

# The Influence of Cognitive and Emotional Biases on Investment Decisions through Financial Literacy

*Behavioral Biases,  
Financial Literacy, and  
Investment Decisions*

Raden Dian Hardiana<sup>1\*</sup>, Nugraha<sup>2</sup>, Toni Heryana<sup>3</sup>, Imas Purnamasari<sup>4</sup>

<sup>1,2,4</sup>*Department of Accounting Education, Faculty of Economics and Business, Universitas Pendidikan Indonesia; Bandung, Indonesia*

<sup>3</sup>*Department of Accounting, Faculty of Economics and Business, Universitas Pendidikan Indonesia; Bandung, Indonesia*

\*Corresponding Author E-Mail: dianhardiana@upi.edu

**2825**

Submitted:  
January 26, 2026

Revised:  
March 27, 2026

Accepted:  
May 23, 2026

Published Online:  
May 31, 2026

## ABSTRACT

*Rapid growth of retail investor participation via digital platforms, investment quality remains inadequate, as numerous individuals continue to exhibit suboptimal decision-making driven by psychological influences. This study investigates the impact of cognitive and emotional biases on investment decisions, utilizing financial literacy as a mediating variable among retail investors in West Java and Banten, Indonesia. Employing a quantitative research design with a survey method, data gathered from experienced retail investors were analyzed using Partial Least Squares Structural Equation Modelling (PLS-SEM). The empirical findings indicate that cognitive and emotional biases exert a significant negative effect on financial literacy, whereas financial literacy demonstrates a significant positive influence on investment decisions. Furthermore, financial literacy significantly mediates the relationship between both categories of psychological biases and investment decisions. The proposed model exhibits moderate explanatory and predictive power, thereby confirming its adequacy in explaining investor behavior. Consequently, these findings imply that financial literacy plays a pivotal role in mitigating the adverse effects of psychological biases in investment decision-making. The study concludes that enhancing financial literacy is imperative to foster rational investment behavior, suggesting that financial education initiatives must integrate strategic interventions to diminish cognitive and emotional distortions.*

**Keywords:** Behavioral Finance, Cognitive Biases, Emotional Biases, Financial Literacy, Investment Decisions.

## INTRODUCTION

In recent years, the Indonesian capital market has experienced substantial expansion, characterized by the increasing involvement of retail investors through diverse digital platforms. The advancement of financial technology (fintech), alongside the reduction of transaction fees, has considerably enhanced broader financial inclusion. Data provided by the Financial Services Authority (*Otoritas Jasa Keuangan/OJK*) indicate a pronounced rise in retail investor numbers, especially in major economic growth hubs like West Java and Banten (*OJK*, 2025). Nonetheless, this quantitative surge has not automatically translated into enhanced investment behavior quality. A significant segment of retail investors still displays suboptimal practices, which are marked by speculative actions, uncalculated risk exposure, and decision-making processes dictated by psychological impulses rather than rigorous fundamental analysis.

The behavioral finance literature indicates that investment behavior is frequently influenced by behavioral biases, which encompass both emotional and cognitive dimensions. Emotional biases comprise herding behavior, regret aversion, and self-attribution, whereas cognitive biases are composed of overconfidence, availability bias, and conservatism bias (Barber & Odean, 2008). These psychological distortions compel

**JIMKES**

Jurnal Ilmiah Manajemen  
Kesatuan  
Vol. 14 No. 3, 2026  
pp. 2825-2834  
IBI Kesatuan  
ISSN 2337 – 7860  
E-ISSN 2721 – 169X  
DOI: 10.37641/jimkes.v14i3.5024

investors to deviate from rational decision-making frameworks, thereby generating inefficient investment outcomes. For instance, overconfidence has been associated with excessive trading activity, which ultimately reduces net returns once transaction fees are factored in (Odean, 1998). This evidence demonstrates that, despite enhanced accessibility to the capital market, the quality of decision-making among retail investors remains highly vulnerable to psychological influences.

Financial literacy is widely acknowledged as a critical determinant in improving investment behavior. Individuals possessing advanced levels of financial literacy tend to display a superior understanding of the risk–return trade-off, which enables them to execute more rational and informed investment decisions. Empirical evidence within the Indonesian context demonstrates a negative association between financial literacy and behavioral biases, whereby heightened literacy levels correspond to diminished bias and more rational investment behavior (Wijayanto et al., 2023). Nevertheless, prior studies have predominantly analyzed emotional and cognitive biases in isolation, without adequately addressing their combined effects on investment decisions. Furthermore, there remains a limited body of research explicitly investigating the mediating role of financial literacy in the relationship between behavioral biases and investment decisions, particularly among retail investors in Indonesia.

Extant literature emphasizes financial literacy as a key determinant of investment behavior and decision quality. For instance, Costa et al. (2019) and Palanichamy et al. (2024) established its significant influence on stock market investment decisions. Similarly, Gultom et al. (2024) demonstrated that financial literacy positively affects individuals' investment interest. These studies confirm that higher financial knowledge directly enhances investment intentions and choices, underscoring the critical role of financial literacy in shaping successful individual financial behavior within complex economic environments.

Against this background, the present study aims to address the existing research gap by providing a comprehensive analysis of the effects of emotional and cognitive biases on investment decisions, while simultaneously examining the mediating role of financial literacy. The focus on retail investors in West Java and Banten is highly pertinent, given that these regions characterize both the rapid surge in investor participation and the complexity of financial behavior. Accordingly, this study is expected to contribute theoretically by advancing the behavioral finance literature, and practically by offering policy implications and financial education strategies to enhance the quality of investment decision-making in Indonesia.

## **LITERATURE REVIEW & HYPOTHESIS DEVELOPMENT**

### **The Effect of Cognitive Biases and Emotional Biases on Investment Decisions**

Behavioral finance offers an expansive framework for understanding the mechanisms through which psychological factors influence financial literacy, extending beyond the rational assumptions embedded within traditional finance theory (Fama, 1970; Rana, 2023). Investors frequently depend on heuristics that generate systematic cognitive distortions, thereby compromising their capacity to process financial information and evaluate risk effectively (Kanapickienė et al., 2024; Parveen, 2025). Cognitive biases, including overconfidence, availability, and conservatism, significantly impact the level of financial literacy by impairing judgment and diminishing the accuracy of financial comprehension. Specifically, overconfidence often leads individuals to overestimate their financial knowledge and disregard objective financial data, whereas conservatism induces resistance to new financial insights and delays adaptation to updated market knowledge (Wendy, 2021; Khan et al., 2023). These biases obstruct the development of robust financial literacy and constrain individuals' capacity to execute rational financial evaluations (Jain et al., 2023).

In addition to cognitive distortions, emotional biases play a substantial role in shaping financial literacy through affective and social influences. Biases such as herding, regret aversion, and self-attribution condition how individuals interpret financial information

and respond to financial uncertainty (Din et al., 2021; Wangzhou et al., 2021). Herding behavior, driven by social pressure and the fear of missing out, often prompts individuals to rely on collective opinions rather than develop independent financial comprehension, whereas regret aversion inhibits learning from prior financial mistakes. Furthermore, market sentiment and collective psychological reactions intensify these tendencies, thereby influencing individuals' confidence and motivation to enhance their financial knowledge (Sarwar & Afaf, 2016; Aggarwal, 2022). Both cognitive and emotional biases significantly affect financial literacy, reinforcing the argument that psychological factors play a crucial role in shaping individuals' financial knowledge and understanding.

H1: Cognitive biases have a significant effect on financial literacy.

H2: Emotional biases have a significant effect on financial literacy.

### **The Effect of Financial Literacy on Investment Decisions**

Financial literacy is widely recognized as a fundamental determinant of individuals' capacity to execute informed and rational investment decisions. It encompasses the knowledge, skills, and confidence required to comprehend complex financial concepts, such as risk diversification, investment instruments, and financial planning (Rehmat et al., 2023; Suresh, 2024). Individuals possessing advanced levels of financial literacy are better equipped to evaluate financial information, interpret market signals, and allocate resources efficiently, thereby enhancing decision quality and long-term financial outcomes (Vlasenko, 2022). Deficient financial literacy is frequently associated with suboptimal investment behavior, including inadequate diversification and heightened vulnerability to misleading or incomplete information (Nugraha et al., 2022).

Empirical evidence presented by Prasetyo et al. (2023) consistently highlights the positive impact of financial literacy on investment decisions and behavior. Financially literate individuals are more inclined to rely on analytical reasoning rather than emotional impulses, resulting in more rational and consistent decision-making. Prior studies further confirm its significance, with Adil et al. (2022) and Abideen et al. (2023) demonstrating that financial literacy significantly influences stock market investment decisions, and Gultom et al. (2024) showing that it positively affects investment interest. Additionally, financial literacy contributes to enhanced financial behavior across various domains, including saving, spending, and investing (Sarlawata, 2025; Fadli, 2025). These findings underscore the essential role of financial literacy in improving the effectiveness and quality of investment decisions.

H3: Financial literacy has a significant effect on investment decisions.

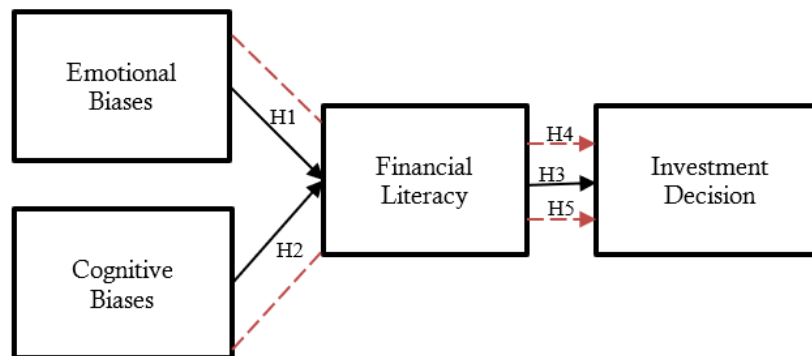
### **The Effect of Financial Literacy as a Mediating Variable**

Financial literacy also functions as a critical mediating variable within the relationship between behavioral biases and investment decisions (Dinarjito, 2023). Behavioral finance theory suggests that psychological biases distort rational judgment; nevertheless, financial literacy can mitigate these adverse effects by strengthening individuals' capacity to process financial information objectively (Rana, 2023; Parveen, 2025). By advanced understanding of financial concepts and risk–return trade-offs, financial literacy enables investors to recognize and manage biases such as overconfidence, herding, and regret aversion, thereby promoting more rational decision-making (Harahap et al., 2022; Rehmat et al., 2023). This mediating role underscores the importance of knowledge in diminishing the negative impact of behavioral distortions on financial outcomes (Kakinuma, 2022; Chandrawati et al., 2023).

Empirical studies provide substantial verification for the mediating role of financial literacy. Evidence presented by Anggriani et al. (2025) indicates that financial literacy significantly diminishes the negative effects of cognitive biases, including overconfidence and availability bias, on investment decisions. It likewise assists investors in managing emotional biases by fostering more disciplined and informed financial behavior, even in

the presence of uncertainty and social influence (Rehmat et al., 2023). Studies conducted within emerging markets further confirm that financial literacy serves as an intermediary mechanism linking behavioral biases to investment outcomes. Nevertheless, financial literacy does not entirely eliminate these biases; rather, it partially mitigates their effects, thereby reflecting the complex interaction between knowledge and psychological tendencies (Preacher & Hayes, 2008; Wang & Zou, 2025).

H4: Financial literacy mediates the effect of cognitive biases on investment decisions.  
H5: Financial literacy mediates the effect of emotional biases on investment decisions.



**Figure 1.** Conceptual Framework

Figure 1 illustrates the conceptual framework of this study, which delineates the relationships among emotional biases, cognitive biases, financial literacy, and investment decisions. Within this model, emotional and cognitive biases are positioned as independent variables that influence financial literacy, whereas financial literacy serves concurrently as an independent and mediating variable affecting investment decisions. Furthermore, financial literacy mediates the relationships between both emotional and cognitive biases and investment decisions, indicating that investors' financial knowledge may substantially strengthen or mitigate the impact of psychological biases on investment decision-making.

## **RESEARCH METHODS**

This study adopts a quantitative research design utilizing a survey-based approach to investigate the relationships among cognitive biases, emotional biases, financial literacy, and investment decisions. The primary objective is to evaluate causal linkages among these constructs within a structured model, wherein financial literacy is positioned as a mediating variable. A quantitative approach is deemed appropriate as it facilitates hypothesis testing through statistical analysis and supports the estimation of complex relationships among latent variables within a data-driven framework.

The study incorporates four main variables: Cognitive Biases (CB) and Emotional Biases (EB) as exogenous variables, Financial Literacy (FL) as a mediating variable, and Investment Decisions (ID) as the endogenous variable. Each construct is operationalized based on established literature in behavioral finance and financial literacy, thereby ensuring conceptual validity and alignment with prior empirical studies. The research instrument was developed in the form of a structured questionnaire, comprising measurement items adapted from validated scales. All variables were measured utilizing a five-point Likert scale ranging from "strongly disagree" to "strongly agree," allowing respondents to articulate their perceptions regarding behavioral tendencies, financial knowledge, and decision-making quality.

The population of this study comprises individual retail investors who actively participate in financial investment activities. A purposive sampling technique was deployed to ensure that respondents met specific criteria, specifically possessing at least

one year of investment experience and having executed transactions in capital market instruments or other financial assets. This approach guarantees that participants possess sufficient knowledge and experience to provide meaningful responses. The sample size was determined in accordance with the requirements of Partial Least Squares Structural Equation Modelling (PLS-SEM), exceeding the minimum threshold of ten times the number of structural paths directed toward the endogenous construct (Hair et al., 2019).

Data collection was executed through an online survey administered via Google Forms over the period from July to September 2025. The survey targeted retail investors located in West Java and Banten, regions characterized by substantial growth in investment participation. Prior to the primary data collection phase, the questionnaire underwent a content validity assessment by experts to ensure clarity and relevance, followed by a pilot test to evaluate reliability and internal consistency among a small group of respondents.

The study employs Partial Least Squares Structural Equation Modelling (PLS-SEM) using SmartPLS to analyze relationships among constructs. This method is suitable for complex models and does not require multivariate normality. The analysis consists of two stages: measurement model and structural model evaluation. The measurement model is assessed through convergent validity (AVE), reliability (Cronbach's Alpha, rhoA, Composite Reliability), and discriminant validity (Fornell–Larcker, cross-loadings, HTMT). The structural model is evaluated using  $R^2$ ,  $Q^2$ , and bootstrapping for path significance. Model fit is assessed using Standardized Root Mean Square Residual (SRMR) and Normed Fit Index (NFI) to examine direct and mediating effects.

## RESULTS

The results of the measurement model evaluation demonstrate that all constructs satisfy the established standards of reliability and validity. Specifically, the values of Cronbach's Alpha, rho\_A, and Composite Reliability for each construct exceed 0.87, thereby indicating a high level of internal consistency and confirming the reliability of the measurement instruments. Furthermore, the Average Variance Extracted (AVE) for all constructs surpasses the minimum threshold of 0.50, suggesting that the reflective indicators sufficiently capture and explain the variance of their respective latent constructs. Comprehensive details regarding the AVE and reliability metrics are systematically reported in Table 1.

**Table 1.** Validity and Reliability Test

Variable	$\alpha$	rho_A	CR	AVE
Cognitive Biases	0.912	0.917	0.925	0.553
Emotional Biases	0.906	0.914	0.922	0.540
Financial Literacy	0.922	0.923	0.936	0.647
Investment Decision	0.887	0.895	0.910	0.559

Table 1 shows that every construct satisfies the necessary criteria for validity and reliability. Each variable's Cronbach's Alpha, rho\_A, and Composite Reliability values are greater than 0.70, demonstrating high internal consistency among the measurement items. Additionally, all constructs have Average Variance Extracted (AVE) values above 0.50, indicating sufficient convergent validity since the indicators can account for a significant amount of variance in the corresponding constructs. These findings show that the measuring approach is reliable and appropriate for additional research.

**Table 2.** Fornell-Lacker Criterion

Variable	CB	EB	FL	ID
Cognitive Biases (CB)	0.744			
Emotional Biases (EB)	0.415	0.735		
Financial Literacy (FL)	-0.349	-0.455	0.805	
Investment Decision (ID)	-0.405	-0.474	0.686	0.747

As presented in Table 2, the square root of the Average Variance Extracted (AVE) for each construct exceeds its correlation coefficients with other latent variables, thereby indicating that robust discriminant validity is successfully established. This result satisfies the Fornell–Larcker criterion, which dictates that each construct must demonstrate stronger associations with its own block of indicators than with the indicators of any other constructs within the structural model (Fornell & Larcker, 1981).

**Table 3.** HTMT Results for Discriminant Validity

Variable	CB	EB	FL
Emotional Biases (EB)	0.440		
Financial Literacy (FL)	0.361	0.480	
Investment Decision (ID)	0.434	0.520	0.748

Table 3 indicates that all Heterotrait–Monotrait (HTMT) ratios between the latent constructs fall below the recommended threshold of 0.85. This finding demonstrates that there are no critical issues pertaining to discriminant validity among the examined variables. This outcome strictly aligns with the methodological guideline proposed by Henseler et al. (2015), which posits that the HTMT ratio offers a more rigorous and sensitive approach for assessing discriminant validity in comparison to traditional methods.

**Table 4.** Direct and Indirect Effect

Hypothesis	Path Coefficients	t-statistic	P-value	Note
Cognitive Biases -> Financial Literacy	-0.193	2.765	0.006	Supported
Emotional Biases -> Financial Literacy	-0.375	5.391	0.000	Supported
Financial Literacy -> Investment Decision	0.686	14.483	0.000	Supported
Cognitive Biases -> Financial Literacy -> Investment Decision	-0.132	2.663	0.008	Supported
Emotional Biases -> Financial Literacy -> Investment Decision	-0.257	4.725	0.000	Supported

Table 4 presents the empirical results of both direct and indirect relationships among the examined variables. The findings indicate that cognitive biases exert a significant negative effect on financial literacy, as evidenced by a path coefficient of -0.193, a t-statistic of 2.765, and a p-value of 0.006. Similarly, emotional biases demonstrate a significant negative effect on financial literacy with a more pronounced magnitude, yielding a path coefficient of -0.375, a t-statistic of 5.391, and a p-value below 0.001. These results suggest that elevated levels of cognitive and emotional biases are substantially associated with diminished financial literacy. In contrast, financial literacy exerts a robust positive effect on investment decisions, characterized by a path coefficient of 0.686, a t-statistic of 14.483, and a p-value below 0.001, thereby indicating that advanced financial literacy systematically leads to superior investment decision outcomes.

Regarding the indirect effects, financial literacy significantly mediates the relationships between both cognitive and emotional biases and investment decisions. Specifically, the indirect effect of cognitive biases is negative, as evidenced by a path coefficient of -0.132, a t-statistic of 2.663, and a p-value of 0.008. Similarly, the indirect effect of emotional biases is also negative, yielding a path coefficient of -0.257, a t-statistic of 4.725, and a p-value below 0.001. These empirical results confirm that financial literacy functions as an underlying mediating mechanism that transmits the negative influence of both psychological biases onto investment decisions.

**Table 5.** R<sup>2</sup> and Q<sup>2</sup> Test

Variable	R <sup>2</sup>	R <sup>2</sup> Adjusted	Q <sup>2</sup>
Financial Literacy	0.238	0.226	0.148
Investment Decision	0.471	0.467	0.248

Table 5 presents the results of the coefficient of determination ( $R^2$ ), adjusted  $R^2$ , and predictive relevance ( $Q^2$ ) for the endogenous variables. The  $R^2$  value for financial literacy is 0.238 with an adjusted  $R^2$  of 0.226, indicating that cognitive and emotional biases explain approximately 23.8% of the variance in financial literacy. For investment decisions, the  $R^2$  value is 0.471 with an adjusted  $R^2$  of 0.467, showing that financial literacy accounts for 47.1% of the variance in investment decisions. These results suggest a moderate explanatory power of the model, particularly for investment decisions (Chin, 1998).

In terms of predictive relevance, the  $Q^2$  values for financial literacy (0.148) and investment decisions (0.248) are both above zero, indicating that the model has sufficient predictive relevance for both constructs. The higher  $Q^2$  value for investment decisions suggests stronger predictive accuracy compared to financial literacy. These findings confirm that the model possesses acceptable explanatory and predictive capabilities in explaining the relationships among the variables (Geisser, 1975).

**Table 6.** Result of Model Fit Assessment

Test	Saturated Model	Estimated Model
SRMR	0.079	0.089
d_ULS	4.150	5.329
d_G	1.645	1.668
Chi-Square	1.116.035	1.127.663
NFI	0.685	0.682

As demonstrated in Table 6, the Standardized Root Mean Square Residual (SRMR) value falls below the 0.10 threshold, thereby indicating an acceptable level of model fit. Concurrently, the Normed Fit Index (NFI) suggests a moderate level of fit, further supporting the overall adequacy of the structural model. The SRMR criterion is widely utilized as a robust indicator of good model fit, wherein values below 0.10 reflect an appropriate level of discrepancy between the observed and estimated covariance matrices. Meanwhile, the NFI functions as a complementary measure to evaluate structural model fit, strictly aligning with the methodological guidelines proposed by Hu and Bentler (1999).

## **DISCUSSION**

The findings of this study reinforce the notion that cognitive and emotional biases significantly diminish individuals' financial literacy. Specifically, the negative coefficients yielded by both types of biases indicate that elevated tendencies toward heuristics or emotional impulses are strongly associated with lower levels of financial comprehension. This outcome aligns with the behavioral finance literature, which emphasizes that bounded rationality constrains individuals' capacity to process financial information accurately. Furthermore, this empirical result is substantiated by prior studies, including Wendy (2021) and Khan et al. (2023), which demonstrate that cognitive distortions such as overconfidence and conservatism impair rational evaluation, as well as Din et al. (2021), who highlight that emotional biases critically weaken objective financial assessment.

Financial literacy is confirmed as a primary determinant in enhancing the quality of investment decisions. The robust path coefficient indicates that individuals possessing higher financial literacy exhibit a greater capacity to execute rational investment choices aligned with their financial objectives. This reinforces the paradigm that financial literacy constitutes not merely knowledge acquisition but also serves as an essential mechanism for mitigating psychological distortions within decision-making processes. This empirical finding aligns with Costa et al. (2019) and Palanichamy et al. (2024), who demonstrated that financial literacy significantly influences stock market investment decisions, as well as Gultom et al. (2024), who reported that financial literacy actively stimulates investment interest. Furthermore, Abideen et al. (2023) and Prasetyo et al. (2023) corroborate that financially literate individuals tend to make more rational and analytically driven

investment decisions. Collectively, these studies underscore financial literacy as a fundamental element in shaping sound investment outcomes.

Further mediation analysis reveals that financial literacy plays a central role in transmitting the underlying effects of cognitive and emotional biases onto investment decisions. In other words, behavioral biases do not merely influence investment decisions directly but rather operate through the mechanism of diminished financial literacy. This supports the bounded rationality perspective, which posits that distorted perception and information processing ultimately weaken financial capability and adversely affect investment outcomes. This empirical finding also aligns with Rehmat et al. (2023) and Anggriani et al. (2025), who argue that financial literacy effectively mediates the effect of behavioral biases by enhancing individuals' capacity to process financial information more objectively.

The research model demonstrates moderate to substantial explanatory power. The  $R^2$  value for investment decisions, 0.471, confirms that financial literacy serves as the primary pathway linking behavioral biases to investment outcomes. The positive  $Q^2$  values further indicate that the model not only fits the observed data but also has predictive relevance for investment decision-making. These findings offer important theoretical and practical implications. This study advances the integration of behavioral finance and financial literacy perspectives by confirming financial literacy as a pivotal mediating construct. In practice, the empirical results suggest the critical need for financial education interventions that transcend conceptual understanding to incorporate targeted debiasing strategies aimed at reducing cognitive and emotional distortions within investment decision-making. Concurrently, regulators and financial institutions can utilize these insights to design more effective educational frameworks and policy interventions tailored to enhance the quality of retail investor decisions.

## **CONCLUSION**

The empirical findings of this study demonstrate that cognitive and emotional biases exert a significant negative effect on financial literacy, thereby indicating that heightened tendencies toward these biases are associated with diminished levels of financial comprehension. In contrast, financial literacy is shown to exert a significant positive effect on investment decisions, underscoring its pivotal role in enhancing the overall quality of financial decision-making processes. Furthermore, the mediation analysis confirms that financial literacy functions as a critical intervening variable that transmits the underlying effects of both cognitive and emotional biases onto investment decisions. The structural model exhibits moderate-to-strong explanatory power, validating its adequacy in capturing the complex relationships among the examined variables. These insights strengthen the integration between the domains of behavioral finance and financial literacy, while practically emphasizing the critical necessity of enhancing financial literacy to optimize the quality of retail investment decisions.

Notwithstanding its contributions, several limitations of this study must be acknowledged. First, the reliance on self-reported survey data may introduce subjective bias, given that the responses depend inherently on individual perceptions. Second, the restricted geographic scope, which focused exclusively on retail investors within specific regions, constrains the generalizability of the empirical findings. Third, the structural model excludes other potentially influential determinants such as market conditions, digital financial literacy, or broader social influences that could concurrently affect investment choices. Future research is encouraged to expand geographic coverage and sample diversity, incorporate additional relevant variables into the model, and employ longitudinal or mixed-method approaches. Such methodological refinements would provide a more comprehensive and dynamic understanding of investment decision-making processes.

**FUNDING STATEMENT:** This research did not receive any specific grant from funding agencies in the public, commercial, or not - for - profit sectors.

**CONFLICTS OF INTEREST:** The author declares no conflict of interest.

**DECLARATION OF GENERATIVE AI STATEMENT:** During the preparation of this work, the author used Turnitin, Grammarly, and ChatGPT to improve sentence structure and overall clarity. All content was then reviewed, edited, and refined by the author, who takes full responsibility for the accuracy, integrity, and originality of the final publication.

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