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INVESTMENT INTENTIONS IN CRYPTOCURRENCY: THE ROLES OF FINANCIAL LITERACY, INVESTOR RISK TOLERANCE, AND CYBER-SECURITY RISK

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<p>Hina Agha Assistant Professor Bahria University Karachi Hinaaamir.bukc@bahria.edu.pk</p> <p>Dr Mubashir Ali khan Associate Professor, Bahria University Karachi</p>	<p>Abstract</p> <p>Understanding cryptocurrency Investment Intention is vital to explaining how individuals interact with rapidly advancing financial technologies under uncertain conditions. Cryptocurrencies differ markedly from traditional assets because of their extreme volatility, decentralized structure, and limited regulatory control, which together intensify both financial risk and behavioral complexity (Aysan et al., 2021). Examining the motivations behind such investments helps researchers and policymakers gain deeper insight into how investors perceive risk, place trust in digital systems, and adapt to ongoing innovations within financial markets. This study investigates how Cybersecurity risk, financial literacy, and investor Risk Tolerance effects individuals' intentions to invest in cryptocurrencies and examines whether Cyber security risk moderates the relationships among these factors. Using data collected from 394 individual investors in Pakistan and analyzed through Partial Least Squares Structural Equation Modeling (PLS-SEM), the results reveal that Cyber security risk is the most influential factor, exerting a strong negative effect on cryptocurrency. Financial literacy and investor risk tolerance also show moderate negative effects, while the moderating influence of CSR is statistically insignificant. These findings suggest that investors' fear of cyber threats outweighs their financial understanding and willingness to take risks. The study provides useful implications for regulators, policymakers, and financial institutions seeking to build investor confidence in digital assets. By highlighting the importance of cybersecurity awareness and financial education, this research offers direction for developing strategies to mitigate perceived risks and promote responsible participation in crypto markets. It further contributes to the limited empirical literature from emerging economies by introducing cybersecurity risk as a central behavioral construct, revealing its dominant deterrent role in shaping cryptocurrency investment behavior.</p>
<p>Keywords:</p>	<p>Cryptocurrency Investment Intention (I), Cyber-security risk (CSR), Financial Literacy (FL), Investor Risk Tolerance (RT).</p>

Introduction

Unlike traditional assets, cryptocurrencies are marked by high volatility, decentralization, and limited regulatory control, which increase both their risk and behavioral complexity (Aysan et al., 2021). Understanding cryptocurrency Investment Intention (I) is important for recognizing how individuals interact with rapidly developing financial technologies in uncertain environments. Examining the motivations that drive such investment intentions helps researchers and policymakers to gain clear understanding into how investors assess risk, develop trust in digital systems, and adapt to emerging market innovations. These insights are essential for designing thorough regulatory frameworks and encouraging responsible engagement in digital asset markets. Among the factors that influence such intentions, two important investor characteristics are FL and RT. FL represents an individual's ability to comprehend different levels of financial information and make well-informed investment choices (Lusardi & Mitchell, 2014). In the cryptocurrency settings where misinformation, market speculation, and technical complexity are widespread, FL becomes very important for evaluating potential risks and opportunities and for forming rational investment intentions (Kallinterakis & Wang, 2022).

Another important determinant of investment intentions is Investor RT which defined as the inclination of an individual to accept uncertainty in pursuit of potential gains (Ante, 2016). The extreme price swings of crypto currencies make them especially attractive to investors with higher RT, while those who are more risk-averse often avoid participating, regardless of their FL levels (Ante, 2020). Understanding how these characteristics interact helps explain why certain individuals are more inclined than others to develop an intention to invest in cryptocurrencies. Another key, but overlooked, aspect of cryptocurrency investment is CSR. Issues such as security breaches, hacking attempts, and weaknesses in trading platforms directly threaten investors' assets and wear away confidence in digital markets (Kshetri, 2017). When CSR is perceived as high, it can discourage investment intention even among individuals who are financially literate highlighting its importance in the study of digital assets. Most of the prior researches has emphasized market trends, risk perceptions, or regulatory influences, often overlooking the behavioral and cognitive factors which are effected by FL, investors tolerance for risk and also the cyber security risk factor that guide individual investment choices.

Accordingly, this study seeks to investigate the direct effects of FL, investor RT, and CSR on cryptocurrency Investment Intention, along with the potential moderating role of CSR in the relationship between FL, investor RT, and cryptocurrency Investment Intentions. By addressing this research gap, the study adds to the behavioral finance literature by offering both theoretical insights and practical guidance for investors, educators, and policymakers who aim to encourage informed and secure participation in digital asset markets. The study makes several key contributions. First, it broadens behavioral finance research by exploring the combined impact of FL, investor RT, and CSR on cryptocurrency Investment Intention, a relationship that has received little attention in earlier work. Second, it presents empirical evidence on how investor characteristics influence decision-making within digital asset environments, moving beyond the more common focus on risk perception or regulatory aspects. Finally, the findings are expected to assist practitioners, educators, and policymakers in recognizing which factors most strongly shape Investment Intentions, thereby helping to design more effective FL initiatives and cybersecurity awareness programs. Taken together, these contributions enhance understanding of the psychological and knowledge-based drivers of investment behavior in rapidly developing financial markets.

1. Literature Review

In today's era of high paced technological advancement, cryptocurrency has emerged as a transformative form of digital finance, getting attention from both retail and institutional investors because of its decentralized design, speculative nature, and strong price volatility results in high risk but high gains (Ante, 2020). Unlike conventional financial instruments, the value of cryptocurrencies is heavily shaped by investor emotions, social media trends, and perceptions of security risk, making them particularly relevant for behavioral research (Hayashi & Routh, 2024). While broader economic factors such as inflation or interest rates can affect traditional markets, decisions to invest in cryptocurrencies tend to rely more on personal factors such as an investor's knowledge, risk perception, and overall understanding and know-how of financial systems. As a result, the cryptocurrency market has seen quick expansion and continues to attract a wide and diverse group of investors.

Recent research suggests that cryptocurrency adoption is shaped by multiple influences, including technological progress, evolving regulations, and investors' perceptions of risk and potential returns. For example, Zhao and Zhang (2021) found that individuals' levels of FL and RT play a significant role in determining their willingness to invest in digital currencies. Likewise, Hayashi and Routh (2024) distinguish between cryptocurrency investors and mixed users, showing how variations in FL and RT correspond to different investment behaviors. Within cryptocurrency markets, the behavioral finance perspective is especially relevant, as volatility and limited regulatory oversight heighten the impact of individual decision-making. Even under favorable macroeconomic conditions, factors such as FL and perceived CSR continue to shape investment intentions in meaningful ways (Nguyen et al., 2021; Hayashi & Routh, 2024). Therefore, behavioral finance provides a strong rationale for exploring investor-specific, micro-level determinants, offering a deeper understanding of cryptocurrency investment behavior beyond the scope of traditional macroeconomic factors.

1.1. Financial Literacy and Crypto Currency Investment Intentions

FL represents an individual's ability of understanding different financial concepts, evaluate various investment opportunities, and make well-informed financial choices (Lusardi & Mitchell, 2014). In conventional financial markets, a higher level of FL is often linked with more rational and better investment decisions, greater portfolio diversification, and increased market participation. Within the cryptocurrency environment, FL takes a more complicated role because of the digital, highly technical, and volatile nature of these assets which is need to be explored (Kallinterakis & Wang, 2022). Investors who possess stronger financial literacy are generally better equipped to interpret market trends accurately, weigh risks, and develop an intention to invest in speculative instruments. Nevertheless, much of the existing literature on cryptocurrency adoption continues to focus on perceived market risks or regulatory concerns, leaving limited exploration of how financial literacy itself directly influences investment intentions.

H₁: *FL is significantly associated with crypto currency Investment Intentions.*

1.2. Investor Risk Tolerance and Crypto Currency Investment Intention

RT reflects an individual's readiness to take high risk in exchange for potential financial rewards (Grable, 2016). Because crypto currencies are highly volatile and their returns are far less predictable than those of traditional assets, investor RT becomes a central factor in shaping investment choices (Ante, 2020). Previous research indicates that investors with greater risk tolerance are more inclined to participate in high-risk markets and often maintain their holdings despite sharp price swings, whereas risk-averse individuals generally avoid speculative assets altogether (Barsky et al., 1997). Considering these patterns, RT is anticipated to exert a direct and positive influence on cryptocurrency Investment Intentions.

H₂: *Investor RT is significantly associated with cryptocurrency Investor Intention.*

1.3. Cyber-security Risk and Crypto Currency Investment Intentions

CSR refers to the possibility of financial loss, data theft, or unauthorized access to digital assets (Kshetri, 2017). In the context of crypto currency markets, issues such as exchange hacks, phishing schemes, and wallet security weaknesses pose direct risks to investors' funds and confidence. Research has shown that perceived CSR can discourage investment in digital assets, even among individuals who demonstrate strong FL (Nguyen et al., 2021). By incorporating CSR into the model, this study helps close an important gap in understanding how security and technical risks influence cryptocurrency Investment Intentions.

H₃: *Perceived CSR is negatively associated with cryptocurrency investment intention*

1.4. Cyber-Security Risk as a Moderator

Cryptocurrencies are prone to various security issues such as exchange hacks, phishing scams, and wallet breaches that can reduce confidence in digital assets (Kshetri, 2017; Nguyen et al., 2021). Even investors with strong financial literacy may be reluctant to participate if they view cybersecurity threats as substantial. Recent research also shows that contextual risks can weaken the positive link between financial knowledge and investment behavior (Nguyen et al., 2021). FL may only lead to stronger Investment Intentions when investors have confidence in the security of the trading platform (Hayashi & Routh, 2024). Within the cryptocurrency setting, this implies that CSR could serve as a moderating factor, reducing the strength of the positive relationship between FL and the Intention to invest in digital currencies. By exploring this interaction, the study offers a more detailed view of how cognitive and environmental elements together shape investor behavior.

H₄: *CSR moderates the relationship between FL and cryptocurrency Investment Intention*

Recent studies on cryptocurrency investment behavior increasingly highlight the role of individual traits such as RT, showing that investors who are more comfortable with financial uncertainty tend to be more willing to engage with digital assets (Hayashi & Routh, 2024). This observation supports behavioral finance theory, which suggests that a person's natural tolerance for risk plays a major role in participation within highly volatile markets. At the same time, researchers and financial authorities point out that cryptocurrency investments come with distinctive cybersecurity risks, such as hacking incidents, phishing attempts, wallet theft, and irreversible transaction losses that can strongly influence investor confidence and decision-making (Organisation for Economic Co-operation and Development [OECD], 2024). Evidence from previous work also shows that perceived CSR can undermine investor trust and reduce their intention to engage with crypto-assets. Despite the recognition of these direct effects, only a few studies have explored whether CSR moderates the relationship between RT and cryptocurrency Investment Intention. It is still uncertain whether risk-tolerant investors remain confident despite cybersecurity concerns or if perceived cyber threats weaken their willingness to invest. By examining this question, the present study extends behavioral finance research to the digital-asset domain, offering insight into how perceptions of technological risk interact with individual risk preferences to shape Investment Intentions.

H₅: *CSR moderates the relationship between RT and cryptocurrency Investment intention*

Table 1: Hypothesis

Hypothesis	Relationship	Description
H1	FL → Cryptocurrency I	Higher FL is expected to significantly influence investors' intention to invest in cryptocurrencies.
H2	RT → Cryptocurrency I	Greater investor RT is expected to significantly influence cryptocurrency Investment intention.
H3	CSR → Cryptocurrency I	Higher perceived CSR is expected to negatively influence cryptocurrency Investment intention.
H4	FL X CSR → Cryptocurrency I	CSR is expected to moderate the effect of FL on Cryptocurrency Investment intention
H5	RT X CSR → Cryptocurrency I	CSR is expected to moderate the effect of RT on Cryptocurrency Investment intention

1.5. Research Framework:

The theoretical framework for this study outlines how FL, RT, and CSR function as predictors of cryptocurrency Investment Intentions (I). FL and RT are viewed as individual-level characteristics that influence investors' decision-making, whereas CSR reflects external contextual factors that shape confidence and behavior in digital financial environments. The framework also accounts for the possible moderating effect of CSR on the relationships between FL, RT, and I. Overall, the proposed model combines behavioral and cognitive perspectives to explain how investor knowledge and perceptions of cybersecurity risks interact to influence the intention to invest in cryptocurrencies. This framework provides the basis for examining both the direct and moderating effects through PLS-SEM analysis.

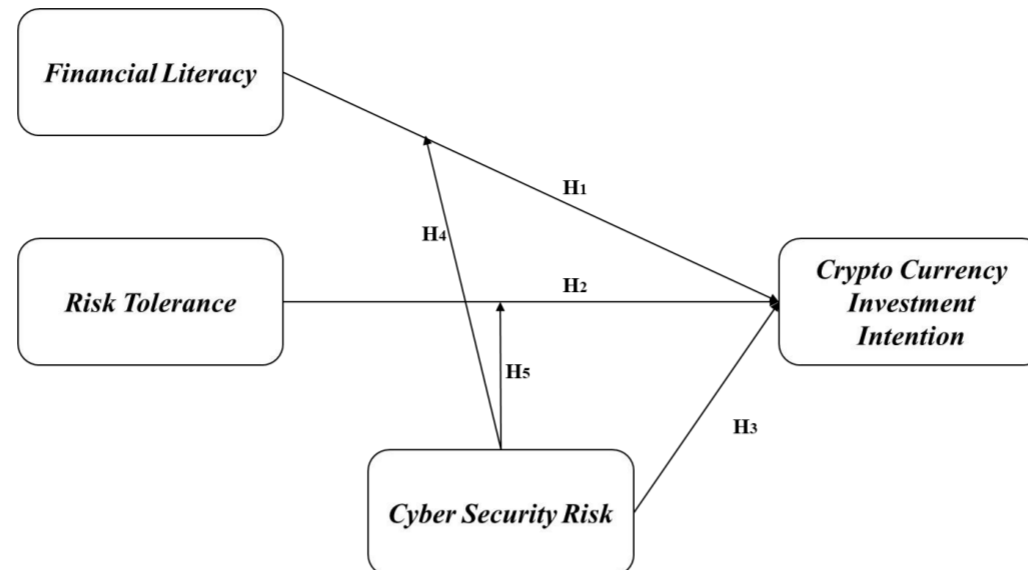


Figure 1: Theoretical Framework

2. Methodology

2.1. Research Design

This study used a **quantitative, cross-sectional research design** to examine the influence of FL, investor RT, and CSR on cryptocurrency Investment intention, **including the moderating effect of CSR on the relationship between FL, investor RT and intention to invest in crypto currency**. A survey-based questionnaire was used to collect data from individual investors.

2.2. Population and Sample

The target population for this study consisted of individual investors who already had a basic awareness of cryptocurrencies at least. To reach people who were more likely to follow digital financial trends, a purposive sampling approach was used. The required sample size was estimated using common guidelines for multiple regression and moderation analysis, which generally recommend around 10–15 participants for each predictor (Hair et al., 2019). Based on this, the study aimed for a minimum of 250 participants, and the final dataset included roughly 300 valid responses, providing sufficient power for the planned analyses.

Data were collected through a structured online questionnaire shared across several channels, including email, social media circles such as WhatsApp cryptocurrency discussion groups, and public crypto-related forums. Participation was completely voluntary, and respondents were informed that their identities would remain anonymous and that all information would be kept confidential.

The questionnaire was divided into sections that captured basic demographic details as well as measures related to FL, RT, CSR, and cryptocurrency I. All items were self-reported, and participants were asked to answer each question honestly based on their own views, experiences, and intentions toward cryptocurrency investment.

2.3. Measurement of Variables

All multi-item constructs were averaged to form composite scores for analysis. To reduce confounding effects, the study includes several control variables: **age, gender, education, income**.

Table 2: Variables and Measurement Tool

Construct	Scale / Measurement	Items / Source
FL	5 items, 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree)	Adapted from Lusardi & Mitchell (2014); Kallinterakis & Wang (2022)
Investor RT	5 items, 5-point Likert scale	Adapted from Grable (2016); Barsky et al. (1997)
CSR	6 items, 5-point Likert scale	Adapted from Nguyen et al. (2021); Kshetri (2017)
Cryptocurrency I	9 items, 5-point Likert scale	Adapted from Zhao & Zhang (2021); Hayashi & Routh (2024)

2.4. Data Analysis

Data were analyzed using PLS-SEM, which was suitable for this study because it can estimate both the measurement and structural components of the model at the same time and works well with models that include moderation (Hair et al., 2019). The analysis began with the usual reliability and validity checks, including Cronbach's alpha, composite reliability, and the average variance extracted (AVE) for each construct. Once the measurement model met the required criteria, the structural model was assessed to examine the direct relationships of FL, RT, and CSR with cryptocurrency I. To test the moderating role of CSR, an interaction term between FL and CSR was created and added to the model. A simple slope analysis was then used to interpret how different levels of CSR change the strength of the relationship between FL and crypto currency investment intention.

2.5. Ethical Considerations

The study met all the ethical research standards. Participants were **informed about the study purpose**, and data were collected **anonymously**. Participants were allowed to withdraw at any stage of data collection.

3. Findings

3.1. Descriptive Analysis:

The demographic profile of the respondents is presented in Table 3. In total, 394 individuals took part in the study. Of these participants, 236 (59.9%) were male and 158 (40.1%) were female, showing that men were more represented in the sample. This trend is consistent with earlier research noting that males are generally more active in high-risk financial markets, including cryptocurrency.

Most respondents were between 21 and 30 years old (158; 40.1%), followed by those aged 31–40 years (118; 29.9%). Altogether, individuals aged 30 and below made up nearly half of the sample, pointing to the strong presence of young adults in cryptocurrency investing likely due to their greater comfort with technology and digital finance tools. Investors aged 41–50 years (51; 12.9%) and those above 50 years (28; 7.1%) formed a smaller portion of the sample, suggesting that older age groups are comparatively less engaged in this market.

In terms of education, most participants held a Master’s degree (197; 50%), with graduates making up 29.9% (118) and secondary passed representing 20.1% (79). Monthly income levels varied across respondents. The highest proportion earned between 150,000 and 250,000 PKR (131; 33.2%), followed by those earning 150,000–75,000 PKR (105; 26.6%). Lower-income participants (<75,000 PKR) accounted for 13.2%, while higher-income categories (<250,000) together represented around 27%.

Table 3: Demographics Analysis

		Frequency	Percent
Gender	Male	236	59.9
	Female	158	40.1
	Total	394	100.0
Age	Upto 20 Years	39	9.9
	21-30	158	40.1
	31-40	118	29.9
	41-50	51	12.9
	Greater Than 50 Years	28	7.1
	Total	394	100.0
Education	Graduate	118	29.9
	Masters	197	50
	Doctorate	79	20.1
	Total	394	100.0
Income	Less Than 75,000	52	13.2
	75,000-150,000	105	26.6
	150,000-250,000	131	33.2
	250,000-300,000	79	20.1
	Greater Than 300,000	27	6.9
	Total	394	100.0

3.2. Statistical Analysis & Model Assessment:

To assess the internal consistency and reliability of the data, the research applied outer loadings. The outcomes of the outer loading analysis indicate that the almost all items exhibit values greater than 0.7, which falls within the acceptable range.

Table 4: Outer Loadings

	CSR	FL	I	RT	CSR x RT	FL
CSR1	0.880					
CSR2	0.855					
CSR3	0.863					
CSR4	0.844					
CSR5	0.865					
CSR6	0.877					
FL1		0.851				
FL2		0.843				
FL3		0.848				
FL4		0.867				
FL5		0.888				
I1			0.812			
I2			0.762			
I3			0.812			
I4			0.872			

I5			0.863			
I6			0.889			
I7			0.903			
I8			0.893			
I9			0.883			
RT1				0.883		
RT2				0.856		
RT3				0.894		
CSR x FL						1.000
CSR x RT					1.000	

The measurement model was assessed using outer loadings to evaluate the reliability of each indicator for its respective construct. Other than few items, all other across the four main constructs; CSR, FL, Investor RT, and Cryptocurrency Investment intention demonstrated strong loadings, ranging from 0.762 to 0.903, exceeding the recommended threshold of 0.70 (Hair et al., 2019). Only 2 items from investor RT has to be dropped because of the weak loadings. CSR items ranged from 0.844 to 0.880, indicating high reliability in measuring perceived CSR. FL items loaded between 0.843 and 0.888, confirming consistent representation of FL. Investment intention indicators ranged from 0.762 to 0.903, reflecting robust measurement across multiple dimensions of intention, while RT items ranged from 0.856 to 0.894, demonstrating reliable capture of investor RT. The interaction terms (CSR × FL and CSR × RT) had loadings of 1.000, which is expected in PLS-SEM for latent interactions and confirms correct construction of moderation variables. Overall, these results indicate that all measurement items are reliable and the model exhibits strong convergent validity, making it suitable for subsequent structural model analysis. There is an internal consistency of reliability in the data as Cronbach's Alpha is greater than 0.7 throughout. To check the validity of the data, we have applied Average Variance Extracted (AVE) test. The result shows that the AVE is greater than 0.5 which proves that there is convergent validity in the data.

Table 5: Reliability & Validity

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
CSR	0.932	0.936	0.946	0.747
FL	0.913	0.929	0.934	0.739
I	0.954	0.955	0.961	0.732
RT	0.853	0.872	0.910	0.770

The reliability and convergent validity of the study's constructs were assessed using Cronbach's alpha, Composite Reliability, and the Average Variance Extracted (AVE). As shown in Table 4.2, the constructs showed strong internal consistency. Cronbach's alpha values ranged from 0.853 for RT to 0.954 for cryptocurrency investment intention, all exceeding the commonly accepted threshold of 0.70. This indicates that the items within each construct consistently capture the same underlying concept.

The composite reliability values supported these results, with rho_a and rho_c ranging from 0.872 to 0.961. Convergent validity was also established through AVE, as all constructs surpassed the recommended minimum of 0.50 (Fornell & Larcker, 1981). The AVE values, which ranged from 0.732 for I to 0.770 for RT, suggest that each construct successfully explains a substantial portion of the variance in its indicators.

Overall, these findings confirm that the measurement model is both reliable and valid, providing a strong basis for proceeding with the structural model and hypothesis testing.

Table 6: Discriminant Validity (HTMT)

	CSR	FL	I	RT	CSR x RT	CSR x FL
CSR						
FL	0.119					
I	0.668	0.305				
RT	0.074	0.590	0.351			
CSR x RT	0.092	0.212	0.117	0.049		
CSR x FL	0.063	0.126	0.201	0.220	0.539	

Discriminant validity was assessed using the Heterotrait-Monotrait (HTMT) ratio, which evaluates whether constructs are sufficiently distinct from each other. According to Henseler et al. (2015), HTMT values should be below 0.90 (or 0.85 for more conservative criteria) to confirm discriminant validity. As shown in Table 4.3, all HTMT values in the current study fall well below the 0.90 threshold. The highest HTMT value observed was 0.668 between CSR and Cryptocurrency Investment intention, indicating a moderate relationship but sufficient distinction between the constructs. Other HTMT values ranged from 0.049 to 0.590, confirming that all constructs, FL, Investor RT, Cryptocurrency Investment Intention and CSR are conceptually distinct. The interaction terms (CSR × FL and CSR × RT) also showed acceptable HTMT values with their respective constructs, supporting the adequacy of the measurement model for moderation analysis. Overall, these results indicate strong discriminant validity, ensuring that each construct captures unique variance and is not conflated with other constructs in the model.

Table 7: Discriminant Validity (Fornell Larcker)

	CSR	FL	I	RT
CSR	0.864			
FL	0.073	0.860		

I	0.632	-0.298	0.855
RT	0.017	0.525	-0.326
			0.878

Discriminant validity was further assessed using the Fornell-Larcker criterion, which requires that the square root of the Average Variance Extracted (AVE) for each construct should be greater than its correlations with other constructs. This ensures that a construct shares more variance with its indicators than with other constructs in the model (Fornell & Larcker, 1981).

As shown in the table: The diagonal values, representing the square roots of AVE, are CSR = 0.864, FL= 0.860, I = 0.855, and RT = 0.878. Each of these diagonal values is greater than the off-diagonal correlations with other constructs. For example, CSR's square root (0.864) is higher than its correlations with FL (0.073), I (0.632), and RT (0.017). Similarly, all other constructs meet the same criterion. These results indicate that each construct is more strongly related to its own indicators than to other constructs, confirming strong discriminant validity. Therefore, the measurement model is reliable and the constructs are sufficiently distinct, supporting the robustness of subsequent structural model analysis.

Table 8: Collinearity

	VIF
CSR1	3.016
CSR2	2.822
CSR3	2.967
CSR4	2.513
CSR5	2.987
CSR6	3.184
FL1	2.382
FL2	2.340
FL3	3.086
FL4	2.396
FL5	3.363
I1	3.247
I2	3.022
I3	2.970
I4	4.289
I5	4.123
I6	4.377
I7	4.464
I8	4.178
I9	4.251
RT1	2.054
RT2	2.142
RT3	2.099
CSR x FL	1.000
CSR x RT	1.000

The VIF was assessed to examine multicollinearity among the indicators in the measurement model. High multicollinearity can change path coefficients and reduce the reliability of estimates. A VIF value below 5 is generally considered (Hair et al., 2019). In this study, the VIF values for all indicators ranged from 1.000 (interaction terms: CSR × FL and CSR × RT) to 4.464 (I7). All VIF values are well below the threshold of 5, indicating no significant multicollinearity among the constructs and their indicators. Overall, the results suggest that the measurement model does not have multicollinearity concerns, providing confidence in the reliability of the subsequent hypothesis testing.

Table 9: R-Square

	R-square	R-square adjusted
I	0.560	0.536

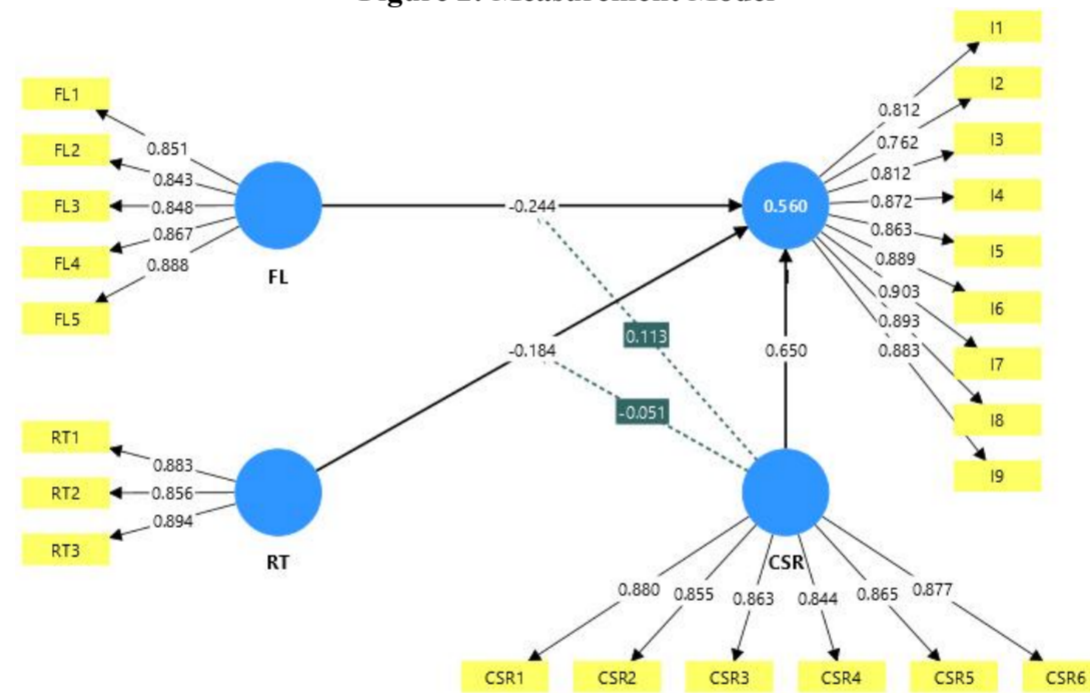
The R-square (R^2) value was examined to assess the explained variance of the dependent variable, Cryptocurrency Investment intention, by the independent variables: FL, Investor RT, and CSR. The results show that $R^2 = 0.560$, indicating that 56% of the variance in cryptocurrency I is explained by the model. The adjusted $R^2 = 0.536$ accounts for the number of predictors and sample size, confirming that the model maintains strong explanatory power even after adjusting for potential over fitting. An R^2 value of 0.560 is considered moderate to substantial in behavioral finance and social science research, suggesting that the independent variables and moderators included in the study provide meaningful insights into the factors influencing Investment intentions in cryptocurrencies. This demonstrates that FL, RT, and perceived CSR are significant predictors of investors' intentions, justifying further analysis of direct and moderating effects in the structural model.

Table 10: F-Square

	CSR	FL	I	RT	CSR x RT	CSR x FL
CSR			0.945			
FL			0.090			
I						
RT			0.051			
CSR x RT			0.004			
CSR x FL			0.021			

The f^2 statistic was used to evaluate the effect size of each independent variable and interaction term on the dependent variable, Cryptocurrency Investment Intention. This measure helps indicate how much each predictor contributes to the overall explained variance of the dependent variable. As outlined by Cohen (1988), f^2 values of 0.02, 0.15, and 0.35 are typically interpreted as small, medium, and large effects. The results show clear differences in the strength of each predictor. CSR has an f^2 value of 0.945, which reflects a very large effect on cryptocurrency investment intention and demonstrates its central role in influencing investors' intentions. FL has an f^2 of 0.090, which falls within the small-to-moderate range. This suggests that while FL does play a role, its influence is not as strong as CSR. Investor RT shows an f^2 of 0.051, indicating a small effect on investment intention. The interaction terms, CSR \times FL (0.021) and CSR \times RT (0.004) also fall within the small effect range. This is common for moderation terms and suggests that although CSR moderates the effects of FL and RT, the strength of these moderating influences is relatively modest. Overall, the f^2 analysis shows that CSR is the most powerful predictor of cryptocurrency I, while FL and RT exert smaller but still meaningful effects. The moderation results indicate that CSR does shape the relationships among these variables, but the primary influence comes from the direct effects rather than the interaction terms.

Figure 2: Measurement Model

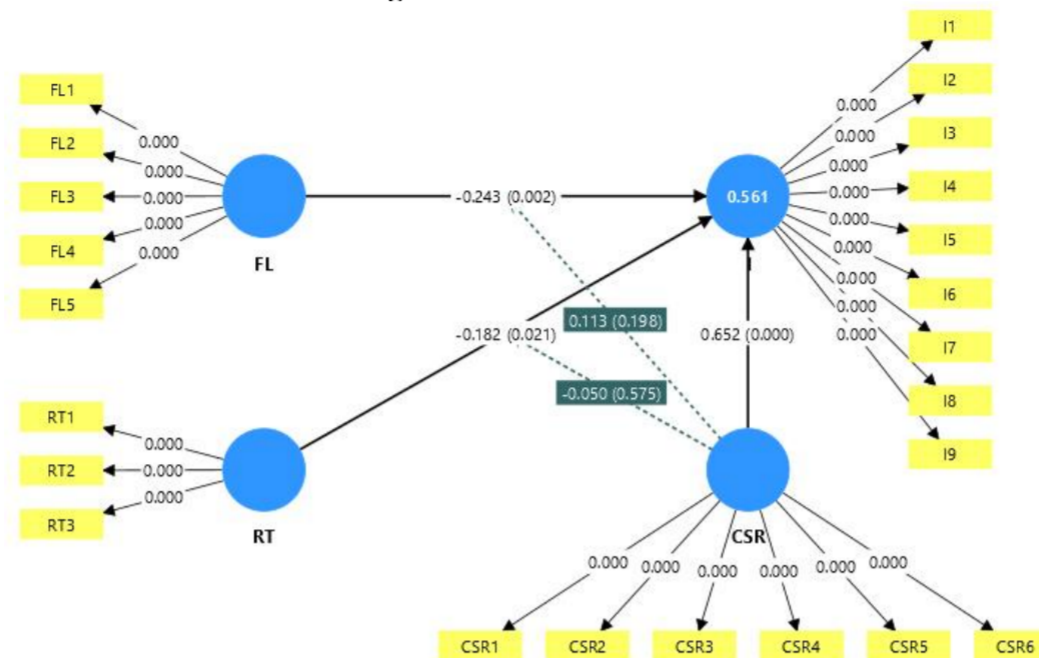


The measurement model demonstrates strong reliability and validity, with all indicators loading significantly on their respective constructs, FL, Investor RT, CSR, and Cryptocurrency Investment intention. Loadings range from 0.762 to 0.903, confirming convergent validity. CSR shows the strongest positive effect on I (0.650), while FL (-0.244) and RT (-0.184) have smaller negative effects. Moderation effects of CSR on FL (0.113) and RT (-0.051) are present but modest. The model explains 56% of the variance in Investment intention ($R^2 = 0.560$), indicating a substantial explanatory power and a solid foundation for testing structural hypotheses.

3.3. Structural Model

The structural model results indicate that cryptocurrency I (I) is significantly influenced by FL, investor RT, and CSR. Specifically, FL ($\beta = -0.243$, $p = 0.002$) and RT ($\beta = -0.182$, $p = 0.021$) both have significant negative effects, suggesting that more financially literate and risk-tolerant individuals tend to be slightly more cautious in investing.

Figure 3: Structural Model



In contrast, CSR has a strong positive effect ($\beta = 0.652$, $p < 0.001$), highlighting the importance of cybersecurity awareness in shaping investment intention. The moderation effects of CSR on the relationships of FL and RT with Intention investment of cryptocurrencies are positive but not significant, indicating limited moderating influence. The model explains 56% of the variance in I ($R^2 = 0.561$), demonstrating moderate to substantial explanatory power and emphasizing CSR as the most influential predictor among the constructs.

Table 11: Path Coefficients

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
CSR -> I	0.652	0.657	0.063	10.308	0.000
CSR x FL -> I	0.113	0.103	0.088	1.288	0.198
CSR x RT -> I	-0.050	-0.043	0.089	0.561	0.575
FL -> I	-0.243	-0.247	0.080	3.031	0.002
RT -> I	-0.182	-0.178	0.079	2.314	0.021

The path coefficient results indicate that cryptocurrency investment intention is significantly influenced by CSR, FL, and RT. CSR has a strong positive effect ($\beta = 0.652$, $t = 10.308$, $p < 0.001$), suggesting that awareness of CSR strongly shapes investors' intentions. In contrast, FL ($\beta = -0.243$, $t = 3.031$, $p = 0.002$) and RT ($\beta = -0.182$, $t = 2.314$, $p = 0.021$) have significant negative effects, indicating that more financially literate and risk-tolerant individuals tend to be slightly more cautious about investing in cryptocurrency. The moderation effects of CSR on the relationships of FL ($\beta = 0.113$, $t = 1.288$, $p = 0.198$) and RT ($\beta = -0.050$, $t = 0.561$, $p = 0.575$) with I are not significant, suggesting that CSR does not meaningfully alter these direct effects. Overall, CSR emerges as the most influential predictor of cryptocurrency Intention investment in this model.

3.4. Discussion

The results of this study offer a clear view of the factors shaping cryptocurrency Investment intention among investors. CSR emerged as the strongest and most significant predictor ($\beta = 0.652$, $p < 0.001$), showing that concerns about cybersecurity threats such as phishing, hacking, or data breaches play a major role in shaping whether individuals feel comfortable investing in digital assets. This aligns with earlier work stressing that trust and perceived security are central when dealing with cryptocurrencies, as investors prefer platforms they believe can keep their information and funds safe (Juma'h, et al, 2025). A noteworthy finding is that both FL and investor RT had significant negative effects on Investment intention (FL: $\beta = -0.243$, $p = 0.002$; RT: $\beta = -0.182$, $p = 0.021$). This indicates that individuals who are more financially literate or who generally tolerate risk were somewhat more hesitant to invest in cryptocurrencies. For FL, this could reflect a deeper understanding of the risks, volatility, and speculative nature of digital assets. The negative effect of RT suggests that even risk-tolerant investors may be cautious when facing markets that are highly unpredictable. These results differ from traditional expectations—where higher RT typically predicts greater interest in speculative assets—highlighting that the behavior of cryptocurrency investors may not always follow conventional financial patterns.

The moderation analysis found that CSR did not significantly moderate the relationships between FL or RT and I (CSR \times FL: $\beta = 0.113$, $p = 0.198$; CSR \times RT: $\beta = -0.050$, $p = 0.575$). This means that although CSR has a strong direct influence on cryptocurrency investment intention, it does not meaningfully change how FL or RT relate to investment

intention. In practical terms, regardless of an investor's level of financial knowledge or RT, concerns about cybersecurity remain a dominant and consistent factor in their decision-making. Overall, the model accounted for 56% of the variance in cryptocurrency Investment intention ($R^2 = 0.561$), indicating moderate to substantial explanatory strength. These findings collectively suggest that security perceptions are at the center of cryptocurrency investment behavior, while individual characteristics such as FL and RT may contribute more to cautious decision-making than to risk-taking. This has important implications for crypto platforms and regulators, underscoring the need for strong security systems and transparent communication to maintain and build investor confidence.

4. Conclusion and Recommendation

This study examined how FL, investor RT, and CSR shape cryptocurrency Investment intention. It also examines the moderating role of CSR on the relationship between FL, RT and cryptocurrency investment intention. The results show that CSR plays the most influential role, as investors who perceive higher security threats are far more cautious when deciding whether to invest in cryptocurrencies. In comparison, both FL and RT demonstrated significant negative effects on cryptocurrency intention to invest. This pattern suggests that individuals who are more financially knowledgeable or who generally tolerate risk may still take a careful approach to cryptocurrency markets, likely because they are more aware of their volatility and the potential for sudden losses. The moderation analysis further revealed that CSR does not significantly change the effects of either FL or RT, meaning that concerns about security consistently influence investment decisions regardless of an investor's knowledge and information level or risk preferences. With the model explaining 56% of the variance in cybersecurity investment intention, the findings underscore how central perceived security is in shaping investment behavior in digital asset markets.

Based on these insights, several recommendations emerge. Cryptocurrency platforms should focus on strengthening cybersecurity such as through robust encryption, multi-factor authentication, and frequent security audits and clearly communicate these measures to increase investor confidence. Investors, on their part, should weigh CSR alongside FL and RT when making investment choices and ensure they interact only with credible and secure platforms. For regulators and policymakers, setting clear cybersecurity standards for cryptocurrency exchanges and promoting educational efforts that build both FL and awareness of digital security would be beneficial. Future research could expand on this work by examining additional behavioral or psychological factors, including trust, perceived usefulness, or social influence, and by exploring how demographic or cultural differences may shape cryptocurrency investment behavior. This would provide a more comprehensive understanding of how individuals make decisions in this rapidly evolving market.

REFERENCES

- Ajzen, I. (1991). **The theory of planned behavior.** *Organizational Behavior and Human Decision Processes*, 50(2), 179–211. [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T)
- Ante, L. (2020). **Cryptocurrency risk and return: Evidence from Bitcoin and altcoins.** *Finance Research Letters*, 35, 101504. <https://doi.org/10.1016/j.frl.2019.101504>
- Aysan, A. F., Demirtaş, H. B., & Saraç, M. (2021). The Ascent of Bitcoin: Bibliometric Analysis of Bitcoin Research. *Journal of Risk and Financial Management*, 14(9), 427. <https://doi.org/10.3390/jrfm14090427>
- Barsky, R. B., Juster, F. T., Kimball, M. S., & Shapiro, M. D. (1997). **Preference parameters and behavioral heterogeneity: An experimental approach in the health and retirement study.** *The Quarterly Journal of Economics*, 112(2), 537–579. <https://doi.org/10.1162/003355397555235>
- Grable, J. E. (2016). **Financial Risk Tolerance and investment behavior: Implications for financial planning.** *Journal of Financial Planning*, 29(5), 38–46.
- Hayashi, Y., & Routh, S. (2024). **Investor typologies and behavioral determinants in cryptocurrency markets.** *Journal of Behavioral Finance*, 25(1), 50–66. <https://doi.org/10.1080/15427560.2023.2201145>
- Hayashi, F., & Routh, J. (2024). *Financial literacy, risk tolerance, and cryptocurrency ownership in the United States* (Research Working Paper No. 24-01). Federal Reserve Bank of Kansas City. <https://doi.org/10.18651/RWP2024-01>
- Kallinterakis, V., & Wang, H. (2022). **Investor behavior in cryptocurrency markets: The role of FINANCIAL LITERACY and information processing.** *Journal of Behavioral Finance*, 23(2), 112–129. <https://doi.org/10.1080/15427560.2022.2048371>
- Kshetri, N. (2017). **The emerging role of big data in key development issues: Opportunities challenges, and concerns.** *Big Data for Development*, 1, 19–42.
- Lusardi, A., & Mitchell, O. S. (2014). **The economic importance of Financial literacy: Theory and evidence.** *Journal of Economic Literature*, 52(1), 5–44. <https://doi.org/10.1257/jel.52.1.5>
- Nguyen, T., Ngo, L., & Hoang, T. (2021). **CSR and its impact on digital asset adoption.** *Journal of Risk Research*, 24(10), 1345–1363. <https://doi.org/10.1080/13669877.2020.1773012>
- Juma'h, A., & Alnsour, Y., & Kartal, H. (2025). *The impact of security and privacy perceptions on cryptocurrency app evaluations by users: A text mining study.* *Investment Management and Financial Innovations*, 22(1), 173–187.
- Organisation for Economic Co-operation and Development. (2024). *Improving the digital financial literacy of crypto-asset users.* OECD Publishing. <https://doi.org/10.1787/19cfecad-en>
- Zhao, S., & Zhang, X. (2021). **Behavioral determinants of cryptocurrency adoption: Evidence from individual investors.** *Journal of Behavioral Finance*, 22(4), 367–384. <https://doi.org/10.1080/15427560.2020.1788375>

Questionnaire

Instructions for Respondents:

Please indicate your level of agreement with each statement using the following scale:

1 = Strongly Disagree | 2 = Disagree | 3 = Neutral | 4 = Agree | 5 = Strongly Agree

Section A: Demographics

Variable	Response
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Age	_____
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Variable **Response**
Gender Male Female Other
Education Level Secondary Bachelor Master Doctorate
Monthly Income _____

Section B: FINANCIAL LITERACY (5 items)

1. I understand how cryptocurrency prices are determined.
2. I am confident in my ability to evaluate the risks and returns of cryptocurrency investments.
3. I can interpret cryptocurrency market trends and charts.
4. I am familiar with blockchain technology and its basic functions.
5. I can make informed decisions regarding buying, holding, or selling cryptocurrencies.

Section C: Investor Risk Tolerance (5 items)

1. I am willing to accept high Financial Literacy fluctuations in cryptocurrency value for potential high returns.
2. I am comfortable investing in assets with uncertain outcomes.
3. I can tolerate temporary financial losses in my investment portfolio.
4. I prefer investments that might be risky but offer higher potential gains.
5. I feel confident making investment decisions under uncertainty.

Section D: Cybersecurity Risk (5 items)

1. I worry about phishing or scams when trading or storing cryptocurrency.
2. Security threats affect my decision to invest in cryptocurrencies.
3. I feel confident in the cybersecurity measures provided by cryptocurrency exchanges. (*Reverse-coded*)
4. CSRs make me hesitant to invest in digital assets.
5. I am concerned that cryptocurrency exchanges may be vulnerable to hacking or data breaches.
6. I believe that weak cybersecurity practices could lead to significant financial losses when investing in cryptocurrencies.

Note: Reverse-coded items should be recoded during data analysis.

Section E: Cryptocurrency Investment Intention (5 items)

1. I intend to invest in cryptocurrencies within the next 6 months.
2. I plan to increase my cryptocurrency holdings in the near future.
3. I am likely to recommend cryptocurrency investment to friends or family.
4. I am willing to allocate a significant portion of my portfolio to cryptocurrencies.
5. I am interested in actively trading cryptocurrencies over the next year.
6. I expect to explore new cryptocurrency projects or tokens as potential investment opportunities.
7. I am willing to monitor cryptocurrency market trends regularly to support my investment decisions.
8. I intend to allocate funds specifically for future cryptocurrency investments.
9. I am motivated to learn more about cryptocurrency markets to strengthen my future investment decisions.