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Factors Affecting Investment in Cryptocurrencies among University Students in Kurdistan: An Application of the Theory of Reasoned Action Using Structural Equation Modeling

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ABSTRACT: This study investigates the factors influencing university students' intentions to invest in cryptocurrency in the Kurdistan Region of Iraq. The target population for this research comprised 345 students enrolled in four private universities across the Kurdistan Region of Iraq. The collected findings were analysed using a structural equation modelling approach. The results reveal that perceived risk has a significant positive effect on both intentions to invest in cryptocurrency and attitudes towards cryptocurrency use. Perceived ease of use and usefulness also significantly impact. Subjective norms and trust significantly influence attitudes towards cryptocurrency use but their direct effect on intentions to invest in cryptocurrency is insignificant. Finally, attitudes towards cryptocurrency use have a significant direct impact on intentions to invest in cryptocurrency. The findings also demonstrate that university students' attitudes toward cryptocurrency mediate the relationships between perceived risk, perceived ease of use, usefulness, subjective norms and trust, which underscores the importance of understanding how students form their attitudes towards cryptocurrencies. Educational institutions should implement robust financial literacy campaigns that emphasize both the potential benefits and significant risks of cryptocurrency investments. Cryptocurrency platforms should focus on clear and transparent communication of both the risks and benefits associated with cryptocurrency use.

Keywords: Attitudes, intentions to invest in cryptocurrency, perceived ease of use and usefulness, perceived risk, subjective norm and trust

1. INTRODUCTION

Globalization has opened up new avenues of doing business, conducting financial transactions and making investments worldwide. Amongst such developments are innovative developments in financial assets that serve as a means of conducting financial transactions and serving as investment vehicles that saw the introduction of numerous cryptocurrencies. Just like traditional currency, cryptocurrency is a form of currency but the major difference is that it functions using blockchain and digital platforms (Almajali, Masa'Deh and Dahalin, 2022). As a result, various terms such as virtual assets, virtual commodity, cyber currency, electronic currency, crypto token and payment token have been coined to describe the various functions cryptocurrency serves (Law Library of Congress, 2021). In recent years, cryptocurrencies have garnered significant attention as a novel investment asset class, driven by their potential for high returns and transformative impact on traditional financial systems. This burgeoning interest is not limited to seasoned investors but extends to younger demographics, including university students, who are increasingly drawn to the digital currency market. Understanding the factors that influence investment decisions among this demographic is crucial, given their growing financial independence and technological proficiency.

Kurdistan, a region with a rapidly developing economy and a youthful population, provides a unique context for exploring cryptocurrency investment behaviours. University students in Kurdistan represent a pivotal segment of the

population, characterized by their increasing engagement with financial technologies and innovative investment opportunities. However, despite their apparent interest, there remains a limited empirical understanding of the factors driving cryptocurrency investments within this specific group. To address this gap, this study applies the Theory of Reasoned Action (TRA) to examine the determinants influencing cryptocurrency investment decisions among university students in Kurdistan. The TRA, developed by Ajzen and Fishbein (1980), posits that individual behaviour is driven by behavioural intentions, which are, in turn, influenced by attitudes toward the behaviour and subjective norms. This theoretical framework offers valuable insights into how students' attitudes toward cryptocurrencies and their perceptions of social pressures impact their investment choices.

Existing studies often focus on limited aspects of investment behaviour, such as technological factors like those based on the technology acceptance model (Kim et al., 2016), or psychological factors (Cai, Lee & Clark, 2019) and demographic factors (Lee et al., 2020). Unlike these studies that do not provide a more holistic understanding of the factors influencing cryptocurrency investments among university students, this research addresses this by applying the TRA, which integrates both attitudes and subjective norms. While previous studies have explored cryptocurrency investments in various contexts like China Riley, 2021) and Australia (Xi, O'Brien & Irannezhad, 2019) and goes the extent of narrowing such examinations within the gender context in Turkey (Senkardes & Akadur, 2021), there is limited research focusing specifically on university students in Kurdistan. Though SEM offers a robust analytical approach to examine complex relationships between multiple variables simultaneously (Henseler, Ringle & Sarstedt, 2015), this methodological approach is barely applied in such contexts. Therefore, by using SEM, this study provides a detailed and quantitative assessment of how attitudes, social norms and other factors interact to influence investment decisions, addressing the limitations of simpler analytical methods used in previous research. In light of these research gaps, this study seeks to illuminate the factors affecting cryptocurrency investment decisions among university students in Kurdistan through the lens of the Theory of Reasoned Action. Thus, by identifying key determinants and understanding their impact, the research aims to provide actionable insights that can inform investment strategies, educational initiatives and policy development within this emerging financial domain.

The application of the TRA to cryptocurrency investments provides a structured approach to investigating the complex interplay of personal and social factors that drive investment decisions. By exploring how attitudes toward cryptocurrencies, perceived social norms and other relevant factors affect students' investment intentions, this study aims to contribute to a deeper understanding of investment behaviours in the cryptocurrency market. This research is particularly relevant in the context of Kurdistan, where the cryptocurrency landscape is evolving and may significantly influence the financial habits of its younger population. Understanding these dynamics is crucial for policymakers, financial educators and investment platforms seeking to engage effectively with university students and harness their potential in the cryptocurrency market.

2. Literature review

2.1 Theoretical literature review

Cryptocurrency investment has gained traction globally, particularly among younger generations like university students. Cryptocurrencies' decentralized nature, volatility, and speculative appeal attract tech-savvy students, setting them apart from traditional assets. This study applies the Theory of Reasoned Action (TRA) to understand factors influencing cryptocurrency investment behaviors among university students in Kurdistan, emphasizing attitudes and subjective norms.

The TRA framework, developed by Ajzen and Fishbein (1980), suggests that behavior is driven by intentions shaped by attitudes and subjective norms. Attitudes toward cryptocurrency investment are influenced by perceived risk, potential benefits, and financial literacy. Research shows that young investors, drawn by high returns, may develop favorable attitudes despite cryptocurrency risks (Kim et al., 2021). However, low financial knowledge can cause caution in investment behavior (Cai Lee, & Clark, 2019). Financial literacy also affects attitudes; students with financial education are more inclined toward innovative investments, while those lacking it may view cryptocurrencies as risky (Yen et al., 2019).

Subjective norms, or perceived social pressures, also play a role. Peer influence and media exposure shape these norms; students who observe favorable attitudes toward cryptocurrencies among peers or on social media are more likely to invest (Bashir et al., 2021; Zhang and Chen, 2021). Social media amplifies this effect, creating a "fear of missing out" (FOMO) that drives impulsive decisions (Ionescu and Vizitiu, 2019).

Behavioral intention is the primary driver of behavior in TRA, with stronger positive attitudes and subjective norms enhancing investment intentions. Cultural factors in Kurdistan, such as social pressures for financial autonomy, may further encourage students to explore non-traditional investments (Ahmed and Wang, 2021). This study, therefore, seeks to understand how these regional and global factors interact in shaping student investment behaviors in cryptocurrencies.

2.2 Previous Studies

According to the TRA, attitudes toward a behaviour are shaped by beliefs about the outcomes of that behaviour and the evaluation of those outcomes. Previous research highlights several factors influencing attitudes toward cryptocurrency investment, such as perceived usefulness, risk tolerance and financial literacy.

Kim et al. (2016), using the Technology Acceptance Model (TAM), found that perceived ease of use and perceived usefulness were significant predictors of investment intentions in cryptocurrencies. However, their study was limited to technology-oriented factors and did not address the broader psychological and social aspects that affect investment decisions, particularly among university students. This gap underscores the need to explore additional factors, such as attitudes and social norms, which are central to the TRA.

Cai Lee and Clark (2019) further explored the psychological factors influencing cryptocurrency investment, emphasizing the role of risk tolerance and behavioral biases. Their findings revealed that investors' perceptions of risk heavily influence their investment decisions. However, focusing solely on psychological factors overlooks the combined influence of attitudes and social pressures, which the TRA helps integrate for a more comprehensive understanding.

Subjective norms refer to the perceived social pressure to perform or not perform a particular behaviour. In the case of cryptocurrency investments, subjective norms can be influenced by peer groups, media and social trends, all of which are critical in shaping the investment behaviour of university students. Zhang and Chen (2021) examined how social media sentiment influences cryptocurrency investment decisions, showing that both positive and negative sentiments expressed online significantly impact investment behaviours. Investors often follow trends and sentiment shifts, leading to market volatility. The study highlights how social media acts as a powerful force in shaping subjective norms around cryptocurrency investment, but it lacks a focus on specific demographic groups such as university students. Nasir and Aziz (2021) investigated the role of behavioural biases in cryptocurrency investment, highlighting how cognitive biases like overconfidence and loss aversion impact decision-making. Their study found that such biases lead to suboptimal investment strategies, but it did not account for how social pressures and subjective norms influence these biases. This study builds on their work by examining how both personal attitudes and social influences interact to shape investment behavior among university students in Kurdistan.

Financial literacy plays a pivotal role in shaping attitudes toward investment. Yen et al. (2018) emphasized that a lack of financial literacy is a significant barrier to effective cryptocurrency investment. While their research offers valuable insights into the role of financial education, it does not fully account for subjective perceptions and social influences, which may be equally important in driving investment behavior. Kumar and Yadav (2021) also found that individuals with higher levels of financial literacy tend to engage in more informed and less speculative investment behaviors, but their focus was limited to general financial knowledge without exploring social factors. This study addresses these gaps by incorporating the TRA, which allows for a more holistic understanding of how financial literacy interacts with attitudes and social norms.

Investment decisions, particularly in emerging markets, are often influenced by socio-economic factors such as regulatory environments, economic instability and cultural norms. Ahmed and Wang (2021) investigated the factors influencing cryptocurrency investment in emerging markets, emphasizing how economic and regulatory conditions affect investment behaviors. However, their study did not specifically target university students or consider the role of subjective perceptions and social influences. This research addresses these gaps by focusing on university students in Kurdistan and exploring how socio-economic conditions and perceived economic risk interact with social norms to influence investment decisions.

By applying the TRA, this study builds on prior research that has largely focused on isolated factors such as technology adoption, financial literacy and behavioural biases. For instance, Kim et al. (2016) and Yen et al. (2018) focused primarily on financial and technological factors, while studies like Cai, Lee and Clark (2019) and Nasir and Aziz (2021) concentrated on psychological biases without integrating the broader social context. This research provides a more comprehensive framework by examining how attitudes, subjective norms and financial literacy together shape the cryptocurrency investment behaviours of university students in Kurdistan. In addition, by examining the regional context, this study addresses the gaps identified by Ahmed and Wang (2021), who focused on broader emerging market conditions without considering how university students, a critical demographic in the growth of cryptocurrency investments, are influenced by both social and economic factors.

2.3 Hypothesis development and conceptual model

Building on a study by Fu et al. (2006) that integrates the TAM and TPB theoretical precepts, this study combines TRA and the TAM to provide a comprehensive examination of all the pertinent behavioural, social and attitudinal factors (eg. personal attitudes and peer influence) and technological aspects of cryptocurrencies to provide a holistic understanding of factors influencing investment decisions in cryptocurrency. Moreover, the theoretical contributions of such a methodology are in the expansion of the scope of the TAM and TPB beyond their conventional applications. For instance, given such an approach, the study is well poised to examine how crypto platforms' perceived benefits and ease of use together with users' subjective norms and attitudes towards investment influence their decisions to invest in cryptocurrencies. Most importantly, the theoretical ideas gleaned from this study can inform policy interventions and education programs aimed at promoting rational investment decisions among university students. In light of these

aspirations, the study hypotheses were formulated based on perceived risk, perceived ease of use and usefulness, subject norms and trust and attitudes as follows:

2.2.1 Perceived risk's influence on attitudes towards cryptocurrency use and intentions to invest in cryptocurrency

Drawing from Almajali, Masa'Deh and Dahalin (2022), perceived risk can be defined as the subjective evaluation of an individual towards the extent of risk or undesirable outcomes following the use of a given technology. In that manner, perceived risk's effects on both on attitudes towards the use of cryptocurrency and intentions to invest in cryptocurrency can be significantly negative. With limited validations amongst university students, such notions can cloud academic judgements and skew educational policy decisions. Despite some studies having shown that perceived does not significantly influence intentions to use cryptocurrency in Taiwan (Nuryyev et al., 2018), Spain (Yoo et al., 2020) and Malaysia (Ter Ji-Xi et al., 2021), there is a general consensus that its effects are negative (Almajali, Masa'Deh and Dahalin, 2022; Gi-Cordero et al., 2020). In the realm of cryptocurrency investments among university students, studies on perceived risks effects on investment attitudes and decisions are yet to gain momentum. However, with risks such as private key loss by users, malware attacks and theft (Nofer et al., 2017) and privacy and data concerns (Abramova and Bohme, 2016), users' attitudes towards cryptocurrencies' use and their intentions to invest are bound to be adversely affected. To further hold perceived risk as a significant predictor of university students' attitudes towards the use of cryptocurrency and intentions to invest in cryptocurrency, potential failures in cryptocurrencies like Bitcoin were not ruled out (Almajali, Masa'Deh and Dahalin, 2022). In light of these observations, the following hypotheses were proposed:

H1: Perceived risk has a significant adverse effect on attitudes towards the use of cryptocurrency among university students in Kurdistan.

•**H2:** Perceived risk has a significant adverse effect on intentions to invest in cryptocurrency among university students in Kurdistan.

2.2.2 Perceived ease of use and usefulness' influence on attitudes towards crypto currency use

Research on the influence of perceived ease of use and usefulness on attitudes towards cryptocurrency use has yielded mixed results. Namahoot and Rattanawiboonsom (2022) found that these factors, along with innovativeness, significantly influenced the intention to use cryptocurrency in Thailand, with attitude mediating the relationship. Alqaryouti et al. (2019) similarly found a positive relationship between perceived ease of use and usage behavior, but no significant relationship between perceived benefits and usage behavior. Nadeem et al. (2021) further supported the positive relationship between perceived ease of use, perceived usefulness and intention to use Bitcoin in China, with perceived usefulness mediating the relationship. Lastly, Efendioğlu et al. (2023) highlighted the mediating role of perceived ease of use and usefulness in the effects of customer service, reduced costs, efficiency and security on cryptocurrency purchase intention in Turkey. These studies collectively suggest that while perceived ease of use and usefulness play a significant role in shaping attitudes towards cryptocurrency use, the specific nature of this influence may vary across different contexts. In light of these ideas, the following hypothesis was formulated:

• H3: Perceived ease of use and usefulness have a significant positive effect on attitudes towards the use of cryptocurrency among university students in Kurdistan.

2.2.3 Subjective norms and trust's influence on attitudes towards cryptocurrency use and intentions to invest in cryptocurrency

Subjective norms reflect the influence of peer groups, family and societal trends on an individual's decision-making process. In the context of cryptocurrency, social influences can either encourage or dissuade individuals from adopting and using digital currencies, depending on prevailing sentiments and opinions. Research shows that when individuals perceive positive social pressure to engage with cryptocurrencies, they are more likely to develop favorable attitudes toward their use. Alzahrani and Daim (2019) investigated the impact of subjective norms on cryptocurrency adoption and found that individuals who perceived strong social pressure to conform to technology trends were more likely to invest in cryptocurrencies. However, they also identified that skepticism within certain social circles or among trusted individuals (such as financial advisors or family members) could lead to adverse attitudes toward the use of cryptocurrencies. Similarly, Liang, Wu and Zhao (2021) emphasized that while some peer groups actively promote cryptocurrency investment, others may propagate fear or distrust, particularly due to the volatility and regulatory uncertainties surrounding cryptocurrencies. These findings suggest that subjective norms can have both positive and negative influences on individuals' attitudes towards cryptocurrency use. University students, being part of highly connected social groups, may be more susceptible to these contrasting social pressures, which could lead to an overall adverse effect on their attitudes toward cryptocurrencies. Thus, the following hypothesis is proposed:

•**H4:** Subjective norms and trust have a significant adverse effect on attitudes towards the use of cryptocurrency among university students in Kurdistan.

Trust plays a critical role in shaping investment intentions, especially in nascent financial technologies like cryptocurrencies. Trust encompasses various dimensions, including confidence in the security of the technology, trust in

the institutions that manage cryptocurrency exchanges and the perceived legitimacy of the overall ecosystem. Gefen, Karahanna and Straub (2003) emphasized the role of trust in technology adoption, finding that higher trust in a technology's security and reliability correlates with increased usage intentions. In the context of cryptocurrencies, Nguyen, De Oliveira and Korsgaard (2021) found that trust in blockchain technology and cryptocurrency platforms positively influenced users' intentions to invest. The transparency and decentralization of blockchain are often cited as factors that increase trust, even in the absence of traditional regulatory safeguards. However, Guri-Rosenblit (2020) noted that trust is fragile in the cryptocurrency market due to its perceived association with illegal activities, market volatility and lack of regulation. Despite these concerns, many young investors are drawn to cryptocurrencies due to the high potential returns and the influence of trust in their peer networks. In university settings, trust in cryptocurrencies may be shaped not only by individual research but also by trusted sources within social networks, such as tech-savvy peers or online influencers.

The positive association between trust and investment intentions has been demonstrated in various studies. For instance, Kim and Song (2020) highlighted that trust in the operational aspects of cryptocurrencies, such as transaction security and platform reliability, plays a crucial role in increasing the willingness to invest, especially in higher-risk environments. Yen, Tsai and Lin (2018) also showed that trust in the legitimacy and potential growth of cryptocurrency markets positively influenced investment decisions. Based on these findings, the following hypothesis is proposed:

•**H5:** Subjective norms and trust have a significant positive effect on university students' intentions to invest in cryptocurrency in Kurdistan.

2.2.4 The effect of university students' attitudes towards the use of cryptocurrency on their intentions to invest in cryptocurrency in Kurdistan

A range of factors influence university students' attitudes towards cryptocurrency and their investment intentions. Alomari (2023) found that performance expectancy, effort expectancy, social influence, security and awareness positively impact students' intention to use cryptocurrency, with financial literacy moderating these associations. Paat, Kindangen and Rumokoy (2023) highlighted the role of investment knowledge and fear of missing out in driving investment intention among young adults. Avci, Özmen and Ozhan (2023) identified perceived ease of use, trust and benefit as key factors influencing consumers' intention to use cryptocurrency in online shopping. Nurmawan (2023) emphasized the importance of students' perceptions of cost, benefit and risk in shaping their attitudes towards cryptocurrency investment. These findings suggest that a combination of factors, including knowledge, perception and external influences, can shape students' attitudes towards cryptocurrency and their investment intentions.

•**H6:** University students' attitudes towards the use of cryptocurrency have a significant positive effect on their intentions to invest in cryptocurrency in Kurdistan.

2.2.5 The mediating effect of university students' attitudes towards the use of cryptocurrency

Attitudes are central to understanding behavioural intentions, as per the TRA. The mediating role of attitudes suggests that factors like perceived risk, perceived ease of use, usefulness, subjective norms and trust influence investment intentions, but their effect is channelled through individuals' attitudes toward cryptocurrency use. This section examines the mediating role of attitudes concerning three hypotheses.

Perceived risk refers to the uncertainty and potential for loss that individuals associate with a particular behavior or investment. In the context of cryptocurrencies, the high volatility, lack of regulation and security concerns can amplify perceived risk. According to Kahneman and Tversky's (1979) Prospect Theory, people tend to avoid risks, particularly when potential losses are involved, which significantly impacts their decision-making.

Yuen and Kwok (2021) found that perceived risk negatively influences intentions to invest in cryptocurrencies, especially among younger, less financially secure populations. However, they also observed that attitudes toward cryptocurrency use could mitigate this effect. For example, if university students develop positive attitudes toward cryptocurrency use, due to peer influence or education, this may lessen the negative impact of perceived risk on their investment decisions. Moreover, Nguyen et al. (2021) identified that perceived risk alone does not always deter investment, but it operates through individual attitudes toward the asset. This highlights the importance of understanding how students form their attitudes toward cryptocurrencies. If students perceive cryptocurrencies as innovative and revolutionary despite the risks, their positive attitudes may mediate the effect of perceived risk, leading to higher investment intentions. Based on these insights, the following hypothesis is proposed:

•**H7:** University students' attitudes towards the use of cryptocurrency have a significant mediating effect on the influence of perceived risk on their intentions to investment in cryptocurrency in Kurdistan.

Subjective norms refer to the perceived social pressures to perform a behaviour, while trust relates to the confidence individuals have in the technology and platforms used in cryptocurrency transactions. Fishbein and Ajzen's (1975) Theory of Reasoned Action posits that subjective norms and trust shape behavioral intentions through attitudes. Kim and Song (2020) found that social norms, such as the opinions of friends, family and online communities, strongly influence attitudes toward cryptocurrency, which then affect investment decisions. Additionally, Nguyen et al. (2021) identified that trust in cryptocurrency platforms is crucial, but its effect on investment intentions is primarily indirect, mediated by the investor's attitude toward the technology. In the university context, students' attitudes toward cryptocurrency are

influenced by their peer groups and online communities. If students trust the technology and feel social pressure to invest, they are more likely to develop positive attitudes toward cryptocurrency, which in turn increases their investment intentions. Hence, the following hypothesis is proposed:

•**H8:** University students' attitudes towards the use of cryptocurrency have a significant mediating effect on the influence of perceived ease of use and usefulness on their intentions to invest in cryptocurrency in Kurdistan.

Perceived ease of use and perceived usefulness are core components of the TAM and play critical roles in determining whether individuals are likely to adopt new technologies. Davis (1989) established that ease of use refers to the degree to which a person believes that using a particular system would be free of effort, while perceived usefulness is the extent to which a person believes that a system will enhance their performance. Several studies highlight the importance of these factors in influencing cryptocurrency adoption. Kim et al. (2016) demonstrated that the easier and more useful individuals find cryptocurrency platforms, the more likely they are to invest. However, they did not explore the role of attitudes in mediating this relationship. Chang et al. (2021) expanded on this by investigating how attitudes act as a bridge between perceived ease of use, usefulness and investment intentions. They found that positive attitudes toward cryptocurrency use significantly strengthened the influence of ease of use and usefulness on investment intentions. Essentially, even if university students recognize the practical benefits of using cryptocurrency (e.g., fast transactions, decentralized control), their attitudes toward cryptocurrency use will determine whether these perceptions translate into actual investment intentions. Thus, the following hypothesis is derived:

•**H9:** University students' attitudes towards the use of cryptocurrency have a significant mediating effect on the influence of subjective norms and trust on their intentions to investment in cryptocurrency in Kurdistan.

Integrating all these novel notions resulted in the development of a new conceptual model shown in Figure 1. Thus, unlike Almajali, Masa'Deh and Dahalin (2022), we acknowledge the direct effects of perceived risk, perceived ease of use and usefulness and subjective norms and trust om attitudes towards crypto currency use. Additionally, instead of focusing on intentions to use cryptocurrency, we advance ideas by broadening examinations to the study of intentions to invest in cryptocurrencies.

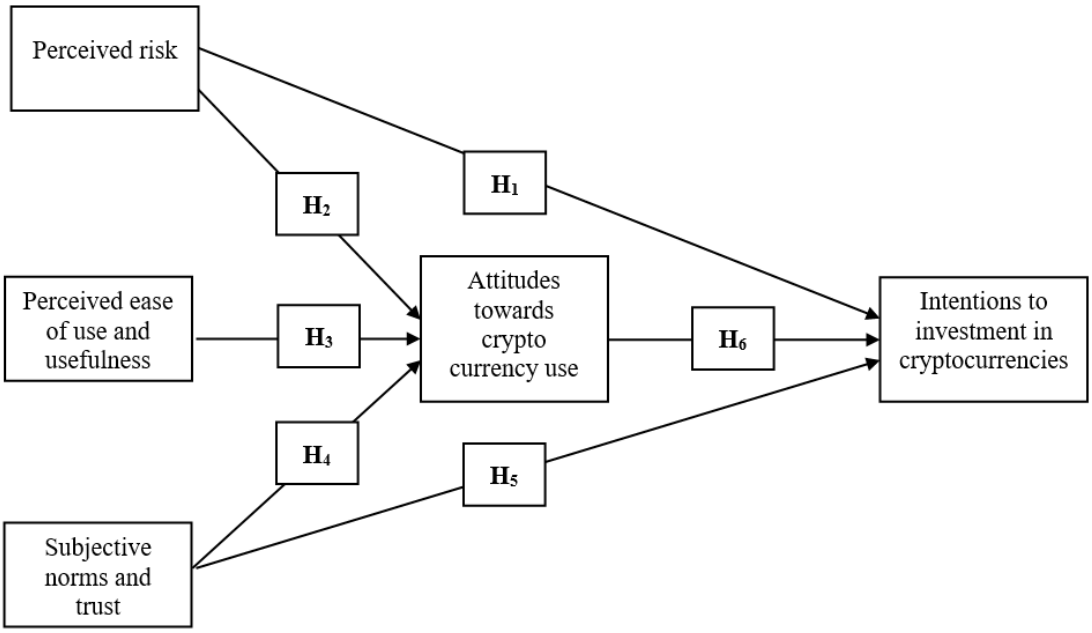

Figure 1: Conceptual framework

3. Research methodology

3.1 Research approach

This study adopted a quantitative research design to investigate the factors influencing university students' intentions to invest in cryptocurrency in the Kurdistan Region of Iraq. The research focused on students enrolled in private universities across the Kurdistan Region of Iraq. A survey questionnaire was used to gather data from respondents and the results were analyzed using Structural Equation Modeling (SEM), employing the Smart PLS software.

3.2 Data analysis

The collected data was analysed using a structural equation modelling (SEM) approach with the aid of Smart PLS 4. Amid such attempts, factor analysis was applied to ascertain related constructs by selecting variables with factor loadings of at least 0.70 (Hanafiah, 2020). As a result, 6 perceived risk, 5 perceived ease of use and usefulness, 5 subjective norms

and trust, 4 attitudes towards crypto currency use and 5 intentions to investment in cryptocurrencies constructs were found to be related. The study proceeded to test the variables' reliability using the Cronbach's alpha and composite reliability tests under the guideline that values of at least 0.70 represent a highly reliable variable with (Haji-Othman & Yusuff, 2022). Discriminant validity was tested using the heterotrait-monotrait ratio of correlations (HTMT). According to Henseler, Ringle and Sarstedt (2015), if the HTMT value is below 0.90, discriminant validity has been established between two reflectively measured constructs. To test for convergent validity, the study applied the Average Variance Explained (AVE) test by selecting variables with AVE values of at least 0.5 (dos Santos & Cirillo, 2023). Model tests involving the prevalence of a significant chi-square value, a Normed Fit Index (NFI) of at least 0.95, a Standardized Root Mean Square Residual (SRMR) value less than 0.08 were also applied (Byrne, 1994; Schumacker & Lomax, 2004).

3.3 Population and sampling procedures

The target population for this research consists of students enrolled in private universities across the Kurdistan Region of Iraq. This population is relevant for the study due to the increasing interest in cryptocurrencies among younger, educated demographics, particularly university students who are often more exposed to digital innovations and emerging financial technologies. University students in this region represent a population that may be exploring alternative forms of investment such as cryptocurrencies, given the region's dynamic economic environment and the global rise of digital assets. Private (Lebanese French University, Cihan University, Catholic University and Erbil International University), universities were chosen as the focal point due to their diversity in student populations and the assumption that students attending these institutions may have more access to digital resources and information about financial technologies. There are several prominent private universities in major cities such as Erbil, Sulaimani and Duhok, making this a suitable population for investigating cryptocurrency-related investment behavior.

A purposive sampling technique was employed to ensure that the sample represents students who are familiar with or have knowledge about cryptocurrencies and potential investment opportunities. Purposive sampling was chosen to target university students who are likely to be exposed to cryptocurrency investment information, either through coursework, social media, or peer influence. The sampling frame includes students from all academic levels (undergraduate and postgraduate) studying various disciplines, including business, economics, finance and information technology, where exposure to financial markets and cryptocurrency is expected to be higher.

The sample size for this study was determined using a combination of previous research guidelines and practical considerations. According to Krejcie and Morgan's (1970) table for determining sample sizes, for a population exceeding 100,000, a sample size of approximately 384 is considered sufficient for a confidence level of 95% and a margin of error of 5%. However, considering resource constraints and the logistical challenges of surveying a wide population across multiple universities, the sample size was set at 350 students. This sample size is sufficient for conducting Structural Equation Modeling (SEM), which typically requires a minimum sample size of 200 to 300 participants to ensure reliable and valid estimates (Hair et al., 2019). Given the complexity of the model, which includes several variables (e.g., subjective norms, trust, perceived risk), a sample size of 350 will provide the necessary statistical power for the analysis.

To ensure diversity and representation, students were selected from five major private universities in the Kurdistan region whose names were withheld for a confidentiality reasons. At each university, students were approached through their academic departments and online surveys were distributed via university mailing lists and student organizations. Participation was voluntary and respondents were required to have a basic understanding of cryptocurrencies to ensure they could provide meaningful responses. To participate in the study, respondents had to meet the following criteria:

1) Currently enrolled in a private university in Kurdistan.

2) Aged between 18 and 35, reflecting the typical university student demographic.

3) A basic understanding of cryptocurrencies and potential investment practices (measured through a screening question).

3.4 Data collection

To test and validate the proposed model hypotheses, questionnaire data was collected from students of private universities in Kurdistan. The questionnaires were distributed and collected by hand. The students were informed of the study's objectives and that their participation in the study was voluntary and did not affect their study activities nor outcomes. A random sampling approach was used to select the students and ensure that each student has an equal chance of being selected. In the process, the study achieved a response rate of 89.67% with 345 responses being analysed.

To measure perceived risk, the study adapted Nadeem et al's (2021) 9 constructs. By combining Davis' (1989) precepts on perceived ease of use and Sohaid and others' (2019) perceived usefulness, we developed 10 novel measure of the students' perceived ease of use and usefulness of cryptocurrency platforms. Using a related measure of subjective norm by Abbasi et al. (2021) and Almajali, Masa'Deh and Dahalin's (2022) measure of trust, the study developed 10 novel subjective norms and trust constructs that were integrated into a single variable. The study also improved Almajali, Masa'Deh and Dahalin's (2022) existing measures of the students' attitudes towards crypto currency use and intentions to investment in cryptocurrencies with each variable comprising of 10 items. The study participants were asked to rank their views of perceived risk, perceived ease of use and usefulness, subject norms and trust and attitudes, attitudes towards cryptocurrency use and intentions to invest in cryptocurrencies on a scale of 1(strongly disagree) to 5 (strongly agree).

The questionnaire was translated from English to Kurdish using a back-to-back translation approach to avoid the problem of language and cultural dissimilarities (Brislin, 1976).

4. Results and Discussion

4.1 Demographic analysis

Table 1: Demographic details

Variable	Description	Frequency	Percentage	p-value
Gender	Male	210	60.87%	<0.001
	Female	135	39.13%	
	Total	**345**	**100**	
Age	18-25 years	153	44.35%	<0.001
	26-33 years	68	19.71%	
	34-41 years	102	29.56%	
	42 years and above	22	6.38%	
	Total	**345**	**100**	
Academic level	Bachelor's degree	132	38.26%	<0.001
	Master's degree	198	57.39%	
	Ph.D	15	4.35%	
	Total	**345**	**100**	
Academic program	Business administration	45	13.08%	<0.001
	Finance	77	22.38%	
	Economics	64	18.60%	
	Marketing	49	14.24%	
	Information technology	36	10.47%	
	Nursing	6	1.74%	
	Engineering	8	2.33%	
	Medicine	19	5.52%	
	Teaching	12	3.49%	
	Law	6	1.74%	
	Sociology	4	1.16%	
	Architecture	18	5.23%	
	Total	**345**	**345**	

The study findings presented in Table 1 are derived from the structural equation modelling of 345 questionnaire responses collected from students of the 3 best-performing universities in Kurdistan. Amongst the responses were 210 male and 135 female students aged between 18-25 years (n=153), 26-33 years (n=68), 34-41 years (n=102) and 42 years and above (n=22) as shown in Table 1. Apart from this diversity in age groups, the students were drawn from various degree programs (business administration, finance, economics, marketing, information technology, nursing, engineering, medicine, teaching, law, sociology and architecture). Apart from adding to a broader literature on investment psychology and financial behaviour, this diversity ensures that the study provides a nuanced understanding of specific insights into the rapidly growing and relatively new field of cryptocurrency investment. Moreover, such nuanced details can be used for refining existing theories or developing new theoretical frameworks for understanding digital asset investment behaviour.

4.2 Factor analysis, validity, reliability and VIF analysis

Using the selected variable constructs, Table 2 confirms their relatedness as their factor loadings surpassed 0.70 (Hanafiah, 2020). With AVE values surpassing 0.50, convergent validity was established (dos Santos & Cirillo, 2023). Drawing further, the selected variables' reliability was not refuted as evidenced by higher Cronbach's alpha and composite reliability values of more than 0.70 with (Haji-Othman & Yusuff, 2022). Following the VIF values less than 5 provided in Table 2, the study confirms that no multi-collinearity issues were detected (Shrestha, 2020).

Table 2: Factor analysis, validity, and reliability and VIF results

		Items	FL	AVE	CA	CR	VIF
Perceived risk	PR1	Others could misuse my Cryptocurrency payment transactions information.	0.78	0.82	0.86	0.88	1.42
	PR2	I think it is unsafe to give personal information over Cryptocurrency payments.	0.86				
	PR3	Cryptocurrency offers secure money transfer.	0.84				
	PR4	I have more control over my money with Cryptocurrency.	0.75				
	PR5	I think that Cryptocurrency is very costly.	0.80				
	PR6	Cryptocurrency cannot be converted to conventional currencies and even so, the price will be unreasonable.	0.86				
Perceived ease of use and usefulness	PEUU3	I think Cryptocurrency makes my purchase easier.	0.80	0.64	0.88	0.90	1.35
	PEUU4	I think Cryptocurrency will make my purchase more effective.	0.87				
	PEUU6	I think Cryptocurrency will make my purchase more efficient.	0.88				
	PEUU9	I find Cryptocurrency use enjoyable.	0.72				
	PEUU10	Cryptocurrency is flexible.	0.81				
Subjective norms and trust	SNT1	My significant others influence me to give Cryptocurrency a try.	0.76	0.76	0.77	0.80	2.38
	SNT2	My significant others influence me to show a positive sentiment in involving myself in Cryptocurrency use.	0.74				
	SNT3	My significant others influence me in deciding my purchases using Cryptocurrency.	0.85				
	SNT7	I am sure that Cryptocurrency is secure.	0.70				
	SNT8	I am sure that Cryptocurrency is trustworthy.	0.74				
Attitudes towards cryptocurrency use	ATCCU2	I am confident that Cryptocurrency purchase is a good idea.	0.73	0.76	0.78	0.81	2.18
	ATCCU6	I am confident that Cryptocurrency usage in financial transactions is a smart idea. ATT3	0.74				
	ATCCU9	The use of Cryptocurrency makes me feel good.	0.76				
	ATCCU10	The idea of Cryptocurrency usage excites me.	0.80				
Intentions to invest in cryptocurrencies	IIC2	Cryptocurrency will be my other currency source in my future product purchase and sell.	0.82	0.83	0.87	0.89	1.86
	IIC4	I am confident that Cryptocurrency use will greatly help me in fulfilling my obligations on time.	0.80				
	IIC5	I plan to regularly use Cryptocurrency.	0.79				
	IIC6	I will promote Cryptocurrency use to others, as an exchange method.	0.84				
	IIC8	I think Cryptocurrency is more appropriate for gaming.	0.88				

FL: Factor loadings; AVE: Average Variance Explained; α: Cronbach's alpha; αCR: Composite reliability; VIF: Variance Inflation Factor.

Having noted in Table 3 that the established HTMT values are less than 0.85, the study inferred that discriminant validity was established using (Henseler, Ringle & Sarstedt, 2015). Amid such observations, the next section of the study presents results of the applied model fitness tests.

Table 3: HTMT test results for discriminant validity

	PR	PEUU	SN&T	ATCCU	IIC
PR	**1**				
PEUU	0.65	**1**			
SNT	0.60	0.63	**1**		
ATCCU	0.59	0.65	0.71	**1**	
IIC	0.57	0.54	0.62	0.69	**1**

4.3 Measurement of model fit indices

In line with set stands, the SRMR value of 0.049 was less than 0.08, the NFI value of 0.980 exceeded the 0.95 cut-off, the chi-square value of 23.282 is significant at 1% and the d_G and d_ULS values of 0.495 and 0.734 are significant at 1% resulting in the model being deduced as having a satisfactory fit (Byrne, 1994; Schumacker and Lomax, 2004). It is light of these establishments that the study proceeded further to conduct a path analysis with the aim of testing the validity of the proposed hypotheses.

Table 4: Model fitness tests

	SRMR	NFI	Chi-Square	d_G	d_ULS
Saturated Model	0.049	0.980	23.282*	0.495	0.734
Estimated Model	0.049	0.980	23.282*	0.495	0.734

4.4 Path analysis

The path coefficient for perceived risk (PR) to intentions to invest in cryptocurrency (IIC) is 0.457, with a p-value of <0.001, indicating a significant positive relationship. This supports the hypothesis (H1) that higher perceived risk is associated with higher intentions to invest in cryptocurrencies. The impact of perceived risk on attitudes towards cryptocurrency use (ATCCU) is significant with a p-value of <0.001, confirming that perceived risk also significantly influences attitudes, supporting H2. The perceived ease of use and usefulness (PEOU&PU) significantly influence IIC, with a p-value of <0.001, supporting H3. Subjective norms and trust (SNT) have a significant impact on attitudes towards cryptocurrency use (p-value <0.001), confirming H4. The direct relationship between subjective norms and trust (SNT) and IIC is 0.382 with a p-value of 0.089, indicating an insignificant effect. Thus, H5 is not supported. Attitudes towards cryptocurrency use (ATCCU) have a significant direct impact on intentions to invest in cryptocurrency (IIC) with a path coefficient of 0.206 and a p-value of <0.001, supporting H6.

The mediation analysis shows that attitudes towards cryptocurrency use (ATCCU) significantly mediate the relationship between perceived risk (PR) and intentions to invest in cryptocurrency (IIC) with an indirect effect of 0.108 and a p-value of <0.001. This supports H7. The mediating effect of ATCCU on the relationship between perceived ease of use and usefulness (PEOU&PU) and IIC is also significant (p-value <0.001), supporting H8. ATCCU significantly mediates the relationship between subjective norms and trust (SNT) and IIC (p-value <0.001), supporting H9.

Table 5: Path and mediating analysis

	Estimate	P Values	Impact	Hypothesis
Direct relationships				
PR -> IIC	0.457	<0.001	Significant	H_1: Supported
PR ->ATCCU		<0.001	Significant	H_2: Supported
PEUU-> IIC		<0.001	Significant	H_3: Supported
SNT ->ATCCU		<0.001	Significant	H_4: Supported
SNT -> IIC	0.382	0.089	Insignificant	H_5: Not supported
ATCCU-> IIC	0.206	0.000	Significant	H_6: Supported
Mediating effects				
PR -> ATCCU-> IIC	0.108	<0.001	Significant	H_7: Supported
PEUU -> ATCCU-> IIC		<0.001	Significant	H_8: Supported
SNT -> ATCCU-> IIC		<0.001	Significant	H_9: Supported

PR: Perceived risk; **PEOU&PU:** Perceived ease of use and usefulness; **SN&T:** Subjective norms and trust; **ATCCU:** Attitudes towards cryptocurrency use; **IIC:** Intentions to investment in cryptocurrencies.

Discussion

According to Almajali, Masa'Deh and Dahalin (2022), perceived risk is defined as an individual's subjective evaluation of potential negative outcomes associated with using a particular technology. Generally, high perceived risks deter people from adopting new technologies, such as cryptocurrencies. However, this study reveals a different pattern among university students, where perceived risk positively correlates with their intent to invest in cryptocurrency. The positive relationship (0.457) suggests that perceived risk may be seen as a challenge or opportunity for higher returns, aligning with the speculative appeal of cryptocurrencies. For younger, risk-tolerant individuals like university students, the allure of high returns may outweigh concerns over risks such as theft, malware, and privacy issues, as supported by Nofer et al. (2017) and Abramova and Bohme (2016). This finding implies that perceived risk may not universally discourage investment but can motivate engagement in speculative markets for certain demographics.

While the literature generally emphasizes ease of use and usefulness in shaping attitudes (Alqaryouti et al., 2019; Namahoot & Rattanawiboonsom, 2022), this study highlights the strong negative impact of perceived risk on attitudes toward cryptocurrency, likely due to security concerns, regulatory uncertainty, and volatility. Efendioğlu et al. (2023) also noted that security concerns are critical in shaping attitudes in Turkey's cryptocurrency market. Thus, even if a cryptocurrency is perceived as useful, high risk can diminish user attitudes, reducing investment likelihood.

Findings also show that subjective norms and trust (SNT) significantly impact attitudes toward cryptocurrency use, supporting Hypothesis H4 with a p-value of <0.001. This aligns with Alzahrani and Daim (2019), who argued that trust is crucial in adopting financial technologies, especially high-risk ones like cryptocurrencies. Liang, Wu, and Zhao (2021) emphasize trust's role in high-uncertainty contexts, such as cryptocurrency, where users' positive attitudes toward technology increase with perceived security. Gefen, Karahanna and Straub (2003) further reinforce that trust influences attitudes toward digital platforms, suggesting that trust in cryptocurrency technology positively impacts user attitudes.

Hypothesis H5 was not supported, as the direct link between SNT and intentions to invest in cryptocurrency (IIC) was insignificant (path coefficient of 0.382, $p = 0.089$). This result aligns with studies by Nguyen, De Oliveira and Korsgaard (2021) and Guri-Rosenblit (2020), who found that while trust shapes attitudes, it does not always lead to intentions to invest. These findings indicate that other factors, such as financial literacy or risk tolerance, might be more significant in determining investment intentions.

Attitudes toward cryptocurrency use (ATCCU) significantly impact IIC, with a path coefficient of 0.206 ($p < 0.001$), supporting Hypothesis H6. This is consistent with prior research, as Alomari (2023) found that positive attitudes toward digital financial technologies predict investment intentions. Similarly, Paat, Kindangen and Rumokoy (2023) showed that positive attitudes in financial technology adoption drive investment intentions. Avci, Özmen, and Ozhan (2023) also noted that attitudes towards digital financial innovations mediate the relationship between perceived benefits and investment intentions, underscoring the critical role of attitudes in fostering investment intent.

The study also demonstrates that attitudes toward cryptocurrency use mediate relationships between key factors; perceived risk, ease of use, usefulness, subjective norms, and trust and investment intentions, as shown in the supported Hypotheses H7, H8, and H9. Perceived risk (PR) influences intentions indirectly through attitudes, supporting Kahneman and Tversky's (1979) Prospect Theory, which suggests people avoid risks when potential losses loom. However, in the cryptocurrency context, students with positive attitudes may overlook risks, driven by peer influence, education, or awareness (Yuen & Kwok, 2021). Nguyen et al. (2021) similarly assert that perceived risk influences investment through attitudes.

The study confirms that attitudes mediate the effect of perceived ease of use and usefulness on investment intentions ($p < 0.001$), aligning with the Technology Acceptance Model (TAM), where ease of use and usefulness are primary technology adoption factors (Davis, 1989). Kim et al. (2016) found that easier and more useful cryptocurrency platforms increase investment likelihood, with attitudes bridging ease of use, usefulness, and intentions (Chang et al., 2021).

Finally, attitudes also mediate the relationship between SNT and investment intentions ($p < 0.001$), supporting Hypothesis H9. This finding resonates with the Theory of Reasoned Action (TRA), which posits that subjective norms and trust influence behavioral intentions through attitudes (Fishbein & Ajzen, 1975). Kim and Song (2020) noted that peer and social influences strongly shape attitudes toward cryptocurrency, which impacts investment. Nguyen et al. (2021) emphasize that trust's effect on investment is primarily indirect, mediated by attitudes. In university settings, students' cryptocurrency attitudes are shaped by peers and online communities, driving investment decisions.

CONCLUSION

The findings from the study, it can be concluded that:

Perceived risk has a significant and positive relationship with university students' intentions to invest in cryptocurrency. Despite the general consensus in existing literature that perceived risk usually discourages investment, particularly due to concerns about privacy, security and technological failures, this study presents a different outcome. It suggests that

among certain groups, such as university students, the speculative and high-reward nature of cryptocurrencies can make perceived risk an attractive factor. This implies that for young and risk-tolerant investors, perceived risk might be seen as an opportunity rather than a deterrent. Perceived risk significantly influences attitudes towards cryptocurrency use among university students. The study's results reveal that subjective norms and trust significantly impact attitudes towards cryptocurrency use, confirming that social influence and trust are critical factors in shaping perceptions of cryptocurrency. However, these factors do not have a direct impact on intentions to invest in cryptocurrency, suggesting that while social pressures and trust can shape attitudes, other factors are required to drive actual investment decisions. The findings also underscore the importance of attitudes towards cryptocurrency use as a significant predictor of investment intentions, highlighting the mediating role of attitudes in the adoption of financial technologies.

The findings demonstrate that university students' attitudes toward cryptocurrency use are pivotal in shaping their investment intentions. These attitudes mediate the relationships between perceived risk, perceived ease of use, usefulness, subjective norms and trust, which underscores the importance of understanding how students form their attitudes towards cryptocurrencies.

Practical and theoretical implications

Cryptocurrency platforms may tailor their marketing strategies to highlight the speculative nature and potential high returns of cryptocurrencies. Since perceived risk appears to attract some investors, platforms can focus on promoting educational content that helps investors understand both the risks and rewards of investing in digital assets.

In the context of TRA, attitudes serve as an essential mediator between perceived risk and behavioural intentions. The significant impact of perceived risk on attitudes toward cryptocurrency use suggests that individuals' negative perceptions of risk hinder the formation of positive attitudes. These negative attitudes, in turn, affect their intentions to invest in cryptocurrency.

The TRA posits that behavioural intentions are shaped by attitudes and subjective norms. In this study, the significant influence of attitudes towards cryptocurrency use on investment intentions aligns with TRA, confirming that positive attitudes play a central role in shaping behavioural intentions. However, the lack of a significant relationship between subjective norms and investment intentions suggests that TRA's assumption regarding the direct influence of subjective norms may not fully apply in the context of cryptocurrency investments. This indicates that while social influences shape attitudes, they may not directly drive investment behaviour, pointing to the need for further exploration of other moderating factors such as perceived risk and financial knowledge.

Based on the mediation effects findings, these results suggest that initiatives aimed at enhancing students' financial literacy, increasing awareness of the benefits and risks of cryptocurrency and fostering positive social norms could play a significant role in promoting cryptocurrency investment. Educational institutions and financial platforms should consider developing programs that address the perceived risks and ease of use associated with cryptocurrency to shape more favorable attitudes among students.

Recommendations

Educational institutions should implement robust financial literacy campaigns that emphasize both the potential benefits and significant risks of cryptocurrency investments. These campaigns should target university students, offering workshops, seminars and online resources that outline the full spectrum of potential outcomes, including loss of capital and security threats.

Cryptocurrency platforms should focus on clear and transparent communication of both the risks and benefits associated with cryptocurrency use. Providing users with comprehensive information on how to manage risks, such as private key protection, safeguarding against malware and ensuring privacy, can help reduce perceived risk and foster more positive attitudes toward cryptocurrency use.

Given the significant impact of attitudes on investment intentions, universities and financial institutions should design educational initiatives to improve students' perceptions of cryptocurrency. These programs should focus on the benefits of cryptocurrency use, the underlying technology and its potential financial advantages.

To enhance trust in cryptocurrency platforms, companies should focus on improving transparency, ensuring security and offering user-friendly experiences. By addressing users' concerns about privacy and risks, cryptocurrency platforms can foster more positive attitudes and potentially increase investment intentions.

Given the significant role of subjective norms in shaping attitudes, cryptocurrency companies can leverage social influence marketing by engaging trusted figures or influencers within educational and social environments. This approach could positively shape attitudes toward cryptocurrency use, potentially leading to increased acceptance.

Constraints and Limitations Encountered

The study is limited to students from private universities in the Kurdistan Region of Iraq. While this provides valuable insights into this specific population, the findings may not be generalizable to students in public universities or students from other regions or countries. The regional focus limits the ability to extend the conclusions beyond Kurdistan, as students' attitudes and intentions toward cryptocurrency might differ based on cultural, economic and social factors.

While the sample size of 350 students is deemed adequate for Structural Equation Modeling (SEM), it may still limit the generalizability of the results. A larger sample might capture more diversity in the student population and yield more robust results. Additionally, the sample may not fully account for variations in students' academic backgrounds, financial knowledge, or socioeconomic status, which could impact their attitudes towards cryptocurrency.

The study focuses exclusively on cryptocurrency, which is only one form of investment. Other investment vehicles (e.g., stocks, bonds, or real estate) were not considered, which may limit the understanding of students' broader investment behavior and financial decision-making processes.

Areas for Future Studies

Future research could include students from public universities and other regions, both within and outside the Kurdistan Region, to provide a more comprehensive understanding of university students' attitudes and investment intentions towards cryptocurrency across different populations and contexts. A comparative study across regions or countries would offer valuable insights into cultural and regional differences.

To increase the generalizability of the findings, future studies should aim for a larger and more diverse sample, possibly including students from various academic disciplines, socioeconomic backgrounds and levels of financial literacy. This would allow for more detailed subgroup analysis, revealing differences in attitudes and intentions based on specific demographic characteristics.

Having demonstrated that university students' attitudes toward cryptocurrency use are pivotal in shaping their investment intentions, future research could explore additional factors that may further influence attitudes and, consequently, investment intentions, such as financial literacy programs or exposure to real-world applications of cryptocurrency.

Cryptocurrency regulations are a rapidly evolving area. Future studies could investigate how changes in regulations or government policies influence students' attitudes and intentions toward cryptocurrency investment, particularly in regions where regulations are either unclear or restrictive.

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