0505	-0.1477	0.0506		

Note. $p < 0.001$ ***

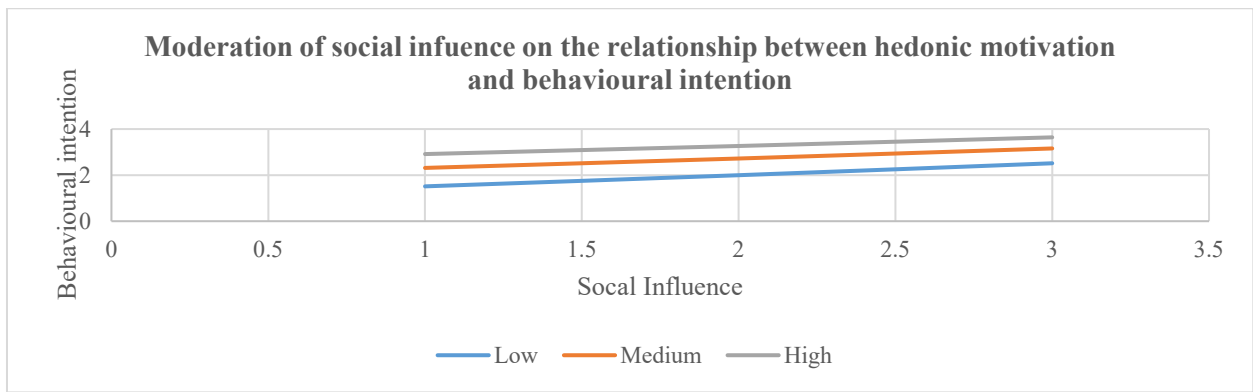


Figure 3: Results of the moderation of SI between Hedonic Motivation and Behavioural Intentions

Table 6 shows that Social Influence (SI) did not significantly moderate ($\beta = -0.0180, t = -0.3829, p < 0.7023$) (LLCI = -0.1107 ; ULCI = 0.0747) the relationship between Habit (H) and behavioural intentions (BI) to use Bitcoin for online payments in online retailing. The mean of the bootstrapping was insignificant ($\beta = -0.0223$, BootLLCI = -0.1121 ; BootULCI = 0.0617) at 95% confidence intervals implying that H4c is rejected. The $R^2 = 0.5066$ indicates that the moderation effect accounts for 50.66% of the variance in the intention to use Bitcoin for online payments in online retailing. Figure 4 illustrates the visualisation of the conditional effect of SI (i.e. focal predictor), showing that the higher the moderation of SI on the relationship between Habit and Behavioural Intentions, the more insignificant its effect.

Table 6. The moderation of SI between Habit and Behavioural Intentions

	Coeff	se	<i>t</i>	<i>p</i>	LLCI	ULCI	R^2
constant	0.8316	0.3038	2.7369	0.0069	0.2316	1.4315	0.5066
Habit	0.4721	0.1677	2.8155	0.0055	0.1410	0.8032	
Social	0.4372	0.1114	3.9259	0.0001	0.2173	0.6571	
Int 1	-0.0180	0.0469	-0.3829	0.7023	-0.1107	0.0747	
Bootstrap results for regression model parameters							
	Coeff	BootMean	BootSE	BootLLCI	BootULCI		
constant	0.8316	0.8075	0.2944	0.2312	1.3926		
Habit	0.4721	0.4827	0.1653	0.1696	0.8125		
Social	0.4372	0.4489	0.1180	0.2259	0.6888		
Int 1	-0.0180	-0.0223	0.0438	-0.1121	0.0617		

Note. $p < 0.001$ ***

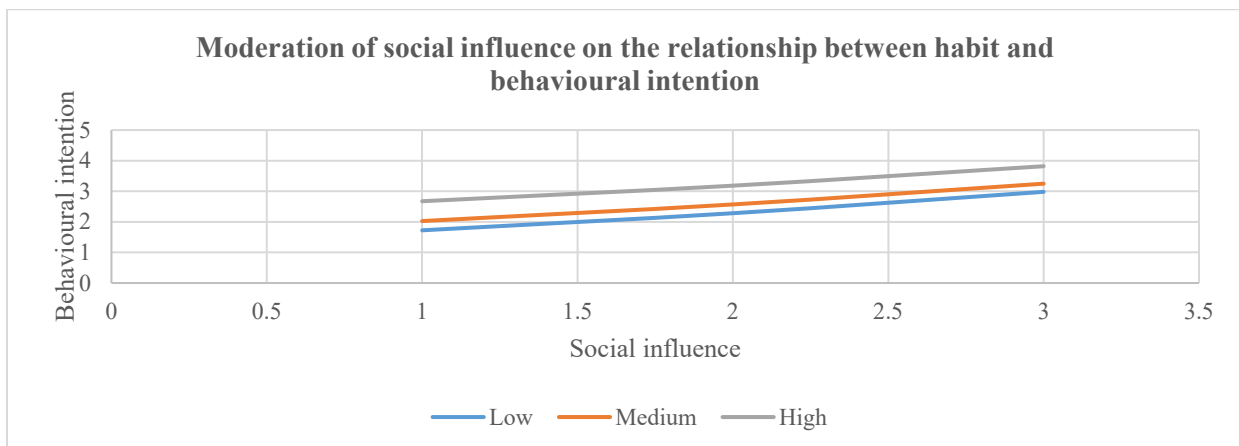


Figure 4: Results of the moderation of SI between Habit and Behavioural Intentions

9. Discussion of results

The findings of this study revealed the impact of Venkatesh's et al. (2012) extended UTAUT measuring the additional three contextual variables – hedonic motivation (HM), price value (PV) and habit (H), thus creating the UTAUT2 model on behavioural intention to use Bitcoin for online payments in e-commerce. Specifically, habit (H) and hedonic motivation (HM) significantly influence behavioural intention to use Bitcoin for online payments. Unexpectedly, price value (PV) did not significantly influence behavioural intention to use Bitcoin for online payments in online retailing. However, this study's results could not confirm the significant moderating effect of Social Influence (SI) on the relationships between hedonic motivation (HM), habit (H) and behavioural intentions (BI) in this context.

In terms of the research question, first, the results of this study indicate a strong significant positive influence of habit (H) on behavioural intentions (BI) to use Bitcoin for online payments in e-commerce, implying that H3 is accepted. Unlike the previous study done by Mahomed (2017) suggesting that due to the newness of cryptocurrency technology and adoption, habit, which is operationalised as the perception that the behaviour is automatic, is not expected to play a role in determining adoption, this study shows that habit significantly impacts behavioural intentions to use Bitcoin for online payments in e-commerce. This finding differs from Loh et al. (2023), who believe that consumers tend to remain with existing online payment options, which may deter them from adopting cryptocurrency such as Bitcoin for online payments. Specifically, the result showing that habit has a significant positive influence on behavioural intention to use Bitcoin for online payments supports the evidence from a Small Medium Enterprises (SME's) perspective research by Roos (2015), who found that habit is one of the essential variables that lead to behavioural intentions to allow Bitcoin as a mode of payment. These findings also support prior studies in other contexts. In mobile banking, habit has been identified as the driving factor to behavioural intention amongst consumers (Kwateng et al., 2018; Win et al., 2021). Kalinić et al. (2019) found that habit significantly and positively affects continuance commitments in mobile commerce services. It shows that habit, directly and indirectly, affects BI to use technology, as Venkatesh et al. (2012) suggested. Likely, consumers' behavioural intentions of partaking in online payments using Bitcoin cryptocurrency come automatically due to learning the uses of e-commerce.

Second, unlike Abbasi et al. (2021), who could not find support for the hypothesis that hedonic motivation has a positive and significant effect on the intention to adopt cryptocurrency, the findings of this study showed that hedonic motivation (HM) is a significant positive predictor of behavioural intentions (BI) to use Bitcoin for online payments in e-commerce implying that H1 is accepted. This finding corroborates other studies in the cryptocurrency context. Al-Amri et al. (2019) and Paschalie and Santoso (2020) have confirmed that hedonic motivation positively influences consumer willingness to invest in cryptocurrency like Bitcoin. In the same light, Yeong et al. (2022) have found that hedonic motivation positively impacts behavioural intention to use Bitcoin. This result has been identified in numerous studies showing that hedonic motivation affects consumers' acceptance of new technology in different fields, such as education, mobile payments, and the banking sector (Gupta & Arora, 2020; Nikolopoulou et al., 2021; Win et al., 2021). Similarly, hedonic motivation positively impacts consumers' intentions to use mobile commerce

(Shaw & Sergueeva, 2019). Venkatesh et al. (2012) report that hedonic motivation IS are universal in the consumer IT market, such as mobile videos and games on iPhones, which indicates that hedonic motivation plays an essential role in predicting intentions for hedonic IS. It suggests that the level of happiness after experiencing online payment in e-commerce can increase consumers' intentions of using Bitcoin for online payments in online retailing.

Unlike other researchers, e.g., Kwateng et al. (2018), who concluded that the primary motivations for adopting m-banking services in Ghana are habit, price value and trust, the results of this study showed that price value (PV) did not have a significant positive impact on consumers' behavioural intentions to use Bitcoin cryptocurrency for e-commerce which is surprising, implying that H2 is rejected. Mahomed (2017) also wanted to understand consumer adoption of cryptocurrencies in South Africa. He reported that price value did not positively influence a consumer's behavioural intention to adopt cryptocurrencies. This result contradicts the findings from other studies in the context of cryptocurrency, showing that when an individual perceives using Bitcoin for online payments in e-commerce as more advantageous than the financial costs involved, he or she is more likely to adopt it. Previous studies elucidate that price value significantly impacts behavioural intention to use cryptocurrency such as Bitcoin (Bakri et al., 2022; Chen et al., 2022; Joshi et al., 2023). Yeong et al. (2022) also found the significant role of price value on the behavioural intention of adopting cryptocurrency. According to Walton and Johnston (2018), the barriers to Bitcoin adoption in South Africa consist of the complex nature of Bitcoin and its high degree of volatility. In financial markets, volatility refers to a deviation in the price of an asset (Gupta & Chaudhary, 2022). Bommer et al. (2023) confirmed that the third factor, price value, suggests that the intention to use cryptocurrency is strongly determined by how the user perceives the benefit of its cost. Therefore, the results of this study suggest that users may not perceive the benefit of using Bitcoin for online payments in e-commerce relative to its cost. Bommer et al. (2023) note that, on the cost side, reducing intermediaries reduces costs. On the value side, the easier it is to purchase goods and services using cryptocurrency must enhance the perceived value or usefulness of cryptocurrency by potential users. As customers' perceptions vary, this could not affect their intentions to use Bitcoin in this context. Empirical research has proven that price value significantly and positively affects behavioural intention on mobile Internet (Nikolopoulou et al., 2021).

Other unexpected results of this study show that Social Influence (SI) did not significantly moderate the relationship between hedonic motivation (HM), habit (H) and behavioural intentions (BI) to use Bitcoin for online payments in e-commerce. Therefore, these results do not support the view that social perception is crucial to cryptocurrency development (Arias-Oliva et al., 2019). Kumari and Lodha (2021) found that SI will moderate the relationship between PU and the adoption of technology such that PU will be more strongly related to adoptions among Indian millennials with a higher level of SI in the context of e-payments. However, one study by Alazab et al. (2021) indicates that social influence has no significant impact on cryptocurrency adoption. Several scholars who applied the UTAUT2 model in other markets, such as Afifa et al. (2022) in Vietnam, Queiroz and Wamba (2019) in the USA and India, and Yeong et al. (2022) in Malaysia, report that performance expectancy, facilitating conditions, and price value had strong effects on

behavioural intention, whilst social influence had a lower impact on adopting cryptocurrency such as Bitcoin for online payments. According to the results of the visualisation of the conditional effect of SI, the higher the moderation of SI on the relationship between Hedonic Motivation, Habit, and Behavioural Intentions, the more insignificant its effect. The behavioural intention to use Bitcoin is not enhanced by social influence when considering consumers' Habitual and Hedonic motivations in adopting cryptocurrency for online payments.

In general, the findings of this study revealed how habit (H) and hedonic motivation (HM) from Venkatesh et al. (2012) extended UTAUT contextual variables creating the UTAUT2 model influence consumers' behavioural intention to use Bitcoin for online payments in e-commerce. Specifically, habit (H) and hedonic motivation (HM) will significantly and positively influence behavioural intention to use Bitcoin for online payments. Surprisingly, the results showed that price value (PV) is not a significant factor positively affecting behavioural intention to use Bitcoin for online payments. Unexpectedly, this study's results showed that Social Influence (SI) did not significantly affect the relationships between hedonic motivation (HM), habit (H) and behavioural intentions (BI) in this context.

10. Theoretical contributions

This study's approach investigated the explanatory power of the additional three contextual variables added by Venkatesh et al. (2012) to the original UTAUT, thus creating the UTAUT2 model. The valuable contributions of the paper strengthen the literature by identifying the essential role of the additional contextual variables of UTAUT2 in explaining the adoption of Bitcoin cryptocurrency for online payments. The study findings offer a unique contribution showing a significant positive effect of Habit (H) and Hedonic Motive (HM) as dimensions influencing behavioural intentions (BI) to use Bitcoin for online payments in e-commerce. This contributes to the literature on the UTAUT2 model applied to online shopping in e-commerce retailing. These results provide insights regarding the research question and objectives of this study.

The findings of this study inform practitioners how the theoretical framework can improve the UTAUT2 and how practitioners could look into this theory or area of study based on the findings showing the impact of habit (H) and hedonic motivation (HM) as contextual variables influencing behavioural intention to use Bitcoin for online payments in e-commerce. The study's findings confirmed that habit (H) and hedonic motivation (HM) significantly and positively influence consumers' behavioural intention to use Bitcoin for online payments. Unpredictably, price value (PV) did not significantly influence behavioural intention to use Bitcoin for online payments. In addition, this study's results could not confirm the significant moderating effect of social influence (SI) on the relationships between habit (H), hedonic motivation (HM), and behavioural intentions in this context.

The study has contributed to the overall understanding of the importance of habit (H) and hedonic motivation (HM) as predictor variables on behavioural intention to use Bitcoin for online payments in e-commerce. It has expanded the knowledge already developed about the UTAUT2 model by applying it to

the Bitcoin cryptocurrency market. The results suggest that practitioners can look into the contextual variables – habit (H) and hedonic motivation (HM), and immediately know which dimensions impact behavioural intention to use Bitcoin for online payments in e-commerce in South Africa.

The study's findings suggest that practitioners can look into how habit (H) and hedonic motivation (HM) could significantly improve the behavioural intention to use Bitcoin for online payments in e-commerce in South Africa. Previous studies also identified several factors impacting consumers' behavioural intention to use Bitcoin for online payments. When encountering a problem to increase the adoption of Bitcoin for online payments in e-commerce, it was found that experts can increase consumers' interest in learning more about Bitcoin online payments to enhance habitual behaviour. Habitual behaviour has been identified as the driving factor for behavioural intention amongst consumers in mobile banking (Win et al., 2021). A study by Sham et al. (2023) confirmed that consumers have adequate knowledge regarding Bitcoin as an easy online payment method that enhances productivity. In the literature, habit, directly and indirectly, affects behavioural intentions to use technology, and growing experience in usage leads to habitual technology use (Venkatesh et al., 2012). Prior research by Roos (2015) shows that habit is an essential factor contributing to behavioural intentions to use Bitcoin as a mode of payment from the perspective of Small and Medium Enterprises (SMEs). In social commerce literature, habit has been confirmed to have a considerable moderating effect on the relationship between perceived usefulness and purchase intention (Selem et al., 2023).

Practitioners in this study can also increase the degree of enjoyment consumers derive from utilising new technology (Bommer et al., 2023, p.3), which reflects hedonic motivation. Mahomed (2017) reported that hedonic motivation will influence a consumer's behavioural intention to adopt cryptocurrencies. This can be described as the level of happiness a consumer gets after experiencing online payment using Bitcoin in an online shopping environment. Venkatesh et al. (2012) insist that retailers can also indicate the hedonic benefits of using a specific technology to consumers in order to increase its adoption.

Unexpectedly, this study's findings did not describe price value (PV) as a significant variable that impacts consumers' behavioural intentions to use Bitcoin cryptocurrency for online payments in e-commerce. This result contradicts the findings in prior studies (Bakri et al., 2022; Chen et al., 2022; Joshi et al., 2023), indicating that price value significantly impacts behavioural intention to use cryptocurrency such as Bitcoin. Research confirmed that price value had strong effects on behavioural intention in other markets, such as Afifa et al. (2022) in Vietnam, Queiroz and Wamba (2019) in the USA and India, and Yeong et al. (2022) in Malaysia. Perhaps the consumers in this study do not perceive the price value of Bitcoin as a driver of their adoption intention for Bitcoin online payments in e-commerce in the South African context. Walton and Johnston (2018) explained that the barriers to Bitcoin adoption in South Africa consist of the complex nature of Bitcoin and its high degree of volatility. Gupta and Chaudhary (2022) refer to volatility as a deviation in the price of an asset in financial markets. Therefore, although the potential price value improvements offered by cryptocurrency may be substantial due to a combination of lower costs and easier transfer, Bommer et al. (2023) mentioned that transfers of funds sent by relatives to their families in

emerging markets have traditionally suffered from high costs and have been relatively difficult to initiate or receive. The more people experience these benefits, the more likely they will realise an enhanced sense of price value and continue cryptocurrency use. The probability of an individual adopting new technology is high when he or she believes the benefits outweigh the monetary costs (Yeong et al., 2022). The results by Bommer et al. (2023) suggest that price value is one of the critical factors in leveraging an individual's intention to use cryptocurrency, and it may still be highly relevant given the different environments and situations.

Further, the results also did not describe social influence (SI) as a significant moderating factor in the relationship between habit (H), hedonic motivation (HM), and behavioural intentions (BI) to use Bitcoin for online payments in e-commerce. These may be consequences for practitioners' knowledge. Similarly, a previous study by Alazab et al. (2021) found that social influence has no significant impact on cryptocurrency adoption. Several scholars reported that social influence had a lower impact on adopting cryptocurrency such as Bitcoin for online payments in other markets, such as Afifa et al. (2022) in Vietnam, Queiroz and Wamba (2019) in the USA and India, and Yeong et al. (2022) in Malaysia.

In their regular practice, practitioners in this study can look at habit (H) and hedonic motivation (HM) as significant variables that lead to the improved behavioural intention of consumers to use Bitcoin for online payments in e-commerce in South Africa. This study provides knowledge on the appropriate strategic management to stimulate consumers' intentions to make online payments through Bitcoins in e-retailing. However, as a result of the insignificant moderating effect of Social Influence (SI) on the relationship between hedonic motivation (HM), habit (H) and behavioural intentions (BI), consumers appeared to be not reliant on social influence as a critical dimension influencing them to use Bitcoin for online payments in e-commerce. They could only consider habit (H) and hedonic motivation (HM) factors affecting their behavioural intentions to adopt Bitcoin for online retail payments.

11. Practical implications

While earlier research by Walton and Johnston (2018) focused on what factors influence Bitcoin adoption by South African virtual communities and virtual investment communities' members, their paper was based on a study by Lee (2009) which looks at factors influencing the adoption of Internet banking. The current study differs from these in that it focuses on the e-commerce context in South Africa. It has also measured the additional three variables into the UTAUT2. Unlike the previous study, the current study's findings inform practitioners how habit (H) and hedonic motivation (HM) can positively influence behavioural intention to use Bitcoin for online payments. Unpredictably, price value (PV) was not a significant factor that can positively affect behavioural intention to use Bitcoin for online payments in e-commerce in South Africa. Unexpectedly, social influence in using Bitcoin for online payments in e-commerce did not significantly moderate the relationships between hedonic motivation (HM), habit (H) and behavioural intentions in this context.

Nonetheless, the findings inform practitioners on how to improve their practice if they need to change consumers' behavioural intention to use Bitcoin for online payments in e-commerce. Both habit (H) and hedonic motivation (HM) become critical dimensions that could influence behavioural intention to use Bitcoin for online payments in e-commerce in South Africa. It is possible that consumers' interest in learning enough about Bitcoin online payments can lead to habitual behaviour. This requires practitioners to develop teaching and learning sessions through websites regarding the use of cryptocurrency, especially how to use Bitcoin online payments in e-commerce using the video's themes and challenge customers to embrace their desires. Using social media tools to introduce several 20-second short stories showing moments where consumers purchase through Bitcoin could help consumers learn how to conduct such transactions. This might be able to build behavioural intention to use Bitcoin for online payments in e-commerce since growing experience in usage leads to habitual technology use (Venkatesh et al., 2012).

Secondly, practitioners can also make it attractive for consumers to enjoy utilising this new technological cryptocurrency. The level of happiness from the experience of online payments in an online shopping environment is an important aspect that could lead to behavioural intention to use Bitcoin for online payments. Such hedonic motivation can increase the online transactions of Bitcoin in the South African e-retailing industry. Consistent with this argument is that Bitcoin will become more efficient as more investors analyse and trade Bitcoin (Urquhart, 2016). If a crypto asset were granted official currency or legal tender status, creditors would be required to accept it to pay monetary obligations, including taxes, similar to notes and coins (currency) issued by the central bank (International Monetary Fund, 2023). Furthermore, companies can obtain information regarding the purchase intentions of the buyer through a system that can track product history from the sales point to the final consumer (Yoo and Won, 2018).

The key is that practitioners must plan to include factors such as habit (H) and hedonic motivation (HM) within their regular practice when aiming to increase the consumers' adoption of Bitcoin cryptocurrency in an online shopping environment. They can stimulate positive consumer intentions by learning and enjoying Bitcoin transactions in online shopping. Because factors such as habit (H) and hedonic motivation (HM) are important, online payments in e-commerce practice should include these aspects. For example, South African consumers can be encouraged to shift their shopping habits from in-person grocery store visits to online transactions using Bitcoin. In contrast, hedonic motivation can stimulate consumers' shopping experience of Bitcoin cryptocurrency, thus making it fun, entertaining and enjoyable. This could help to increase consumers' behavioural intention to use Bitcoin for online payments in e-commerce in South Africa. Making these factors part of strategic management could help remove consumers' fear and insecurities about using Bitcoin in an online shopping environment. Retailers incorporating these tactics into everyday activities could help foster customer centricity, build a strong digital presence, and speed the shift of offline shoppers to online shopping within the next few years, thus growing e-commerce sales in South Africa. In addition, this could also match the market trend driving the future growth of Bitcoin online shopping transactions, as more consumers in South Africa would have learned how to use Bitcoin when buying online and thus acquire experiences of fun, entertainment and enjoyment. Together, these could help make it possible to increase behavioural intention to use Bitcoin for online payments in e-commerce

in South Africa. Distributors' scalability will expand as in a shared ledger; all their customers (wholesalers, retailers) can be effortlessly accessed (no need for different supply chains for different customers) (Litke, Anagnostopoulos & Varvarigou, 2019). Consumers can leave reviews and enumerate accumulated retailers' reputation scores by making different types of transactions to the ledger (Liu et al., 2019).

12. Conclusion

In the literature, Venkatesh et al. (2012) extended UTAUT by measuring the additional three contextual variables – hedonic motivation (HM), price value (PV) and habit (H), thus creating the UTAUT2 model. When applying this model to the context of Bitcoin for online payments in e-commerce, the results of the current study suggest that the theoretical framework can improve the UTAUT2 and help practitioners to better understand this theory or area of study, based on the findings showing the impact of habit (H) and hedonic motivation (HM) on consumers' intention to use Bitcoin for online payments. However, the price value (PV) may not be a significant factor that can positively influence the behavioural intention to use Bitcoin for online payments. The study also points out that social influence, referring to the extent an individual believes that the use of new technology will be of importance to others, such as family or friends (Venkatesh et al., 2012), may not significantly moderate the relationships between habit (H), and hedonic motivation (HM), and behavioural intentions in this context.

13. Limitations and future research directions

It must be borne in mind that this study was only conducted in South Africa on a small sample of consumers currently performing online transactions in e-retailing. Although age, gender, voluntariness of use, and experience are incorporated as moderating factors in UTAUT2, these were not tested in this study. The price value showed an unexpected finding and should be investigated further in the Bitcoin shopping transactions in the South African setting. Future studies can expand this by including a large sample size not only in South Africa but across the African continent as part of developing a conducive environment where consumers would be eager to learn more about Bitcoin shopping transactions and acquire an experience of fun, entertainment, and enjoyment before generalisation can be made about the factors influencing consumers' behavioural intentions to use Bitcoin for online transactions in e-commerce in South Africa. For retailers, a lack of trust and certification of the products' path are current limitations that future research can evaluate. More theoretical dimensions, such as the TAM, the entire UTAUT2, the D&M IS success model, etc., can be used to determine such behavioural intentions and the likelihood of continuing to use Bitcoin cryptocurrency for online payments in e-commerce from the international business perspective. According to Bouri et al. (2019), Bitcoin dominated the cryptocurrency market between 2010 and 2015, surpassing 85%. However, it is gradually fading due to the potential of other leading cryptocurrencies that currently account for over 50% of the overall market value of cryptocurrencies. Future research should evaluate the continuance intention to use Bitcoin to sustain its lifespan.

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