
Crypto-curious or crypto-cautious? Behavioural insights from India's retail equity investors

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Abstract: In India's rapidly evolving capital market, cryptocurrencies have sparked significant interest among retail equity investors, particularly younger males under 35 years of age. This study makes a novel theoretical contribution by extending the technology acceptance model (TAM)–theory of planned behaviour (TPB) through the integration of three constructs namely, usability confidence, utilitarian value and perceived risk, which capture behavioural and market characteristics unique to emerging economies such as India. Using SPSS 25 and partial least squares structural equation modelling (PLS-SEM) on a sample of 278 crypto-aware but non-investing investors, the findings show utilitarian value as the most influential driver of adoption, while perceived risk functions both as a deterrent and as a behavioural filter reflecting cautious curiosity. By integrating these factors specifically for India, the study expands the applicability of TAM–TPB to emerging markets, advances understanding of the psychology of retail investors and offers insights for regulators, financial institutions, and policymakers to promote secure and informed cryptocurrency participation in India.

Keywords: cryptocurrency adoption; retail equity investors; attitude; TAM; technology acceptance model; TPB; theory of planned behaviour; risk perception; utilitarian value; India.

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1 Introduction

Over the past two decades, advancements in technology have profoundly transformed the financial sector (Bland et al., 2024), spurring the development of digital banking, online payments, e-commerce, and peer-to-peer lending (Changchit et al., 2024). These innovations have created a more dynamic and accessible investment landscape, broadening the range of available asset classes for investors. Alternative investments such as commodities, private equity, digital assets and hedge funds have gained prominence alongside traditional assets such as equities, bonds, and real estate, offering diversification and risk-management opportunities (Bodie et al., 2014). Bitcoin, created by Nakamoto and Bitcoin (2008), is considered one of the most disruptive and innovative additions to this investment spectrum. It has been argued that cryptocurrencies can serve as a hedge against inflation as their price fluctuations often precede shifts in expected inflation (Blau et al., 2021; Choi and Shin, 2022; Matkovskyy and Jalan, 2021). Since its inception, the cryptocurrency market has become a global financial force, challenging traditional financial systems and reshaping investor behaviour (Almajali et al., 2022; Kunjadić, 2018; Wątopek et al., 2023).

Cryptocurrencies, as an innovative form of digital currency, are decentralised and lack backing from sovereign guarantees, making them different from conventional currencies (Lee et al., 2018). The absence of institutional acceptance, lack of intrinsic value and relatively opaque structure make them vulnerable to market volatility, fraud, and systemic risks (Natarajan et al., 2017; Das, 2024). In India, regulators, particularly the Reserve Bank of India (RBI), have repeatedly expressed concerns about the speculative nature of cryptocurrencies and the potential threats they pose to financial stability, legal compliance, and consumer protection (RBI, 2021). RBI Governor Shaktikanta Das has cautioned the public that unchecked growth of private cryptocurrencies could undermine the effectiveness of monetary policy and threaten broader economic stability, stressing the need for a coordinated global regulatory framework (Times of India, 2024). Similarly, the Securities and Exchange Board of India has also urged the public to transact only with registered intermediaries to reduce financial risks (SEBI, 2024).

Despite these ongoing regulatory uncertainties and associated financial risks, cryptocurrency adoption in India has surged and secured the first position in the Global Crypto Adoption Index in 2024 (Chainalysis, 2024). This growth reflects the increasing interest and participation in digital assets in different social segments. The Indian cryptocurrency market was valued at approximately USD 2.6 billion in 2024 and is projected to reach USD 13.9 billion by 2033, supported by a compound annual growth rate (CAGR) of 18.48% (IMARC, 2024). However, most existing studies have focused on global cryptocurrency trends, Bitcoin volatility and cross-country comparisons (AlQudah and Bariviera, 2025; Bhuvana and Aithal, 2022). Global behavioural studies have examined factors such as trust, social influence (Gupta et al., 2021), technical aspects of cryptocurrencies (Fionalia and Heykal, 2024), regulatory uncertainty, financial risks (Ratnoo, 2024; Kumar and Rani, 2024; Cumming et al., 2019) and behavioural biases such as overconfidence and herding in digital currency adoption (Sharma et al., 2024; Gautam and Kumar, 2023). However, limited scholarly studies have explored the perspectives of Indian retail equity investors (Panigrahi, 2023).

To address this gap, the present study applies the technology acceptance model (TAM) and the theory of planned behaviour (TPB), integrating three context-specific variables, such as risk perception, utilitarian value, and usability confidence. By understanding how these factors interact with investors' attitudes, this research offers valuable insight into shaping cryptocurrency investment decision behaviour. These insights aim to leverage financial institutions, policymakers, and market participants to better engage with this emerging investor segment. Furthermore, the study explores how investor attitudes shape their intention to invest in cryptocurrencies, providing a deeper insight into the drivers that influence adoption.

The current research paper is structured into multiple sections. Firstly, it presents the introductory part, followed by a comprehensive review of literature that highlights the distinctions from previous research in the field. The next section outlines the methodology and data analysis techniques. The final section offers a synthesis of key findings along with recommendations for further research and policy implications regarding cryptocurrency adoption and investment behaviours in India.

2 Literature review, conceptual framework and research hypothesis

Cryptocurrencies, especially Bitcoin, have attracted considerable attention in recent years, largely due to their decentralised nature and their potential to disrupt traditional financial systems (Wątorrek et al., 2023). Historically, retail equity investors have concentrated their investment efforts on conventional financial instruments such as stocks, mutual funds, and bonds. However, there has been a noticeable shift in investor behaviour with an increasing number of retail equity investors considering cryptocurrencies as an alternative and viable asset class (Catalini and Gans, 2020). This shift in perspective reflects a broader change in investor behaviour toward embracing digital assets. As a result, more individual investors now allocate a portion of their portfolios to cryptocurrencies alongside traditional equity holdings despite their associated risks and regulatory uncertainties (Sharma et al., 2024). The objective of this chapter is to evaluate and synthesise the existing literature on the various factors that shape the adoption of cryptocurrency.

2.1 Cryptocurrency and previous related studies

Cryptocurrencies are digital assets that utilise cryptographic principles for secure and decentralised transactions, bypassing conventional financial intermediaries (Ayodeji et al., 2023). Investors initially viewed cryptocurrencies as highly volatile and speculative assets. Later, they considered these digital currencies as alternative investments (Kubát, 2015; Van Alstyne, 2014; Kelleher, 2021). By 2024, the global market capitalisation of cryptocurrencies had increased to approximately USD 2.42 trillion (IMARC, 2024), marking a significant milestone in the increasing adoption and recognition of these digital assets (Yermack, 2024).

The growing popularity of cryptocurrencies has sparked significant public interest, as evidenced by the surge in the number of personal accounts on cryptocurrency exchanges (Saiedi et al., 2021; Sharma et al., 2024; Murugappan et al., 2023). Cryptocurrency investment accounts more than doubled from 203 million in 2021 to 402 million in 2023 (Tapscott and Tapscott, 2016). Despite this rapid growth, the market remains highly volatile, influenced by factors such as demand-supply dynamics, investor sentiment, and regulatory developments (Anamika et al., 2023; Fang et al., 2020; Dimpfl and Elshiaty, 2021; Liu and Serletis, 2019). This volatility offers both risks and opportunities for retail investors, especially in India, where investment behaviour is shaped by distinct economic and socio-cultural factors (Hidegföldi et al., 2025). In India, cryptocurrencies are often viewed as speculative and diversification tools (Jana et al., 2024).

Generally, traditional investment decisions are typically influenced by factors such as financial returns, company performance, market stability, and perceptions of management or brand. However, these factors are less applicable to cryptocurrencies (Mukhtarov, 2023), whose values are primarily driven by market dynamics, technological developments, and network effects (Ram, 2019; Shilov and Zubarev, 2021). This shift in value determinants highlights the need to reframe investor decision models to accommodate cryptocurrency-specific drivers.

However, previous research indicated that cryptocurrency adoption is influenced by various factors that vary across different regions. In Nigeria, adoption is influenced by government scrutiny and distrust of traditional banking systems (Ayadi et al., 2024), whereas risk perceptions and religious considerations significantly influence investor behaviour in Islamic markets (Veerasingam and Teoh, 2023). Furthermore, compatibility, trialability, perceived usefulness, observability, and perceived value were found to be driving factors of cryptocurrency investment in Malaysia (Wong et al., 2022). Similarly, in Jordan, subjective norms, perceived usefulness, trust and perceived enjoyment drive Bitcoin adoption (Almajali et al., 2022).

In India, several factors significantly influence cryptocurrency investment decisions, including education, occupation, product pricing, social media influence, brand endorsements, social status, workplace interactions and app usage (Chary et al., 2022). Also, trust, perceived risk, self-efficacy, pessimism and social norms play pivotal roles in shaping investor behaviour toward cryptocurrencies (Kala and Chaubey, 2023). The decentralised nature of cryptocurrencies enhances privacy and security, which further attracts investors (Herskind et al., 2020). However, the anonymity inherent in cryptocurrency transactions raises concerns about their potential misuse for illegal activities, including money laundering (Madadi and Ghomashi, 2022).

However, most existing studies fail to integrate the TAM and TPB frameworks in a comprehensive model to explain cryptocurrency adoption, particularly in the Indian

context. Furthermore, while previous research in India has focused on factors such as technological awareness, financial literacy and perceived risk (Kala and Chaubey, 2023), constructs such as usability confidence (users' belief in their ability to use crypto platforms) and utilitarian value (perceived functional benefits) remain largely underexplored. In addition, there is a lack of studies that specifically focus on Indian retail equity investors, who may have different risk tolerances, investment experiences, and behavioural intentions compared to the general population. This leaves a gap in understanding the decision-making of traditional retail equity investors in India. Different regions emphasise different adoption drivers, such as trialability in Malaysia (Wong et al., 2022), subjective norms in Jordan (Almajali et al., 2022) and trust in Islamic markets (Veerasingam and Teoh, 2023), but India-specific studies show mixed results about which factors are most important. These contradictions show the importance of localised empirical validation within integrated theoretical frameworks (e.g., TAM–TPB) to ensure model relevance in India. Consequently, these observed gaps and contradictions form the basis for the present study, which develops an integrated TAM–TPB model that incorporates risk perception, usability confidence, and utilitarian value to understand the adoption behaviour of cryptocurrency among Indian retail equity investors.

2.2 Theoretical background and research models

The adoption of cryptocurrencies among retail equity investors is a complex phenomenon that can be effectively understood through two foundational theories of technology acceptance and behavioural intention, i.e., the TAM (Davis, 1989) and the TPB (Ajzen, 1991). These theories have been widely used in the literature to study technology adoption across various sectors, including finance (Venkatesh et al., 2003; Ratnoo, 2024).

Previous research has often applied the TAM and TPB as independent frameworks to explain technology adoption; however, this limits their ability to capture the multidimensional nature of adoption behaviour when used independently (Chen et al., 2007). TAM focuses primarily on perceived usefulness and ease of use as determinants of behaviour intention (Venkatesh et al., 2003), while TPB explains intention and behaviour through attitudinal, normative, and control-related factors. As these theories differ in scope, their combined use allows for a more holistic understanding of user behaviour. Consequently, an increasing number of studies have examined the integration of TAM and TPB, particularly in IT adoption and e-service adoption. The findings suggest that the combined model offers superior explanatory power compared to using either model alone (Bosnjak et al., 2006; Chen et al., 2007; Wu and Chen, 2005). Similarly, in the context of mobile banking, the integration of TAM and TPB with additional constructs such as trust and perceived risk has further enhanced the understanding of user intentions and behaviour (Aldammagh et al., 2021). Following this tradition, integrated models have also been proposed for financial applications like online stock trading (Raut and Kumar, 2024). However, such integrative approaches remain scarce in the context of cryptocurrency adoption, particularly in emerging economies such as India. To address this gap and examine the determinants of cryptocurrency adoption among retail equity investors in India, the present study investigates risk perception, usability confidence, and utilitarian value, which resonate with both TAM (usefulness, ease of use) and TPB (attitude, behavioural intention) (Ramírez-Correa et al., 2019).

TAM posits that an individual's intention to use technology is primarily determined by two factors: perceived ease of use (PEOU) and perceived usefulness (Davis, 1989). In TAM, utilitarian value (UV), conceptually linked to perceived usefulness (PU), plays a pivotal role in shaping an investor's attitude. A growing body of research suggests that when investors perceive cryptocurrency offering functional benefits such as diversification, inflation hedging, or enhanced returns, they develop a favourable attitude toward it (Haque et al., 2022). It is important to determine an individual's attitude towards the adoption of cryptocurrency. Numerous studies have shown that the more useful technology is perceived, the more likely it is to be adopted by users (Davis, 1989; Bhuvana and Aithal, 2022) to improve their outcomes through technology (Gupta et al., 2021). In contrast, TPB holds that attitude is shaped by both cognitive evaluations (e.g., perceived benefits) and emotional responses to behaviour (Ajzen, 1991; Kim et al., 2009; Retailing, 2000). Studies confirm that a positive attitude significantly predicts intention to adopt cryptocurrencies (Gupta et al., 2021; Venkatesh et al., 2003).

However, while many studies emphasise attitude and perceived usefulness, fewer explore the concept of utilitarian value as an independent construct, especially in the Indian retail investment context. This distinction is essential in India, where retail investors often balance speculative interest with pragmatic financial expectations. Thus, examining UV separately may offer a more accurate predictor of behaviour in contexts where financial returns are uncertain and emotionally charged.

Usability confidence (UC), aligned with TAM's PEOU, reflects the confidence of an investor to use the cryptocurrency technologies, such as trading platforms and wallets. Several studies have confirmed that usability confidence plays a vital role in determining technology adoption, as people are more likely to use technologies if they are easy to use and accessible (Fionalia and Heykal, 2024; Almajali et al., 2022; Davis, 1989). Ease of use improves user engagement and influences behavioural intention in crypto markets (Sharma et al., 2021). Nevertheless, research also shows that ease of use alone may not ensure adoption, especially if investors lack trust or face regulatory ambiguity, indicating the need to understand how usability interacts with external risk factors.

In addition, risk perception influences consumer behaviour in investments by shaping how individuals assess the dangers associated with a given activity, especially with cryptocurrency. It is influenced by factors such as market volatility, fraud, regulatory uncertainty and technological or financial risks (Gerber et al., 2014; Kapse et al., 2024; Gasser et al., 2015). Specifically, risks such as high volatility, legal uncertainties, irreversible transactions and price fluctuations (Ratnoo, 2024; Cumming et al., 2019; Harrast et al., 2022; Almeida and Gonçalves, 2022), along with concerns about account hacking, online transactions issues and merchant acceptance (Becker et al., 2013), significantly influence investors' decisions to engage with cryptocurrencies. Previous studies have indicated that uncertainty and risk are naturally related to innovation, and higher risk perception often negatively affects the intention to adopt new technologies, including cryptocurrencies (Sharma et al., 2021; Kumar and Rani, 2024; Cumming et al., 2019). However, conflicting evidence suggests that younger, tech-savvy investors may tolerate or even embrace high risk, revealing demographic and psychological moderators that require further exploration.

In the context of cryptocurrency investment, behavioural intention is defined as an individual's likelihood to invest based on attitude, perceived risk and confidence in usability (Ajzen, 1991; Davis, 1989). This intention strongly predicts the actual behaviour of cryptocurrency investment (Venkatesh et al., 2003). TAM explains that behavioural

intention is influenced by PU and ease of use (EOU), whereas TPB incorporates internal factors (attitudes, motives, preferences, perceptual processes) and external factors (social, economic, cultural) to shape behaviour. Consequently, attitude emerges as a critical determinant of cryptocurrency investment behaviour. Several studies have shown that a favourable attitude is the strongest predictor of intention to invest in crypto assets (Pilatin and Dilek, 2024). Yet, this relationship may weaken for less experienced investors or those more sensitive to risk, emphasising the need to understand contextual boundaries of the attitude–behaviour link.

Furthermore, the literature emphasised that factors such as comfort, convenience, payment methods, product choice and product information play a significant role in shaping individuals' perception of benefits, which in turn influence their attitude toward cryptocurrencies (Guych et al., 2018; Alqaryouti et al., 2019). Consumer decision-making is influenced by perceptions shaped by personal preferences, cultural contexts, beliefs and expectations (Weber and Hsee, 2000). Perceived benefits such as decentralisation, enhanced privacy, lower transaction fees, financial security, anonymity and greater control over finances drive investor interest (Smutny et al., 2021; Alamsyah et al., 2024). They enable peer-to-peer transactions, reduce reliance on traditional financial institutions (Chung et al., 2023), lower transaction fees (Kaminskyi et al., 2019; Makarov and Schoar, 2022) and promote financial inclusion, especially for underbanked populations (El Hajj and Farran, 2024; Alqaryouti et al., 2019; Pantin, 2023; Adelaja et al., 2024). However, a recurring contradiction in the literature is whether novice investors fully perceive and value these benefits, suggesting that investor education, platform design, and usability support may significantly enhance perceived value and reduce adoption hesitancy.

In summary, this literature review demonstrates that while existing TAM–TPB-based studies provide valuable insights, they often ignore cryptocurrency-specific challenges such as volatility, trust, and demographic variability. By integrating utilitarian value, usability confidence, and risk perception (Figure 1) into an extended TAM–TPB framework, this study addresses theoretical and empirical gaps, contributing a comprehensive and context-sensitive understanding of cryptocurrency adoption behaviour in India.

2.3 Research hypotheses

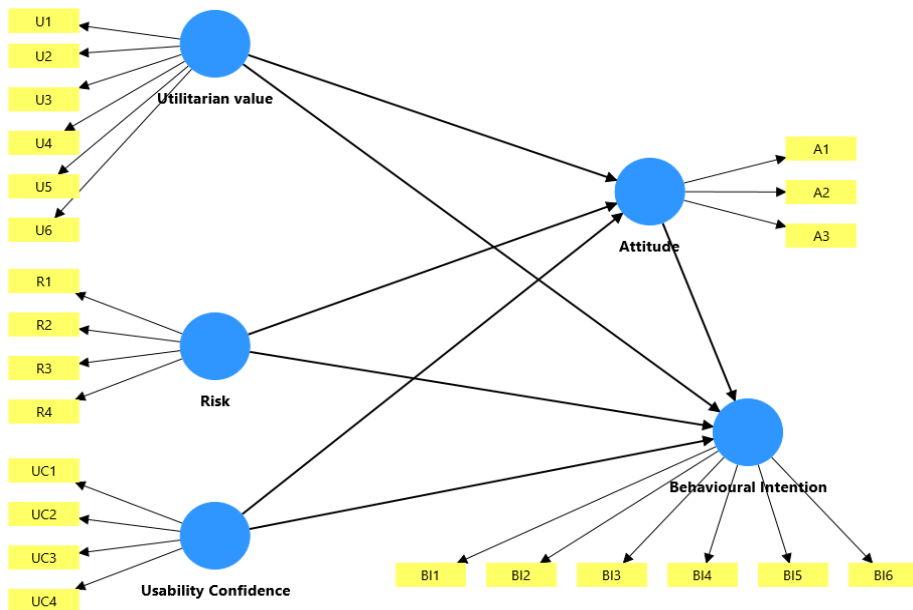
Based on the extended TAM-TPB theoretical framework described above, this study proposes that utilitarian value (UV), usability confidence (UC), and risk perception (RP) influence both attitude toward cryptocurrency investment and the behavioural intention to invest. TAM suggests that higher perceived usefulness (captured here through UV) and greater ease of use (reflected in UC) enhance positive attitudes and increase adoption likelihood (Davis, 1989; Venkatesh et al., 2003). TPB further posits that attitudes, shaped by perceived benefits and risks, are strong predictors of intention (Ajzen, 1991). In this study, RP is positioned as a critical factor that can either deter or, in certain investor segments, motivate adoption. Accordingly, the following hypotheses are proposed:

- *H1: Utilitarian value (UV) significantly influences the attitude toward cryptocurrency investment.*
- *H2: Utilitarian Value (UV) significantly influences the behavioural intention to invest in cryptocurrencies.*

- *H3*: Risk Perception (PR) significantly influences the behavioural intention to invest in cryptocurrencies.
- *H4*: Risk Perception (PR) significantly influences the attitude toward cryptocurrency investment.
- *H5*: Usability Confidence (UC) significantly influences the behavioural intention to invest in cryptocurrencies.
- *H6*: Usability Confidence (UC) significantly influences the attitude toward cryptocurrency investment.
- *H7*: Attitude (A) has a significant influence on the behavioural intention to invest in cryptocurrencies.

These hypotheses are designed to test the factors that influence the attitudes and intentions of retail investors to adopt cryptocurrencies in India. Each hypothesis is grounded in previous literature that links perceived usefulness, risk perception and usability confidence with investment behaviour in digital assets (Venkatesh et al., 2003; Davis, 1989), while addressing the India-specific gaps identified in the literature review.

Figure 1 Theoretical framework (see online version for colours)



3 Methodology

The research strategy refers to the planned, structured and systematic approach undertaken to address research questions by collecting and analysing data methodically (Creswell and Creswell, 2017). This study adopts a descriptive-exploratory research design, integrating both qualitative and quantitative methods to gain a comprehensive understanding of investor attitudes and perceptions towards cryptocurrency.

3.1 Respondents and procedure

A cross-sectional approach was adopted, drawing on both primary and secondary data sources. The study sample consisted of retail equity investors from urban and semi-urban regions of India who possessed prior knowledge of cryptocurrency. Data were collected using self-administered questionnaires, applying a blended approach of in-person and web-based surveys. This methodology is consistent with previous studies, which have reported no significant differences in results between these two data collection methods (Fuqua et al., 1982; Sarkies et al., 2015; Tang and Lin, 2016).

Due to the absence of a centralised database of cryptocurrency investors, non-probability sampling was employed, specifically purposive and snowball techniques. A total of 346 responses were received, of which 282 valid questionnaires were retained after data screening. This final sample size met the recommended thresholds for structural equation modelling (SEM), with 23 parameters and satisfied the minimum requirement of 230 cases suggested by Kline (2023), Jackson (2003) and Hair (2010).

The comprehensive overview of the profiles of respondents is represented in Table 1, exhibiting a male-dominated sample with 62.4% participation. Notably, 80% of the respondents represent the age group of 15 to 35 years old. This demographic indicates a strong interest in cryptocurrency among Millennials and Gen Z, positioning them as potential key drivers of adoption in India. Additionally, 79% of participants held graduate or postgraduate degrees, indicating a relatively high level of education and awareness regarding cryptocurrency risks and benefits. The income data reveal that 61.4% earned below ₹3 lakhs per month, while approximately 20% earned between ₹3 lakhs and ₹6 lakhs. Additionally, 74.9% of respondents had less than four years of investment experience, suggesting the sample largely consisted of young, mid-income investors who are still in the early stages of their engagement with the financial market.

Table 1 The demographic profile of the participants

<i>Components</i>	<i>Frequency (f)</i>	<i>Percentage (%)</i>
<i>Gender</i>		
Male	176	62.4
Female	106	37.6
<i>Age (Years)</i>		
15–25	124	44.0
26–35	103	36.5
36–45	38	13.5
Above 45	17	6.0
<i>Qualification</i>		
Master graduate	62	22.0
Graduate	161	57.1
MPhil/PhD	15	5.3
Others	44	15.6

Table 1 The demographic profile of the participants (continued)

<i>Components</i>	<i>Frequency (f)</i>	<i>Percentage (%)</i>
<i>Occupation</i>		
Self-employed	82	29.1
Salaried	134	47.5
Housewife	29	10.3
Retired	3	1.1
Others	34	12.1
<i>Income (Monthly)</i>		
Below 1 lac	104	36.9
1lakh–3 lakhs	69	24.5
3 lakhs–6 lakhs	58	20.6
More than 6 lakhs	51	18.1
<i>Investment experience</i>		
Less than 2 years	98	34.8
2–4 years	113	40.1
4–8 years	37	13.1
More than 8 years	34	12.1
<i>Cryptocurrency awareness</i>		
Yes	282	100.0
Total	282	100

Source: Authors' creation

3.2 Questionnaire development and instruments

The self-structured questionnaire, developed in English, was organised into two sections to facilitate comprehensive data collection. Section A collected the demographic and background information of respondents, such as gender, age, educational qualifications, monthly income, investment experience and cryptocurrency awareness. This enabled respondent profiling and provided contextual understanding of their investment behaviour. Section B contained 27 questions designed to measure the core constructs of the study, including independent variables such as risk perception, utilitarian value, usability convenience and attitude and the dependent variable, behavioural intention. These elements were derived from an extensive review of literature.

A pilot involving 50 respondents was conducted to ensure the clarity, relevance and internal consistency of the questionnaire, resulting in some modifications. Following reliability and validity testing, four items with external loadings below 0.70 were removed, leaving 23 items for the final analysis. All constructs were measured using a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), while cryptocurrency awareness was coded as a binary variable (no = 0 and yes = 1).

4 Result and discussion

Several statistical tests were performed on the data using partial least squares structural equation modelling (PLS-SEM) and IBM SPSS version 25. This section discusses the statistical techniques applied to the dataset and reports the results in detail.

4.1 Statistical technique

Following data collection, preliminary statistical procedures including exploratory factor analysis (EFA), reliability assessments and descriptive evaluations were conducted using IBM SPSS Version 25 to examine the data's fundamental structure and to reveal essential dimensions influencing relationships among latent variables.

Subsequently, confirmatory factor analysis (CFA) and SEM were performed using SmartPLS Version 4. PLS-SEM was selected because it is well-suited for smaller sample sizes and non-normal data. This technique is particularly effective for hypothesis testing, measurement model assessment (Hair et al., 2017, p.641; Leguina, 2015), and structural path analysis in complex research frameworks involving multiple constructs (Hair, 2010; Sarstedt et al., 2021; Chin, 1998; Reinartz et al., 2009).

4.2 Measurement model

Table 2 shows the measurement model where the reliability and validity of each construct were evaluated using Cronbach's Alpha, composite reliability (CR), Convergent validity and discriminant validity. All constructs exhibited Cronbach's Alpha and CR values above the 0.70 threshold values (Cronbach, 1951; Leguina, 2015), confirming internal consistency. Convergent validity was established through factor loadings > 0.70, CR values above 0.70, and average variance extracted (AVE) above 0.50, indicating that the items strongly represented their latent constructs (Leguina, 2015).

Discriminant validity was established using the Fornell–Larcker criterion, where the square root of each construct's AVE exceeded its inter-construct correlations and the Heterotrait–Monotrait (HTMT) ratio remained below 0.85 (or below 0.90 under more lenient criteria) (Sarsted et al., 2021; Fornell and Larcker, 1981).

Table 2 Measurement model (reliability, validity, loadings, VIF analysis)

Items	Construct	Factor Loading	VIF	AVE	Cronbach's Alpha	Composite reliability (rho_c)
A1:	Attitude	0.906	2.229	0.815	0.888	0.929
A2:		0.891	2.736			
A3:		0.911	3.147			
BI1:	Behavioural intention	0.860	3.145	0.697	0.913	0.932
BI2:		0.836	2.884			
BI3:		0.879	3.484			
BI4:		0.817	2.352			
BI5:		0.850	2.643			
BI6:		0.762	1.998			

Table 2 Measurement model (reliability, validity, loadings, VIF analysis) (continued)

<i>Items</i>	<i>Construct</i>	<i>Factor Loading</i>	<i>VIF</i>	<i>AVE</i>	<i>Cronbach's Alpha</i>	<i>Composite reliability (rho_c)</i>
R1:	Risk perception	0.821	1.786	0.678	0.842	0.894
R2:		0.835	1.935			
R3:		0.823	2.045			
R4:		0.815	1.934			
U1:	Utilitarian value	0.896	3.495	0.810	0.922	0.945
U2:		0.813	2.204			
U3:		0.841	2.405			
U4:		0.898	3.618			
U5:		0.858	2.750			
U6:		0.713	1.673			
UC1:	Usability convenience	0.930	3.762	0.703	0.914	0.934
UC2:		0.924	3.898			
UC3:		0.926	3.844			
UC4:		0.817	2.153			

Source: Authors' creation

Table 3 demonstrates the discriminant validity, as each diagonal value (square roots of AVE) exceeds the corresponding off-diagonal correlations among the constructs. For instance, the square root of AVE for Attitude (0.903) exceeded its correlation with other constructs like Utilitarian Value (0.565) and Behavioural Intention (0.487), demonstrating strong discriminant validity. Additionally, the variance inflation factor (VIF) for all constructs varied between 1.400 (Risk Perception) to 1.649 (Utilitarian Value), which are significantly below the recommended value of 5, signifying no multicollinearity concerns (Leguina, 2015). These findings jointly confirm the overall reliability and validity of the measurement model.

Table 3 Discriminant validity (Heterotrait-Monotrait ratio (HTMT) – matrix)

<i>Variables</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>VIF</i>
1. Attitude	0.903					1.526
2. Behavioural Intention	0.487	0.835				–
3. Risk Perception	0.220	0.568	0.823			1.400
4. Usability Confidence	0.294	0.437	0.309	0.900		1.165
5. Utilitarian value	0.565	0.691	0.505	0.314	0.839	1.649

Source: Authors' creation

4.3 Structural model

The PLS-SEM structural model was employed to test the proposed hypotheses and predictive power of the research model by investigating the impact of three exogenous constructs: Utilitarian Value, Risk Perception and Usability Confidence on two

endogenous constructs: Attitude and Behavioural Intention towards using cryptocurrency among equity investors in India.

The model's predictive capacity was measured using the coefficient of determination (R^2). As shown in Table 4 and Figure 2, the R^2 for Attitude was 0.345 and for Behavioural Intention was 0.589. According to Baumgartner and Homburg (1996), R^2 exceeding 0.20 is substantial in consumer behaviour studies, validating the model's explanatory adequacy. This means that 58.9% of the variance in Behavioural Intention was explained by the combined effects of Attitude, Risk Perception, Usability Confidence and Utilitarian Value, reflecting the robust model fit and strong predictive capability.

Table 4 Results of the structural model and R^2

<i>Hypothesis Path</i>	<i>M</i>	<i>STDEV</i>	<i>T-value O/STDEV</i>	<i>P-values</i>	<i>Result</i>
H1: Attitude → Behavioural Intention	0.134	0.059	2.316	0.021	Supported
H2: Risk Perception → Attitude	-0.118	0.059	1.997	0.046	Supported
H3: Risk Perception → Behavioural Intention	0.256	0.054	4.990	0.000	Supported
H4: Usability Confidence → Attitude	0.150	0.059	2.533	0.011	Supported
H5: Usability Confidence → Behavioural Intention	0.201	0.049	3.729	0.000	Supported
H6: Utilitarian value → Attitude	0.580	0.056	10.306	0.000	Supported
H7: Utilitarian value → Behavioural Intention	0.499	0.062	6.784	0.000	Supported
<i>Endogenous construct</i>	<i>Coefficient of determinants (R^2)</i>		<i>Adjusted R</i>		
Attitude	0.345		0.338		
Behavioural Intention	0.589		0.583		

Significance level at $p < 0.05$ (t-value 1.960).

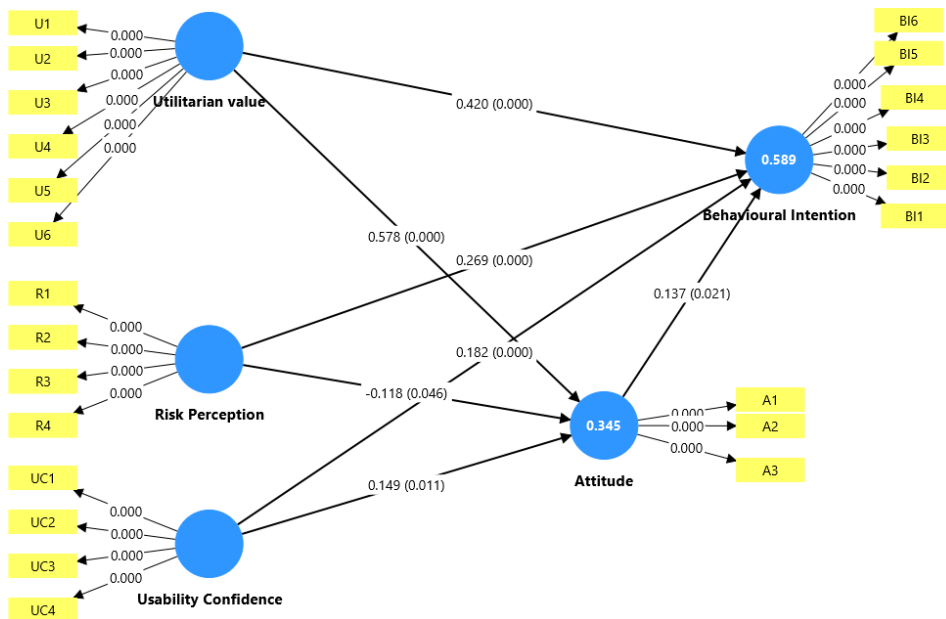
Source: Authors' creation

Moreover, the bootstrapping with 500 sub-samples was applied to check the significance of the path coefficients. All t-values exceeded 1.96 at the 5% significance level (Leguina, 2015), confirming the model's robustness. Model fit indices (Table 5) such as SRMR = 0.071 (below the 0.08 threshold, Henseler et al., 2016), d_ULS, d_G and NFI = 0.843, suggested an acceptable fit. Although values above 0.90 are ideal for stronger validation, the obtained results still meet the acceptable range, validating the hypothesised model.

Table 5 Fitness of model

	<i>Saturated model</i>	<i>Estimated model</i>	<i>Interpretation</i>
SRMR (Standardised Root Mean Square Residual)	0.071	0.071	Acceptable fit (should be <0.08)
d_ULS (Unweighted Least Squares Discrepancy)	1.389	1.389	No benchmark, used for comparative purposes
d_G (Geodesic Discrepancy)	0.480	0.480	No strict threshold; lower is better
Chi-square	792.805	792.805	Used to test exact model fit (limited use in PLS-SEM)
NFI (Normed Fit Index)	0.843	0.843	Acceptable (should be >0.80; ideal >0.90)

Source: Authors' creation

Figure 2 Structural model, mean value, path coefficients, such as p-value and R^2 (see online version for colours)

4.4 Importance performance map

The importance-performance map analysis (IPMA), also known as priority map analysis and is an extension of PLS-SEM that evaluates the importance and performance of constructs predicting a target variable, such as Behavioural Intention or Attitude. This analysis helps in identifying which constructs require the most attention to improve outcomes, such as the adoption of cryptocurrency.

IPMA enables researchers and decision-makers to focus on variables that are highly important yet underperforming, ensuring maximum impact with minimal effort

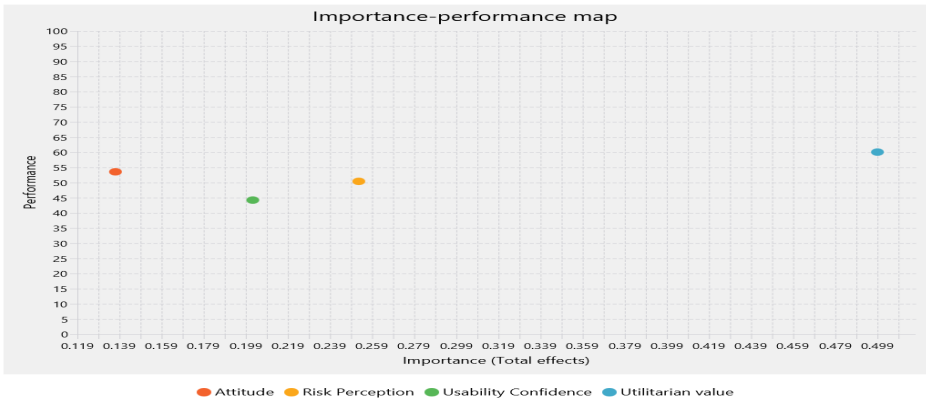
(Hair, 2010). In this study, Utilitarian Value emerged as both the most important and the highest performing predictor of Behavioural Intention (Figure 3). In contrast, Usability Confidence, while important, showed lower performance and should be prioritised for improvement (Table 6).

Table 6 IPMA-behavioural intention

Construct	Importance	Performance	Interpretation
Utilitarian value	0.499	60.063	The most important and highest performing key driver of crypto investment intention
Risk perception	0.253	50.416	Moderately important; performance is mid-range and still worth monitoring
Usability confidence	0.203	44.231	Lower performance despite moderate importance needs improvement
Attitude	0.137	53.562	The least important among the four but still relevant improvements may yield small gains

Source: Authors' creation

Figure 3 Importance performance map-behavioural intention construct (see online version for colours)



Source: Authors' creation

Table 7 IPMA- attitude

Construct	Importance	Performance	Interpretation
Utilitarian value	0.578	60.063	The strongest predictor of Attitude with high performance is the core influencer
Usability confidence	0.149	44.231	Low performance, but some influence – can be targeted for enhancement
Risk perception	–0.118	50.416	Negative effect on Attitude with higher perceived risk lowers positive attitude

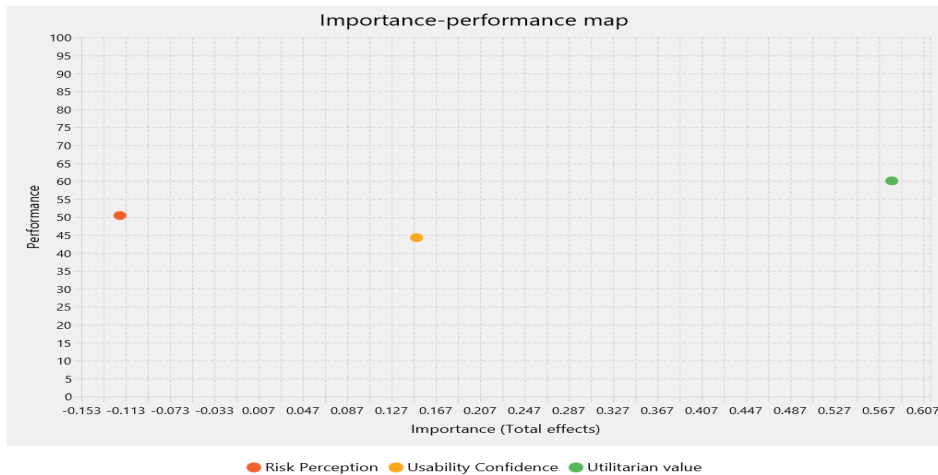
Source: Authors' creation

Hence, utilitarian Value remained the strongest driver for attitude (Figure 4) with high performance, while Usability Confidence displayed some influence but low performance,

reflecting users' trust in their ability to navigate crypto platforms and requires further attention (Table 7). The adverse impact of risk perception on attitude underscores the importance of targeted education and awareness programs to mitigate concerns.

Overall, these findings highlight that enhancing usability confidence and mitigating perceived risks through education and awareness initiatives could significantly improve both attitude and intention towards cryptocurrency adoption.

Figure 4 Importance performance map-attitude construct (see online version for colours)



Source: Authors' creation

5 Discussion and findings

This study applies an integrated TAM–TPB framework to examine the behavioural responses of Indian retail equity investors towards cryptocurrency. Descriptive statistics reveal that 80.5% of the investors are aged under 35 years, indicating strong enthusiasm among the younger generation. Despite a rising proportion of female participants, male investors still constitute 62% of the sample, revealing an ongoing gender imbalance (Joshi et al., 2023). This gender gap is not unique to India; global research consistently indicates that women remain underrepresented in the cryptocurrency ecosystem. Previous research confirms that these disparities are further exacerbated in developing and emerging economies where sociocultural norms and access-related inequalities hinder women's participation (Boateng, 2023). This finding is consistent with the study of Hoechenberger et al. (2024), who revealed that the gender gap in cryptocurrency knowledge is not rooted in actual literacy but in self-confidence and perception biases. Similarly, another study found that men were more likely than women to invest in cryptocurrencies due to higher knowledge, risk tolerance, and investment tracking habits. In contrast, women's lower income, limited crypto literacy, greater risk aversion, lower exposure to investment tools and differences in personality traits and financial attitudes (Nyhus et al., 2024), along with differences in actual and perceived financial knowledge (Bannier et al., 2019; Senkardes and Akadur, 2021), reduce their participation, highlighting a clear gender gap in crypto investment behaviour. Addressing this gender

imbalance through supportive, educational and targeted, financially inclusive environments, such as vernacular-based investor education campaigns and gender-responsive fintech platforms, could encourage greater female participation and foster equitable and inclusive market growth (Joshi et al., 2023; Henshaw, 2023; Triple-A, 2024).

The PLS-SEM analysis demonstrates that utilitarian value emerges as the most emerging facilitating factor, positively influencing both attitude and behavioural intentions towards cryptocurrency. As depicted by Table 3 and Figure 2, the path from Attitude to Behavioural Intention verifies its positive and significant relationship. Specifically, attitude towards the behavioural intention ($\beta = 0.137$, $t = 2.316$, $p = 0.021$) was found to be significant and impactful. An individual with a favourable attitude is more likely to exhibit an intention to invest in cryptocurrencies (Schaupp et al., 2022; Panos et al., 2020). This finding is consistent with research that highlights the critical role of attitude in shaping behavioural intentions, particularly in the context of emerging financial technologies such as cryptocurrency (Chary et al., 2022; Hasan et al., 2022; Namahoot and Rattanawiboonsom, 2022). A study by Diana et al. (2024) also confirmed that attitude directly influences the behavioral intention to adopt the technology. Investors who feel more enthusiastic about learning new technologies tend to have a positive influence on adoption behaviour. The positivity of individuals toward technology increases the possibility of using technology (Nguyen et al., 2024). Therefore, Hypothesis 1 was supported.

Next, perceived risk was found to have a significantly negative influence on attitude toward the cryptocurrency. Perceived risk such as high volatility, lack of regulation, security breaches, uncertain market dynamics and unpredictable regulatory environments strongly shape investor attitudes and act as barriers to the cryptocurrency investment (Lynn, 2024; Glaser et al., 2014; Shetty, 2022; Rogers et al., 2003; Shahzad et al., 2018; Subramaniam and Chakraborty, 2020). These concerns are evident not only in India but also worldwide. Studies conducted in USA, Europe and East Asia has identified fear of hacking, financial loss, and unclear legal status as key inhibitors of adoption (Baur et al., 2018; Corbet et al., 2019).

In addition, illegal activities such as fraud and money laundering are a major global concern (Alvarez, 2018). Risk factors differ between developing and developed countries. In developing countries such as Nigeria, India and Brazil, the main concerns are regulatory uncertainty, lack of infrastructure, and cybersecurity vulnerabilities, whereas in developed countries such as USA, Germany, and Japan, data privacy, compliance burdens, and integration complexity are the concerns (Marengo and Pagano, 2023). In the Indian context, the risk-attitude relationship is further intensified by inconsistent and evolving regulatory approaches. From the RBI's multiple public warnings and restrictions on virtual currencies to the imposition of a 30% flat tax on crypto gains, these regulatory actions have created an environment of uncertainty, negatively affecting investor perception and long-term confidence (RBI, 2021; Kala and Chaubey, 2023).

This underscores the need for clearer regulatory frameworks in India, such as guidelines for crypto platforms, compliance checkpoints and investor protection norms to reduce uncertainty, build trust and simultaneously promote innovation in the sector (Cumming et al., 2019; Verma and Tiwari, 2024). Further, this study found that perceived risk negatively but significantly influences the investor attitude ($\beta = -0.118$, $p = 0.046$). These results are consistent with the previous studies (Rahardja et al., 2023; Lynn, 2024;

Glaser et al., 2014; Shetty, 2022), confirming that perceived risk has a direct negative effect on user attitudes. Therefore, hypothesis 2 is verified and supported. However, in contrast, perceived risk also shows a positive and significant relationship with behavioural intention ($t = 4.990$, $p = 0.000$), suggesting that while risk lowers enthusiasm, it does not necessarily discourage participation. Some investors may fear missing out on profits (FOMO) or falling behind peers, motivating adoption despite risks. In this context, risk is sometimes seen as a necessary step toward potential reward, turning it into a motivator rather than a barrier (Kahneman, 1979; Tversky and Kahneman, 1991). This finding is supported by another study by Rahardja et al. (2023), which revealed that investors remain active if they believe that potential benefits, such as high returns and portfolio diversification outweigh the risks. However, risk perception is a barrier; individuals are more likely to intend to adopt a technology when perceived benefits outweigh perceived risks and they observe others using it safely, also they can try it with minimal consequences (Rogers et al., 2003; Champion and Skinner, 2008). In India, despite regulatory ambiguity and high taxation, many retail investors continue to engage in crypto markets, indicating that perceived benefits can override risk-related hesitations. This is supported by the report of Chainalysis (2024) that highlighted India's highest rank in global crypto adoption for the second consecutive year, especially in terms of retail participation. Also, younger, tech-savvy and risk-tolerant individuals are more inclined to invest, especially in developing economies where traditional investment opportunities offer limited returns (Bai et al., 2024; Ferguson et al., 2024). This resilience suggests that despite high risk and volatility, investors are motivated by the pursuit of high expected returns, thereby confirming Hypothesis 3.

Moreover, according to the findings of the current study, usability confidence strongly and positively influences the attitudes and behavioural intentions ($\beta = 0.149$, $p = 0.011$) to adopt cryptocurrencies. The results indicate that greater self-efficacy in the navigation of cryptocurrency platforms fosters more favourable attitudes and stronger adoption intentions. As noted by Albayati et al. (2021), Alqaryouti et al. (2019), Malik et al. (2021) and Davis (1989), PEOU, user confidence, simplified interfaces, system trust, low complexity, functional compatibility and overall usability of the platform are critical facilitators of technology adoption. When users perceive crypto platforms as easy to use, they are more likely to recognise the benefits of cryptocurrencies, which in turn positively influences their attitudes and behavioural intention. Similarly, studies by Gefen et al. (2003) and Venkatesh et al. (2003) established that self-efficacy and EOU significantly impact technology acceptance behaviour. Thus, the present results reinforce that confidence in operating crypto platforms is a crucial determinant of positive attitudes and adoption behaviour, thus confirming Hypotheses 4 and 5.

Next, according to the present study, the utilitarian value also significantly influences both Attitude ($\beta = 0.182$, $p < 0.001$) and Behavioural Intention ($\beta = 0.578$, $p < 0.001$), confirming the relationship in previous studies of Davis (1989). These results indicate that functional benefits such as efficiency, transparency, convenience, and cost-effectiveness play a major and positive role in shaping user perspectives towards cryptocurrency adoption. Investors increasingly view cryptocurrencies as technologically advanced and high-yielding financial instruments, reflecting a growing awareness of their utilitarian value. UTUAT2, an extended model of TAM, confirms that performance expectancy, closely tied to utilitarian value, remains the strongest predictor of behavioural intention (Venkatesh et al., 2012). The present study results can be compared to previous studies conducted by Albayati et al. (2021), Alqaryouti et al. (2019) and Kou

et al. (2021). They also validated that utility-oriented benefits such as transaction speed, lower fees, system transparency and reliability encourage cryptocurrency adoption, particularly in developing and tech-forward. Hence, H6 and H7 are supported.

Overall, the findings refine and extend the TAM–TPB framework by demonstrating how India-specific risk perceptions, gender disparities, and evolving regulatory conditions collectively shape cryptocurrency adoption. This integration not only advances theoretical understanding in the context of emerging markets but also offers actionable insights for promoting inclusive, secure, and sustainable growth of the cryptocurrency sector.

6 Conclusion

This study makes a unique theoretical contribution by extending the TAM and the TPB through the integration of psychological constructs such as utilitarian value, risk perception, usability confidence, and investor attitude. This research adapts these models to the emerging Indian financial ecosystem, providing a contextualised framework for understanding the behavioural investment intentions of retail equity investors in cryptocurrency. The findings reveal that perceived technological advantage and potential for high returns are key drivers of cryptocurrency adoption, also highlighting the critical role of regulatory uncertainty, high market volatility, and security concerns in shaping perceived risk. These India-specific risk perceptions act as significant barriers despite a growing interest in crypto assets (Kumar and Rani, 2024; Zetsche et al., 2019).

The study further identifies a demographic shift, with younger and tech-savvy Indian investors showing a more optimistic attitude towards cryptocurrencies. However, their willingness to adopt is conditioned by the need for clear policies, well-defined regulatory frameworks, institutional participation, and secure, user-friendly platforms (Yermack, 2024). By situating these findings within India's unique socio-economic and regulatory context, the research not only enhances the explanatory power of TAM/TPB but also offers practical insights for policymakers, regulators, and fintech developers. This contribution positions the study as a significant step toward understanding how behavioural finance and technology acceptance interact in emerging digital investment markets like India.

6.1 Limitations and future research scope

While this study applied a rigorous methodology and was supported by advanced statistical tools such as PLS-SEM and SPSS, it still faces certain limitations that may affect the generalisability and comprehensiveness of its findings. Recognising these limitations not only enhances the transparency but also provides the scope for future research.

First, it was conducted exclusively in India, a developing country, which can limit the generalisability of the results to developed countries where regulatory landscapes and investor behaviours may differ significantly. To address this, future studies could adopt a comparative cross-country design involving both developed and developing nations. Such an approach would provide broader insight and improve the generalisability of the findings by capturing diverse regulatory frameworks and investment patterns in economic contexts. Second, the cross-sectional nature of the data limits the ability of the study to

capture changes in investor attitudes and behaviour over time. Future research should employ a longitudinal design to better illuminate evolving investor behaviours and assess how market developments or regulatory changes influence attitudes and behaviours. Third, the relatively small sample size may affect the representativeness of the findings and limit the ability to draw broader inferences. Future studies could expand to larger and diverse samples to enhance the robustness and generalisability of the results. Fourth, the study focused exclusively on retail equity investors who are already familiar with cryptocurrency, thereby excluding the perspectives of institutional investors, brokerage firms, regulators, financial institutions, potential investors and non-familiar individuals with cryptocurrency. This narrow focus may limit the comprehensiveness of the findings. Future research could broaden the scope by including these diverse stakeholder groups, along with moderating variables such as income, gender and age to provide a more holistic view of cryptocurrency adoption. Furthermore, the study uses a limited set of variables from the TAM and TPB frameworks. Future research should extend the model by integrating additional variables from frameworks such as the unified theory of acceptance and use of technology (UTAUT), innovation diffusion theory (IDT), and Institutional Theory to develop a more holistic understanding of cryptocurrency adoption behaviour. Lastly, all responses were self-reported through structured Likert-scale questionnaires, which are susceptible to biases such as social desirability or response fatigue. To reduce bias and improve the validity of the findings, future studies could employ triangulation by integrating objective and subjective data. By addressing these methodological constraints, future research can generate richer, more generalisable, and more actionable insights into the adoption of cryptocurrencies in diverse contexts.

6.2 Practical and managerial implications

This research offers several key implications for various stakeholders such as policy-makers, cryptocurrency platforms and financial advisors, all of whom can drive wider adoption by addressing risk concerns and fostering user confidence through education, support and regulatory clarity (El Hajj and Farran, 2024).

In the realm of cryptocurrency, policymakers need to establish a clear, comprehensive and transparent regulatory framework that addresses key concerns such as security, fraud prevention and taxation. It will not only mitigate investor concerns but also create a more stable environment for investments in digital assets. By articulating guidelines for custody, reporting and consumer protection, regulators can establish the trust necessary for wider market participation. Secondly, Cryptocurrency platforms must prioritise user experience and transparency to foster confidence. Improving user interfaces, combined with robust security protocols such as two-factor authentication and insurance coverage against hacking incidents, will reassure investors that their assets are safe. Additionally, providing educational tools such as demo accounts and risk management features, such as stop-loss orders, can enable investors to make more informed decisions and effectively mitigate potential risks. Besides this, financial advisors and institutions should integrate cryptocurrency products into their portfolios to provide clients with diversified, regulated investment opportunities. Advisors must be well-trained in crypto fundamentals and associated risks to offer balanced and informed guidance. Furthermore, specialised training programs complemented by focused workshops or seminars can dispel common misconceptions and equip investors to make more inclusive and informed decisions

aligned with their risk profiles. By implementing these measures, including regulatory clarity, platform transparency and comprehensive investor education, stakeholders can collaboratively foster a more inclusive, informed and resilient cryptocurrency ecosystem.

Conflicts of interest

All authors declare that they have no conflicts of interest.

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