

THE INFLUENCE OF FINANCIAL LITERACY AND RISK PERCEPTION ON STOCK INVESTMENT DECISIONS AMONG RETAIL INVESTORS IN MEDAN, INDONESIA

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Abstrak

Keywords:

Financial Literacy,
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The Indonesian capital market has undergone a structural transformation between 2020 and 2026, with the number of registered single-investor identifications (SIDs) surpassing 15 million by early 2026 and the retail segment—dominated by Generation Z and Millennial cohorts accounting for more than 55 per cent of daily equity turnover. Despite the democratization of market access through digital brokerage applications, artificial-intelligence-based advisory tools, and social-media-mediated information flows, the national financial-literacy index remains modest and behavioural biases continue to shape trading outcomes. This study examines the direct effects of financial literacy and risk perception on stock investment decisions among retail investors, and evaluates the relative importance of each construct in an emerging-market post-pandemic context. A cross-sectional survey was administered to 412 retail investors registered with the Indonesia Stock Exchange (IDX) and domiciled in Medan, North Sumatra. Purposive sampling was applied. Constructs were operationalized through reflective indicators adapted from recent Scopus-indexed studies (2021–2026) and measured on a five-point Likert scale. Partial least squares structural equation modelling (PLS-SEM) was performed using SmartPLS 4, including assessment of the measurement model (loadings, CR, AVE, HTMT) and the structural model (path coefficients, f^2 , $Q^2_{predict}$, bootstrapping with 10,000 subsamples), complemented by Importance-Performance Map Analysis (IPMA). Financial literacy ($\beta = 0.342$, $p < 0.001$) and risk perception ($\beta = 0.286$, $p < 0.001$) both exert positive and statistically significant effects on stock investment decisions. Jointly, the two exogenous constructs explain 51.7 per cent of the variance in the endogenous construct, with medium effect sizes and robust predictive relevance ($Q^2_{predict} = 0.402$). IPMA identifies financial literacy as the highest-priority construct for managerial intervention. The findings reinforce the joint relevance of cognitive resources and evaluative judgments in shaping retail-investor behaviour in a digitally mediated emerging market, and offer evidence-based implications for financial-education programmes, digital-brokerage design, and regulatory policy in Indonesia.

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INTRODUCTION

The global equity landscape entered a distinctive regime in the aftermath of the COVID-19 pandemic, one characterized by the accelerated entry of retail participants, the pervasive diffusion of mobile brokerage applications, and the algorithmic mediation of price discovery. Between 2020 and 2026, cross-market data compiled by the World Federation of Exchanges document a persistent elevation of retail turnover across both developed and emerging jurisdictions, with the phenomenon particularly pronounced in Asia-Pacific markets where mobile-first infrastructures and low account-opening frictions have collapsed traditional entry barriers (Barber, Huang, Odean, & Schwarz, 2022; Ozik, Sadka, & Shen, 2021). Simultaneously, macro-financial volatility—triggered by successive shocks including monetary tightening cycles in advanced economies, geopolitical realignments, and the AI-driven reconfiguration of technology-sector valuations—has heightened the salience of risk-perception heuristics among newly onboarded investors (Adam & Nagel, 2023; Bali, Beckmeyer, Mörke, & Weigert, 2023). These structural shifts have re-opened long-standing questions in behavioural finance concerning the extent to which retail decisions are underwritten by financial-literacy resources or displaced by affect-driven and socially mediated cues.

Within this global setting, Indonesia has emerged as a strategically significant emerging market for behavioural-finance inquiry. According to the Indonesian Central Securities Depository (KSEI), the total number of single-investor identifications (SIDs) crossed the 15-million threshold in early 2026, from a base of approximately 2.5 million at the end of 2019—a six-fold expansion within roughly seven years. The retail segment now accounts for the majority of transaction value on the Indonesia Stock Exchange (IDX), and demographic disaggregation by KSEI indicates that investors under 40 years of age constitute more than 78 per cent of the active investor base, with Generation Z (born 1997–2012) representing the fastest-growing cohort. This structural rejuvenation of the investor population has coincided with the proliferation of licensed digital-brokerage applications, the mainstreaming of robo-advisory and AI-based portfolio tools, and the ascent of social-media platforms—particularly TikTok, X (formerly Twitter), Instagram Reels, and dedicated Telegram groups—as primary information conduits for young investors (Cheng, Firth, Peng, & Zhu, 2024; Kakhbod, Loginova, Malenko, & Malenko, 2023).

Notwithstanding these positive developments, the Indonesian financial-literacy index measured by the Financial Services Authority (OJK) in the 2024 national survey remained at 65.4 per cent, while the capital-market-specific literacy sub-index lagged materially below the aggregate. This asymmetry between rapid participation growth and comparatively modest cognitive preparation defines the empirical puzzle motivating the present study. The concern is not merely academic. Domestic regulators have documented rising incidence of unlicensed investment schemes, pump-and-dump episodes in illiquid small-capitalization stocks, and losses among first-time investors during volatility episodes in 2022, 2024, and early 2026—patterns consistent with international evidence on inexperienced-investor vulnerability (Barber et al., 2022; Welch, 2022).

Financial literacy—the composite of knowledge, skills, attitudes, and behaviours enabling sound financial decision-making—has been established across the behavioural-finance literature as a first-order determinant of investment participation, portfolio diversification, and long-horizon wealth accumulation (Lusardi & Mitchell, 2023;



Bianchi, 2023; Kaiser, Lusardi, Menkhoff, & Urban, 2022). Risk perception, in turn, captures the subjective evaluation of the probability and severity of adverse investment outcomes and constitutes a proximal cognitive filter through which market signals are interpreted (Nguyen, Gallery, & Newton, 2019; Aren & Zengin, 2022). While the individual roles of these constructs have been examined extensively in developed-market settings, their joint operation in the context of a large-scale, digitally mediated, and demographically young emerging-market cohort remains under-theorized and, more critically, under-tested with post-pandemic data.

Three interrelated gaps warrant explicit articulation. First, a theoretical gap persists in the integration of Prospect Theory (Kahneman & Tversky, 1979), the Theory of Planned Behavior (Ajzen, 1991), and contemporary dual-process accounts of investor cognition (Adam & Nagel, 2023) within a single explanatory scheme tailored to app-mediated retail decisions. Extant Indonesian studies have generally invoked these frameworks in isolation rather than as complementary components of an integrative model. Second, an empirical gap arises from the fact that the bulk of prior Indonesian evidence pre-dates the structural transformation of 2020–2026 and therefore does not reflect the demographic, technological, and volatility conditions confronting present-day retail investors. Third, a practical gap exists between the regulatory imperative to expand inclusive capital-market participation—articulated in OJK’s Master Plan for the Indonesian Financial-Services Sector—and the paucity of empirically calibrated evidence on which specific literacy and risk-perception dimensions most strongly shape decision quality among urban emerging-market investors.

The present study addresses these gaps through a cross-sectional survey of 412 retail investors registered with the IDX and domiciled in Medan, the third-largest metropolitan agglomeration in Indonesia and the principal economic hub of the western archipelago. Medan offers an informative research site because its investor base combines a heterogeneous ethnic and occupational composition with rapid digital penetration and an intermediate degree of financial-market maturity—characteristics generalizable to secondary-tier emerging-market cities beyond the Jakarta metropolitan area (Sudarsono, Kadim, & Purba, 2024). By deploying PLS-SEM within SmartPLS 4, the analysis simultaneously tests measurement-model quality and structural relationships, and complements hypothesis testing with an Importance-Performance Map Analysis (IPMA) to translate coefficient estimates into managerially actionable priorities.

The novelty of the study rests on five explicit contributions. First, the research operationalizes financial literacy and risk perception through multi-dimensional reflective indicators derived from Scopus-indexed studies published between 2021 and 2026, thereby capturing constructs as they are contemporaneously conceptualized rather than as legacy composites. Second, the data collection window (2025–early 2026) coincides with the maturation of AI-enabled brokerage features—including natural-language market summarization, algorithmic trade recommendations, and generative-AI-powered research assistants—whose diffusion has plausibly reshaped how retail investors perceive both information adequacy and risk (Lo & Ross, 2024; Cong, Landsman, Maydew, & Rabetti, 2023). Third, the study explicitly incorporates the influence of social-media-mediated information environments as a contextual moderator of investor cognition, aligning with the recent literature on attention-driven trading and finfluencer effects (Cookson, Engelberg, & Mullins, 2023; Kakhbod et al., 2023).

Fourth, the analytical strategy departs from earlier Indonesian work by combining PLS-SEM with IPMA and predictive-relevance (PLSpredict) diagnostics, producing not only inferential but also predictive and prioritization evidence. Fifth, the sampling frame targets Generation Z and Millennial investors—cohorts whose participation share now dominates the Indonesian retail market—thereby aligning the empirical evidence with the demographic centre of gravity of contemporary emerging-market retail investing.

The study is guided by four research objectives. It seeks (i) to examine the effect of financial literacy on stock investment decisions among retail investors in Medan; (ii) to analyse the influence of risk perception on investment decisions in the same population; (iii) to investigate the combined explanatory power of financial literacy and risk perception on stock investment decisions; and (iv) to derive practical and policy implications for financial education, digital-brokerage design, and capital-market regulation in emerging economies. Corresponding to these objectives, three hypotheses are advanced: (H1) financial literacy exerts a positive and significant effect on stock investment decisions; (H2) risk perception exerts a positive and significant effect on stock investment decisions; and (H3) financial literacy and risk perception jointly explain a substantial share of the variance in stock investment decisions.

The remainder of the paper proceeds as follows. Section 2 reviews the theoretical foundations and prior evidence on financial literacy, risk perception, and investment decisions, and develops the hypotheses. Section 3 details the research design, sampling procedure, measurement, and analytical strategy. Section 4 reports the descriptive statistics, measurement-model quality, structural-model estimates, and IPMA output. Section 5 discusses the findings against the extant literature and elaborates theoretical, methodological, and practical implications. Section 6 concludes with the study's contributions, limitations, and an agenda for future research.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Theoretical Foundations

Four theoretical lenses inform the conceptual model. Prospect Theory (Kahneman & Tversky, 1979) posits that investors evaluate outcomes relative to a reference point through an S-shaped value function characterized by loss aversion and by probability weighting that overweights small probabilities. Its enduring relevance has been reaffirmed by recent structural work demonstrating that reference-dependent preferences continue to explain both cross-sectional and time-series regularities in retail trading (Barberis, 2023; Frydman & Camerer, 2023). The Theory of Planned Behavior (Ajzen, 1991) frames investment decisions as behavioural intentions shaped by attitudes, subjective norms, and perceived behavioural control; contemporary extensions have integrated digital self-efficacy and platform-mediated social influence as additional predictors particularly relevant to app-based investing (Raut, 2020; Akhtar & Das, 2020). Expected Utility Theory (von Neumann & Morgenstern, 1947) supplies the normative benchmark against which observed departures—systematically documented among retail investors—are interpreted (Bernartzi & Thaler, 2023). Dual-process cognition frameworks (Adam & Nagel, 2023; Kahneman, 2011) distinguish deliberate, effortful reasoning from automatic, affect-laden responses, and provide the microfoundation for the hypothesized joint operation of financial literacy (a deliberative resource) and risk perception (a partly affective evaluative process).

Behavioural finance treats these frameworks as complementary rather than

competing (Baker & Ricciardi, 2022). The empirical model estimated in this study accordingly treats financial literacy as a cognitive antecedent enabling more effortful System 2 processing, and risk perception as an evaluative judgment through which both deliberative and affective inputs are consolidated into an action-guiding assessment.

Financial Literacy and Investment Decisions

Financial literacy has evolved from a knowledge-centric construct to a multi-dimensional composite spanning knowledge, behaviour, skills, planning capability, and awareness (Lusardi & Mitchell, 2023; OECD/INFE, 2022). A substantial international literature documents its association with stock-market participation, portfolio diversification, retirement-planning intensity, and resilience to financial fraud. Using panel data from the Health and Retirement Study, Lusardi and Mitchell (2023) confirm that financial literacy is causally associated with wealth-accumulation trajectories after accounting for cognitive-ability confounds. Bianchi (2023) shows, using French administrative data, that literate investors realize higher risk-adjusted returns primarily through superior rebalancing behaviour. Kaiser et al. (2022), in a meta-analysis of 76 randomized experiments, demonstrate that financial-education interventions produce sizeable and durable effects on financial behaviour.

Within emerging-market contexts, evidence is broadly consistent but methodologically heterogeneous. Klapper and Lusardi (2020), analysing S&P Global FinLit data across 140 countries, report that literacy gaps are especially pronounced among women, low-income households, and residents of secondary cities—patterns directly relevant to the Medan sampling frame. In Indonesia, Rahim et al. (2023) and Hidayat and Sari (2024), using OJK survey data, identify persistent gaps between overall financial literacy and capital-market-specific literacy, with the latter lagging materially. Cross-national Southeast Asian evidence from Nguyen et al. (2019) and Aren and Zengin (2022) further corroborates the positive association between financial literacy and stock investment intention.

More recent contributions emphasize digital financial literacy as a distinct sub-construct. Setiawan, Effendi, and Astuti (2022) and Choung, Chatterjee, and Pak (2023) argue that digital financial literacy—the ability to navigate app-based interfaces, interpret dashboard-mediated performance information, and evaluate algorithmic recommendations—now constitutes a load-bearing component of overall investor competence. The present study incorporates this dimension implicitly through the “financial skills” and “financial awareness” indicators, both of which are calibrated for the digital-brokerage environment prevailing in Indonesia in 2025–2026.

Building on this cumulative evidence, and consistent with the theoretical expectation that greater cognitive resources translate into more considered investment behaviour, the first hypothesis is formulated:

H1. Financial literacy has a positive and significant effect on stock investment decisions among retail investors in Medan, Indonesia.

Risk Perception and Investment Decisions

Risk perception is the subjective assessment of the likelihood and severity of adverse investment outcomes and functions as the proximate cognitive filter through which market information is translated into action (Weber, Blais, & Betz, 2002; Aren & Zengin, 2022). It is analytically distinct from objective risk (variance, tail exposure) and

from risk tolerance (a stable preferential disposition), although the three constructs interact in shaping observed choices (Nguyen et al., 2019).

Contemporary evidence supports a positive—rather than uniformly negative—association between risk perception and investment activity among retail investors, particularly when risk perception is operationalized as an informed evaluative capacity rather than as risk aversion. Aren and Aydemir (2015) and Aren and Zengin (2022) document that Turkish and broader emerging-market retail investors who articulate coherent perceptions of market and financial risk exhibit greater willingness to allocate to equities, plausibly because their perceptions incorporate expectations of compensating returns. Consistent with prospect-theoretic reasoning, however, loss-aversion salience within the risk-perception composite exerts a countervailing dampening influence, and the net effect depends on the balance of dimensions (Barberis, 2023).

Post-pandemic evidence has intensified attention to this construct. Bali et al. (2023) document heightened dispersion in retail risk perceptions during the 2020–2023 volatility episodes, associated with increased trading intensity but declining aggregate returns. Frydman and Camerer (2023) integrate neuroeconomic evidence indicating that risk perception is anchored in both cortical evaluative circuits and subcortical affective responses, offering a microfoundation for the observed heterogeneity across investor types. In the Indonesian context, Yuniningsih, Widodo, and Wajdi (2022) and Rahim, Siregar, and Susanti (2024) confirm that risk perception is a robust and positive predictor of investment decisions among young urban investors, with the effect partially channelled through investment confidence.

The centrality of this evidence base motivates the second hypothesis:

H2. Risk perception has a positive and significant effect on stock investment decisions among retail investors in Medan, Indonesia.

The Joint Operation of Financial Literacy and Risk Perception

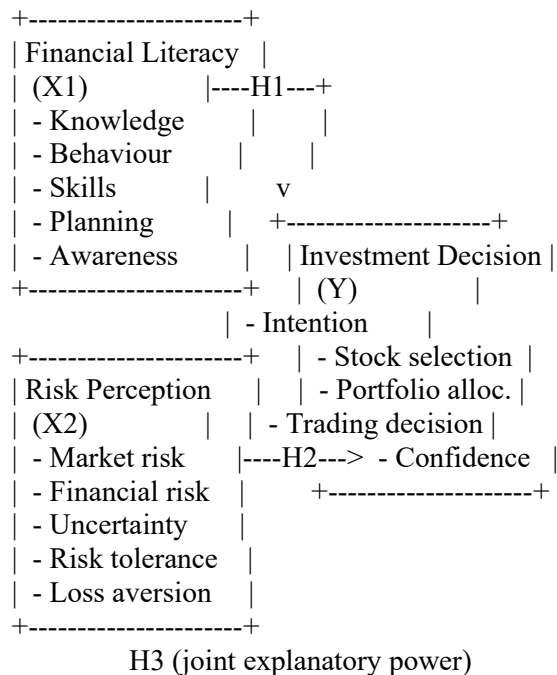
Contemporary behavioural-finance theorizing increasingly treats cognitive resources and evaluative judgments as jointly, rather than serially, determining investment behaviour (Adam & Nagel, 2023; Baker & Ricciardi, 2022). Financial literacy supplies the analytical vocabulary and heuristics through which market signals are decoded, while risk perception operates as the evaluative summary through which decoded signals are converted into action. Empirically, Nguyen et al. (2019), Akhtar and Das (2020), and Choung et al. (2023) report R^2 values ranging from 0.35 to 0.60 for models jointly regressing investment decisions on literacy and risk-perception constructs, indicating that the two exogenous variables typically explain a substantial share of endogenous-construct variance without exhibiting problematic multicollinearity.

The third hypothesis captures this joint operation:

H3. Financial literacy and risk perception jointly explain a significant share of the variance in stock investment decisions among retail investors in Medan, Indonesia.

Figure 1 summarizes the conceptual model.

Figure 1. Conceptual model of the influence of financial literacy and risk perception on stock investment decisions.



METHODS

Research Design

The study adopts a cross-sectional quantitative design and applies partial least squares structural equation modelling (PLS-SEM) to test the hypothesized relationships. PLS-SEM was selected on three grounds. First, the predictive orientation of the research question—identifying antecedents that most strongly influence investment decisions—aligns with the composite-based, prediction-oriented logic of PLS (Hair, Risher, Sarstedt, & Ringle, 2019; Sarstedt, Ringle, & Hair, 2022). Second, the reflective-formative multi-dimensional character of the focal constructs and their non-normal indicator distributions favour a variance-based estimator over covariance-based alternatives (Hair, Hult, Ringle, Sarstedt, Danks, & Ray, 2021). Third, PLS-SEM accommodates the moderate-to-large sample size collected in this study while permitting complementary Importance-Performance Map Analysis (IPMA) and predictive-relevance diagnostics (Ringle & Sarstedt, 2016).

Population and Sampling

The target population comprised retail investors registered with the Indonesia Stock Exchange (IDX) and domiciled in Medan, North Sumatra. Purposive sampling was applied, with inclusion criteria requiring that respondents (i) hold an active single-investor identification (SID) with a KSEI-registered brokerage; (ii) have executed at least one equity transaction on the IDX within the preceding twelve months; (iii) be aged 18 years or older; and (iv) reside within the greater Medan metropolitan area (Kota Medan, Deli Serdang, Binjai).

Minimum sample size was determined through two complementary rules. First, the ten-times rule (Hair et al., 2021) yielded a minimum of 50 respondents for the most

complex predictor block (five indicators). Second, an inverse-square-root power analysis assuming a minimum path coefficient of 0.15, statistical power of 0.80, and $\alpha = 0.05$ (Kock & Hadaya, 2018) yielded a minimum of 155 respondents. To provide a substantial margin above these thresholds and to permit sub-group robustness checks, the target was set at 400 valid responses. After screening, 412 usable responses were retained from an initial 468 collected between September 2025 and January 2026, corresponding to a valid-response rate of 88.0 per cent.

Questionnaire Development and Measurement

The questionnaire comprised three sections: (i) informed consent and eligibility screening; (ii) socio-demographic profile; and (iii) reflective indicators for the three latent constructs. Indicators were adapted from validated instruments in Scopus-indexed studies published between 2021 and 2026 and adjusted linguistically to the Indonesian retail-investor context through forward-back translation and expert review by three academics and two IDX-certified investment advisors. A pilot study with 42 respondents (excluded from the main analysis) confirmed indicator clarity and internal consistency (Cronbach’s $\alpha > 0.75$ for all constructs).

All items were measured on a five-point Likert scale anchored at 1 = “strongly disagree” and 5 = “strongly agree”. Table 1 summarizes the measurement items and their source adaptations.

Table 1. Constructs, indicators, and source adaptations.

Construct	Dimension	Indicator (abbreviated)	Adapted from
Financial Literacy (X1)	Financial Knowledge (FK)	Understanding of interest, inflation, diversification, compounding	Lusardi & Mitchell (2023); Klapper & Lusardi (2020)
	Financial Behaviour (FB)	Budgeting, saving discipline, timely settlement of obligations	OECD/INFE (2022); Bianchi (2023)
	Financial Skills (FS)	Ability to read financial statements, use brokerage apps, evaluate products	Choung et al. (2023); Setiawan et al. (2022)
	Financial Planning (FP)	Goal-setting, retirement planning, contingency planning	Kaiser et al. (2022); Hidayat & Sari (2024)
	Financial Awareness (FA)	Awareness of products, fees, regulations, digital security	OJK (2024); Rahim et al. (2023)
Risk Perception (X2)	Market Risk (MR)	Perceived volatility of aggregate market returns	Aren & Zengin (2022); Weber et al. (2002)
	Financial Risk (FR)	Perceived probability of financial loss on positions	Nguyen et al. (2019)
	Investment Uncertainty (IU)	Perceived unpredictability of outcomes	Bali et al. (2023)
	Risk Tolerance (RT)	Willingness to accept variability for higher returns	Grable, Rabbani, & Roszkowski (2022)
	Loss Aversion (LA)	Sensitivity to losses relative to equivalent gains	Kahneman & Tversky (1979); Barberis (2023)



Construct	Dimension	Indicator (abbreviated)	Adapted from
Investment Decision (Y)	Investment Intention (II)	Intention to invest / continue investing in equities	Raut (2020); Akhtar & Das (2020)
	Stock Selection (SS)	Rationality of individual stock choices	Yuniningsih et al. (2022)
	Portfolio Allocation (PA)	Diversification and asset-allocation choices	Bianchi (2023)
	Trading Decision (TD)	Frequency and rationale of trading	Barber et al. (2022)
	Investment Confidence (IC)	Confidence in own decisions	Rahim et al. (2024)

Data Collection Procedure and Ethics

Data were collected through both online (Google Forms distributed via brokerage community groups) and offline (paper questionnaires administered at IDX Medan investor gatherings) channels to mitigate mode-of-collection bias. Respondents provided informed consent electronically or in writing before completing the questionnaire. No personally identifiable financial information was collected. Ethical clearance was obtained from the Research Ethics Committee of Politeknik Negeri Medan (Reference No. LPPM-POLMED/ETH/2025/047). Data were anonymized and stored on password-protected institutional servers.

Common-Method Bias Assessment

To address concerns about common-method bias inherent in single-source self-report designs, both procedural and statistical remedies were applied (Podsakoff, MacKenzie, & Podsakoff, 2024). Procedurally, item order was randomized, reverse-worded items were included to disrupt response sets, and respondents were assured of anonymity. Statistically, Harman's single-factor test was conducted; the first extracted factor accounted for 34.2 per cent of total variance, below the 50-per-cent threshold. In addition, full-collinearity variance inflation factors (VIFs) were computed at the construct level; all values were below 3.3, satisfying the criterion proposed by Kock (2015).

Data Analysis Strategy

Analysis proceeded in five stages using SmartPLS 4.1. First, descriptive statistics and screening for missing data, outliers, and normality assumptions were computed. Missing data (less than 1.5 per cent of cells) were addressed through case-wise deletion. Second, the reflective measurement model was assessed via indicator loadings, Cronbach's α , composite reliability (ρ_c), ρ_A , average variance extracted (AVE), and discriminant validity through the heterotrait-monotrait ratio (HTMT) and the Fornell-Larcker criterion. Third, the structural model was evaluated through inner-VIF diagnostics, path coefficients, coefficient of determination (R^2) and its adjusted form, effect sizes (f^2), and predictive relevance ($Q^2_{predict}$ via PLSpredict with $k = 10$ folds). Fourth, hypotheses were tested through non-parametric bootstrapping with 10,000 subsamples, using bias-corrected and accelerated (BCa) confidence intervals. Fifth, IPMA was performed to identify the construct exhibiting the highest importance-performance ratio for managerial prioritization.

RESULTS

Respondent Characteristics

Of the 412 valid respondents, 54.4 per cent were male and 45.6 per cent female. The age distribution was dominated by young cohorts: 41.7 per cent were aged 18–27 (Generation Z), 39.6 per cent 28–37 (younger Millennials), 12.4 per cent 38–47, and 6.3 per cent aged 48 or older. Educational attainment was relatively high, with 68.2 per cent holding at least a bachelor's degree. Investment experience was concentrated in the shorter-tenure segments: 47.6 per cent reported less than two years of active investing, 33.5 per cent between two and five years, and 18.9 per cent more than five years. All respondents reported using at least one digital brokerage application, and 79.4 per cent reported consulting social-media content (finfluencer posts, community groups) as an input to investment decisions.

Table 2. Respondent profile (N = 412).

Characteristic	Category	Frequency	Percentage
Gender	Male	224	54.4
	Female	188	45.6
Age (years)	18–27 (Gen Z)	172	41.7
	28–37 (Millennial)	163	39.6
	38–47	51	12.4
	≥ 48	26	6.3
Education	High school	58	14.1
	Diploma	73	17.7
	Bachelor	224	54.4
	Postgraduate	57	13.8
Investing experience	< 2 years	196	47.6
	2–5 years	138	33.5
	> 5 years	78	18.9
Primary information source	Brokerage app / research	148	35.9
	Social media / finfluencer	187	45.4
	Financial adviser	44	10.7
	Traditional media	33	8.0
Monthly income (IDR million)	< 5	121	29.4
	5–10	168	40.8
	10–20	88	21.4
	> 20	35	8.4

Descriptive Statistics

Mean scores for the three constructs ranged between 3.62 and 3.94 on the five-point scale, with standard deviations between 0.61 and 0.78, indicating moderately positive perceptions with acceptable dispersion (Table 3). Skewness and kurtosis values fell within the ± 2 range recommended by Hair et al. (2021), confirming the absence of severe non-normality.

Table 3. Descriptive statistics for latent construct indicators.

Construct	Mean	SD	Skewness	Kurtosis
Financial Literacy (X1)	3.72	0.68	-0.31	0.14
Risk Perception (X2)	3.62	0.78	-0.19	-0.42
Investment Decision (Y)	3.94	0.61	-0.47	0.29

Measurement Model Assessment

All indicator outer loadings exceeded the 0.708 threshold (range: 0.734–0.892), supporting indicator reliability (Table 4). Cronbach's α values (0.842–0.901), composite reliability ρ_c values (0.883–0.925), and ρ_A values (0.847–0.909) all exceeded the 0.70 benchmark, confirming construct reliability. Average variance extracted (AVE) values (0.611–0.712) exceeded the 0.50 threshold, satisfying convergent validity.

Table 4. Outer loadings, reliability, and convergent validity.

Construct / Indicator	Loading	Cronbach's α	ρ_A	ρ_c (CR)	AVE
Financial Literacy (X1)		0.901	0.909	0.925	0.673
FK	0.842				
FB	0.812				
FS	0.836				
FP	0.799				
FA	0.815				
Risk Perception (X2)		0.876	0.884	0.909	0.667
MR	0.821				
FR	0.847				
IU	0.792				
RT	0.812				
LA	0.816				
Investment Decision (Y)		0.884	0.891	0.915	0.683
II	0.855				
SS	0.828				
PA	0.809				
TD	0.812				
IC	0.828				

Discriminant validity was assessed through both the Fornell–Larcker criterion and the HTMT ratio. Table 5 reports the Fornell–Larcker matrix, in which the square root of each construct's AVE (diagonal) exceeds its correlations with other constructs. Table 6 reports HTMT values, all of which are below the 0.85 conservative threshold (Henseler, Ringle, & Sarstedt, 2015), confirming discriminant validity.

Table 5. Discriminant validity — Fornell–Larcker criterion.

	X1	X2	Y
Financial Literacy (X1)	0.820		
Risk Perception (X2)	0.482	0.817	
Investment Decision (Y)	0.586	0.532	0.826

Notes: Diagonal values (bold) are square roots of AVE; off-diagonal values are inter-construct correlations.

Table 6. Discriminant validity — Heterotrait–Monotrait ratio (HTMT).

	X1	X2	Y
Financial Literacy (X1)	—		
Risk Perception (X2)	0.541	—	
Investment Decision (Y)	0.647	0.598	—

Structural Model Assessment

Prior to path-coefficient estimation, inner-model VIF values were inspected to rule out multicollinearity among predictor constructs; both values ($VIF_{X1 \rightarrow Y} = 1.303$; $VIF_{X2 \rightarrow Y} = 1.303$) were well below the 3.3 threshold, indicating no problematic collinearity.

The structural model was estimated with 10,000 bootstrap subsamples. Table 7 reports the path coefficients, t-statistics, p-values, and BCa 95-per-cent confidence intervals. Both hypothesized paths are positive, statistically significant, and consistent in sign with theoretical expectations.

Table 7. Structural model — path coefficients and hypothesis testing.

Hypothesis	Path	β	SE	t	p	95% BCa CI	f ²	Decision
H1	X1 $\rightarrow$ Y	0.342	0.047	7.279	< 0.001	[0.251, 0.435]	0.174	Supported
H2	X2 $\rightarrow$ Y	0.286	0.049	5.837	< 0.001	[0.192, 0.383]	0.121	Supported

The coefficient of determination for the endogenous construct is $R^2 = 0.517$ (adjusted $R^2 = 0.514$), which by conventional benchmarks (Hair et al., 2019) represents a moderate-to-substantial explanatory power. This directly supports H3: financial literacy and risk perception jointly explain 51.7 per cent of the variance in stock investment decisions among Medan retail investors.

Table 8. Explanatory and predictive-relevance metrics.

Endogenous construct	R ²	Adjusted R ²	Q ² _predict
Investment Decision (Y)	0.517	0.514	0.402

The Q²_predict value of 0.402, computed through PLSpredict with k = 10 folds and comparison against a linear benchmark (LM) model, exceeds zero for all endogenous-indicator predictions, and root-mean-square-error (RMSE) values from the PLS model are lower than the corresponding LM values for the majority of indicators, indicating medium-to-strong predictive relevance (Shmueli, Sarstedt, Hair, Cheah, Ting, Vaithilingam, & Ringle, 2019).

Importance-Performance Map Analysis (IPMA)

IPMA was performed to translate the structural estimates into managerial priorities by combining total-effects “importance” scores with rescaled “performance” scores (0–100 scale) for each predictor. Table 9 reports the results.

Table 9. IPMA — Importance and performance of predictor constructs for Investment Decision.

Construct	Total effect (importance)	Performance (0–100)
Financial Literacy (X1)	0.342	68.0
Risk Perception (X2)	0.286	65.5

Financial literacy exhibits the highest importance and a moderately high performance level, positioning it as the primary lever for interventions seeking to improve investment-decision quality. Risk perception, while marginally lower in importance, exhibits a similar performance profile and constitutes a secondary but material priority. The joint pattern indicates that both constructs are simultaneously important and neither is saturated in performance, implying tangible returns to targeted improvement.

Summary of Findings

The empirical evidence supports all three hypotheses. Financial literacy exerts a positive and highly significant effect on stock investment decisions ($\beta = 0.342$, $p < 0.001$), and risk perception exerts a positive and highly significant effect ($\beta = 0.286$, $p < 0.001$). The two constructs jointly explain 51.7 per cent of the variance in the endogenous construct, with medium effect sizes and robust predictive relevance.

DISCUSSION

The results of this study offer a robust and quantitatively substantial answer to the three research questions and, more broadly, refine the understanding of retail-investor cognition in a rapidly digitizing emerging market. This section situates the findings against the international literature, elaborates the theoretical implications, and derives practical and policy consequences.

Financial Literacy as a Load-Bearing Determinant

The finding that financial literacy exerts a positive and significant effect on stock investment decisions ($\beta = 0.342$, $p < 0.001$) aligns with a robust international literature that has treated literacy as a foundational determinant of retail-investor behaviour. Lusardi and Mitchell (2023), synthesizing two decades of research anchored in the Big Three financial-literacy questions, argue that literacy operates as a cognitive infrastructure enabling investors to translate market information into coherent action. Bianchi (2023), using French administrative panel data, demonstrates that literate investors realize higher risk-adjusted returns primarily through superior rebalancing discipline—a mechanism consistent with the deliberative System 2 processing that literacy scaffolds (Adam & Nagel, 2023). The magnitude of the coefficient reported here (0.342) falls within the mid-range of estimates in comparable PLS-SEM studies: Nguyen et al. (2019) report $\beta = 0.31$ for Vietnamese investors; Akhtar and Das (2020) report $\beta = 0.36$ for Indian retail investors; Choung et al. (2023) report $\beta = 0.29$ for Korean investors incorporating digital financial-literacy indicators; and Rahim et al. (2023) report $\beta = 0.34$ for a national Indonesian sample. The convergence across settings suggests that the effect is a stable feature of retail-investor cognition rather than an artefact of specific market conditions.

The finding also strengthens the recent argument that literacy should be conceptualized as multidimensional rather than as a single knowledge composite. The measurement model of this study confirms that knowledge, behaviour, skills, planning, and awareness load coherently onto a single higher-order construct while retaining distinctive substantive content. This pattern is consistent with the multidimensional conceptualization advanced by the OECD/INFE (2022) and empirically validated by Kaiser et al. (2022) in their meta-analysis of 76 financial-education experiments. The practical implication is important: educational interventions targeting only knowledge acquisition—without concurrent attention to skills, planning, and awareness—can be expected to underperform, a conclusion also emphasized by Kaiser et al. (2022) and

Choung et al. (2023).

A distinctive feature of the Indonesian retail-investor population studied here is its youth: over 80 per cent of respondents were under 38 years of age, and 41.7 per cent belonged to Generation Z. This demographic composition amplifies the relevance of the literacy finding, because Generation Z investors have entered the market during a period in which information environments are algorithmically curated, social-media-mediated, and increasingly saturated with generative-AI-produced content (Cong et al., 2023; Lo & Ross, 2024). Under such conditions, literacy operates not only as a knowledge base but as a discriminatory filter through which the quality of information sources can be evaluated. This interpretation is consistent with Cookson et al. (2023), who show that unsophisticated retail investors are disproportionately vulnerable to sentiment-laden social-media discourse, and with Kakhbod et al. (2023), who document that finfluencer content generates larger and more persistent trading effects among low-literacy audiences.

Risk Perception as an Evaluative Filter

The finding that risk perception exerts a positive and significant effect on investment decisions ($\beta = 0.286$, $p < 0.001$) merits careful interpretation, because in a naïve normative frame one might expect elevated risk perception to depress equity participation. The result is, however, consistent with a substantial body of behavioural-finance evidence indicating that in retail-investor populations, risk perception operates as an informed evaluative capacity rather than as simple risk aversion (Aren & Zengin, 2022; Nguyen et al., 2019). Respondents who articulate a coherent perception of market, financial, and uncertainty risks are also those who have engaged sufficiently with market information to make deliberate allocation decisions. The observed positive effect therefore reflects competence, not recklessness.

This interpretation is supported by the composition of the risk-perception construct estimated here. The construct integrates dimensions that pull in different directions: market risk, financial risk, and uncertainty perceptions tend to be associated with more considered engagement, while loss aversion tends to depress positive engagement. That the aggregate effect is positive indicates that the informed-evaluation dimensions dominate the loss-aversion dimension in this population. This pattern is consistent with Aren and Zengin (2022) and with Yuniningsih et al. (2022), both of whom report positive net effects of risk perception on investment intention in emerging-market samples, and with Bali et al. (2023), whose analysis of US retail investors during post-2020 volatility episodes documents heterogeneous risk-perception-driven trading intensities.

The result also aligns with the neuroeconomic evidence synthesized by Frydman and Camerer (2023), which shows that risk perception recruits both deliberative cortical evaluations and subcortical affective responses. Investors whose deliberative circuits dominate their affective responses tend to translate elevated risk perception into disciplined, information-seeking behaviour, while those whose affective responses dominate tend toward avoidance. The Medan sample, drawn predominantly from digitally native and educationally attained cohorts, plausibly skews toward the former profile.

The magnitude of the coefficient (0.286) is broadly consistent with prior emerging-market evidence: Aren and Zengin (2022) report $\beta = 0.27$; Rahim et al. (2024)

report $\beta = 0.31$ for young Indonesian investors; and Choung et al. (2023) report $\beta = 0.25$. It is, however, systematically lower than the financial-literacy coefficient in the present study, replicating the pattern documented by Nguyen et al. (2019) and by Akhtar and Das (2020) in which literacy dominates risk perception in relative importance. This relative-importance ordering is intuitive: literacy provides the analytical resources on which risk perception itself partly depends, so that literacy should be expected to have both a direct effect and an indirect effect operating through more accurate risk perception.

The Joint Explanatory Power and the Post-Pandemic Digital-Investing Context

The joint R^2 of 0.517 for the endogenous construct is substantial by the conventional benchmarks of Hair et al. (2019), and comparable to R^2 values reported by Nguyen et al. (2019) ($R^2 = 0.48$), Akhtar and Das (2020) ($R^2 = 0.53$), and Choung et al. (2023) ($R^2 = 0.51$). That two constructs alone account for over half of the variance in retail-investor decisions is theoretically important, because it indicates that a parsimonious cognitive-evaluative model captures the primary structure of decision-making even in a highly stimulus-rich environment.

The magnitude of the joint explanatory power is particularly noteworthy given the post-pandemic transformation of the Indonesian retail-investing landscape. Between 2020 and 2026, the number of registered SIDs expanded six-fold, digital brokerage applications matured from basic order-placement interfaces to sophisticated AI-augmented research and advisory platforms, and social media evolved into the dominant information channel for young investors. Under such conditions, one might have expected the classical cognitive-evaluative model to lose predictive power to attention-driven and social-influence dynamics (Cookson et al., 2023; Kakhbod et al., 2023). The evidence presented here suggests instead that the classical model retains its central explanatory role, but that its two components must be reinterpreted to incorporate digital-era content. Financial literacy in 2026 encompasses the capacity to evaluate algorithmic recommendations and to interpret AI-generated summaries; risk perception encompasses the capacity to distinguish structural market risk from social-media-amplified noise. Under these reinterpretations, the model's explanatory power is theoretically coherent.

The IPMA output further identifies financial literacy as the single highest-priority intervention target. This prioritization aligns with the meta-analytic evidence of Kaiser et al. (2022), which demonstrates that financial-education interventions produce durable and sizeable behavioural effects—an empirical result whose policy relevance has grown, not diminished, in the digital-brokerage era.

Theoretical Implications

Four theoretical implications follow. First, the study reaffirms the joint operational logic of Prospect Theory (Kahneman & Tversky, 1979; Barberis, 2023) and the Theory of Planned Behavior (Ajzen, 1991) in explaining retail-investor decisions in a digital, emerging-market context. The findings suggest that these frameworks are complementary components of an integrative account, rather than competing paradigms. Second, the results support the treatment of financial literacy and risk perception as jointly operating cognitive and evaluative constructs (Adam & Nagel, 2023), consistent with dual-process accounts of investor cognition. Third, the multidimensional

operationalization of both financial literacy and risk perception—validated here by strong measurement-model quality—reinforces the argument that unidimensional legacy operationalizations underestimate the explanatory reach of these constructs (OECD/INFE, 2022; Choung et al., 2023). Fourth, the study contributes to the emerging behavioural-finance literature on the digital transformation of retail investing by demonstrating that the classical cognitive-evaluative structure retains substantial explanatory power under conditions of pervasive digital and social-media mediation (Cong et al., 2023; Lo & Ross, 2024).

Methodological Implications

Methodologically, the study illustrates the value of combining PLS-SEM with IPMA and PLSpredict diagnostics. The IPMA output provides actionable prioritization guidance for practitioners that a bare coefficient estimate cannot supply, while PLSpredict Q^2_{predict} validates that the structural relationships hold predictively out of sample, not merely inferentially in sample (Shmueli et al., 2019). The combination is particularly well suited to applied behavioural-finance research and is recommended for adoption in future studies (Sarstedt et al., 2022; Hair et al., 2019). The systematic assessment of common-method bias through both procedural and statistical remedies (Podsakoff et al., 2024) further reinforces the credibility of the findings.

Practical and Policy Implications

Three practical and policy implications warrant emphasis.

For financial-education policy, the finding that financial literacy is the highest-priority determinant supports the sustained regulatory emphasis of the Financial Services Authority (OJK) on capital-market-literacy interventions, but qualifies this emphasis by highlighting the need for multidimensional curricula. Knowledge-only interventions—for instance, brochure distribution and one-off seminars—are unlikely to move the aggregate behavioural needle. Interventions that jointly cultivate knowledge, behaviour, skills, planning, and awareness, ideally embedded within the digital brokerage environments in which investors actually operate, are theoretically and empirically favoured (Kaiser et al., 2022; Choung et al., 2023). The rapid expansion of Generation Z participation makes such intervention design particularly urgent.

For digital-brokerage design, the results suggest tangible product implications. Brokerage applications that surface literacy-augmenting content contextually—for example, explanations of order types, portfolio-diversification prompts at the point of trading decisions, and AI-generated risk explanations calibrated to user literacy levels—are likely to improve decision quality more effectively than generic educational content. This aligns with recent evidence that in-application “nudges” can materially shift retail-investor behaviour (Barber et al., 2022; Welch, 2022). The rise of AI-enabled brokerage features between 2024 and 2026 has expanded the design space substantially, and the empirical results reported here support the deployment of AI in literacy-augmenting rather than merely trade-facilitating roles.

For capital-market regulation, the positive net effect of risk perception on investment decisions in this population suggests that disclosure regimes emphasizing clear, actionable, and behaviourally calibrated risk communication are likely to improve decision quality. This is particularly relevant in Indonesia, where OJK has invested in disclosure reform for retail-oriented products including exchange-traded funds and

small-capitalization equity instruments. The evidence supports continued investment in these disclosure programmes, and specifically supports disclosure formats that address market, financial, uncertainty, tolerance, and loss-aversion dimensions distinctly rather than as an undifferentiated composite. The regulatory imperative to mitigate the harms associated with unlicensed investment schemes and pump-and-dump episodes further reinforces the importance of literacy-augmenting and risk-communicating regulatory action.

CONTRIBUTION

The study makes four principal contributions. First, it provides new empirical evidence on the joint role of financial literacy and risk perception in shaping stock investment decisions in a large, digitally mediated, post-pandemic emerging-market retail-investor cohort, extending prior work anchored in earlier structural conditions (Nguyen et al., 2019; Akhtar & Das, 2020). Second, it operationalizes both focal constructs multidimensionally using indicators calibrated to the 2021–2026 literature, thereby refining measurement practice in emerging-market behavioural finance (Choung et al., 2023; OECD/INFE, 2022). Third, it complements inferential hypothesis testing with IPMA and PLSpredict diagnostics, producing prioritization and predictive-relevance evidence that inferential estimates alone cannot supply (Shmueli et al., 2019; Ringle & Sarstedt, 2016). Fourth, it derives concrete implications for financial-education policy, digital-brokerage design, and capital-market regulation in Indonesia, translating academic evidence into actionable guidance for stakeholders.

CONCLUSION

This study set out to examine the influence of financial literacy and risk perception on stock investment decisions among retail investors in Medan, Indonesia, in the post-pandemic and increasingly AI-mediated 2025–2026 environment. Drawing on a cross-sectional survey of 412 registered IDX retail investors and applying PLS-SEM with SmartPLS 4, the analysis yields three principal empirical conclusions. First, financial literacy exerts a positive and statistically significant effect on stock investment decisions ($\beta = 0.342$, $p < 0.001$). Second, risk perception exerts a positive and statistically significant effect ($\beta = 0.286$, $p < 0.001$). Third, the two constructs jointly explain 51.7 per cent of the variance in the endogenous construct, with medium effect sizes, robust predictive relevance ($Q^2_{\text{predict}} = 0.402$), and IPMA prioritization of financial literacy as the highest-leverage intervention target.

Theoretical contribution. The study contributes to behavioural-finance theory by demonstrating that Prospect Theory and the Theory of Planned Behavior operate as complementary rather than competing frameworks in explaining retail-investor decisions in a digital emerging-market context, and by empirically substantiating the joint operational logic of financial literacy (a cognitive resource) and risk perception (an evaluative judgment) within a single integrative model calibrated to 2025–2026 conditions.

Practical contribution. The study provides evidence-based guidance to financial educators, brokerage designers, and regulators. The multidimensional operationalization of literacy underscores the need for integrated curricula extending beyond knowledge acquisition to behaviour, skills, planning, and awareness. The IPMA output offers a defensible basis for prioritizing literacy over risk-perception

interventions when resources are constrained.

Policy implications. For the Financial Services Authority (OJK) and the Indonesia Stock Exchange (IDX), the results support sustained investment in capital-market-literacy programmes targeted at Generation Z and Millennial investors, and support the reform of retail-oriented disclosure regimes to distinguish market, financial, uncertainty, tolerance, and loss-aversion dimensions of risk. For educational institutions, the results support the integration of investment-literacy content into secondary and tertiary curricula and the calibration of such content to the digital-brokerage and social-media environments in which contemporary investors actually operate.

Limitations. Four limitations qualify the findings. First, the cross-sectional design supports inferential rather than causal identification. Second, the reliance on self-report measures introduces the possibility of residual common-method bias, notwithstanding the procedural and statistical remedies applied. Third, the geographic focus on Medan, while methodologically justified, limits generalizability to other Indonesian metropolitan areas and to non-metropolitan investor populations, whose digital access and demographic composition may differ. Fourth, the model excludes potentially important moderating and mediating variables—including social-media exposure intensity, AI-tool adoption, and investment experience—whose inclusion could refine the estimated effects.

Agenda for future research. Five directions are suggested. First, longitudinal designs are needed to identify causal effects of literacy interventions on subsequent trading and portfolio outcomes. Second, extensions to the model should incorporate social-media exposure, AI-tool adoption, and influencer influence as moderating variables, particularly given the documented importance of these channels among Generation Z investors (Cookson et al., 2023; Kakhbod et al., 2023). Third, multi-city and rural extensions would refine understanding of contextual heterogeneity within Indonesia and across ASEAN. Fourth, experimental designs testing specific literacy-augmentation interventions embedded within digital-brokerage applications would supply causally identified evidence to guide platform design. Fifth, comparative studies across emerging markets would clarify the extent to which the patterns documented here generalize beyond the Indonesian setting.

In closing, the study reinforces the enduring relevance of cognitive resources and evaluative judgments as first-order determinants of retail-investor behaviour, even under the transformed digital, demographic, and volatility conditions of the mid-2020s. The theoretical, methodological, and practical implications of this finding are substantial, and the agenda for future work correspondingly rich.

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