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The Impact of Financial Literacy, Risk Tolerance, and Innovation Adoption on Investment Decisions: Evidence from Retail Investors

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ABSTRACT

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This study investigates the impact of financial literacy, risk tolerance, and innovation adoption on investment decisions among retail investors in Pakistan. Drawing on behavioral finance and innovation diffusion theories, the research employs a quantitative approach using a structured survey administered to 400 retail investors. Structural Equation Modeling (SEM) with SmartPLS was applied to analyze the relationships between constructs. The findings reveal that financial literacy has a significant positive effect on investment decisions, both directly and indirectly through innovation adoption. Risk tolerance not only influences innovation adoption but also moderates the relationship between financial literacy and investment decisions, indicating that risk preferences shape how knowledge translates into action. Innovation adoption emerged as a key mediator, suggesting that technologically engaged investors are more likely to make informed investment choices. The study highlights the importance of integrating financial education with digital literacy and understanding investor psychology. Practical implications emphasize the need for targeted financial literacy programs, risk-based investment advisory services, and fintech-driven investor empowerment strategies. These insights are crucial for policymakers, financial educators, and practitioners aiming to enhance financial inclusion and market participation in Pakistan.

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1.0 Introduction

The modern financial market gives retail investors enhanced power through digital platforms and financial information and investment opportunities which executives of financial institutions exclusively controlled in the past. The financial market openness has created a wide range of wealth-building opportunities but also introduced intricate succumbing elements for financial decision-making tasks. The current financial market demands from retail investors both strong financial competence and risk awareness as well as willingness to embrace innovative financial technologies while they confront volatile conditions and information imbalance (Zekos & Zekos, 2021). The study of investment decision behaviors becomes vital due to current market changes. The combination of financial literacy with risk tolerance and innovation adoption directs the thinking and responding behavior patterns of retail investors. The complex relationship between financial factors requires detailed analytical study because they guide investment outlooks and risk estimation and resource distribution (Karsokiene & Giedraitis, 2023).

People consider financial literacy both necessary and important for creating sound financial decisions. The capability to grasp financial rules and conduct budgeting tasks and money investments makes up financial literacy's core meaning. Studies demonstrate that people who possess stronger financial skills demonstrate superior financial behaviors that lead them to save money and distribute investments across different options and avoid expensive types of borrowing (Katnic et al., 2024). Literacy does not provide a complete explanation of investment behavior because people make choices based on their psychological characteristics along with their attitudinal orientations. Resource tolerance stands as a main psychological factor which determines an individual's capacity to endure investment return fluctuations. People who have greater tolerance for risk typically select high-yield high-risk investments yet those with low risk comforts stay in predictable and safer asset classes (Cooper, 2024). Financial technology acceptance requires determination along with practical capability for using new financial technology tools and products to integrate them into investment operations. Fintech and digital platforms create new investment opportunities and management methods which function simultaneously as tools that help people understand financial matters and implement their risk tolerance preferences (Al-Okaily, 2025).

Financial literacy together with risk tolerance and innovation adoption generate important implications on decision-making activities for investment purposes. Financial education improves risk-return evaluation however risk tolerance thresholds determine if investors will take such information into practice. People with high risk tolerance risks making bad choices when they lack financial knowledge which damages their portfolio investments and blocks them from reaching their financial objectives (Issacs, 2024). The relationship exists between these three variables due to the dual role of innovation adoption which either strengthens or minimizes their combined effects. The investor using financial technology who also maintains high financial literacy can achieve better market exposure and lower trading expenses to make advanced investment decisions for portfolio enhancement. People who show low innovation adoption face restrictions from traditional investment methods that reduce the value of their financial knowledge along with riskoriented strategies (Tang, 2022). A complete unified structure should analyze the combined effects between these constructs because they function together in retail investment decision-making.

This research analyzes the retail investment behavior by integrating behavioral finance with innovation diffusion theory and the theory of planned behavior as its theoretical base. Behavioral finance disrupts classical finance principles because it demonstrates how irrational behavior of investors is influenced by cognitive biases alongside emotional responses and simple decision-making approaches. Financial literacy functions as a mental tool under this framework which helps combat biases to produce comprehensive deliberate decision structures (Lavanya & Mamilla 2024). According to the theory of planned behavior human actions originate from attitudes together with subjective norms as well as perceived behavioral control yet all these factors develop based on knowledge base risk perceptions and technological orientation. The theory of innovation diffusion strengthens the perspective by demonstrating how new technological implementation occurs among users who demonstrate specific traits such as experience openness and increased social involvement and information acquisition mandates. This study develops financial literacy as a cognitive competence, risk tolerance as an attitudinal disposition and innovation adoption as a behavioral capability which unite to create a three-part model describing investment decision processes.

The expanding research on single investment behavior aspects has not resolved the essential questions regarding factor combination effects. The current literature treats financial literacy and risk tolerance and innovation adoption separately although they potentially cooperate with one another in dynamic ways. The majority of previously conducted analysis based its research on developed marketplaces which demonstrate advanced digital networks and abundant financial training opportunities as well as investment product availability (Khera et al., 2022). Emerging market retail investors encounter diverse socioeconomic conditions because they have differing levels of financial inclusion together with differing digital literacy and risk innovation perception in their societies. Extensive research conducted in developed markets requires context-sensitive analysis because its particular geographical focus reduces the overall applicability of discovered outcomes. The specific influence of fintech on investment choices between financial literacy and risk attitudes has minimal theoretical base and insufficient empirical research despite numerous studies on fintech and general financial behavior patterns (Phillips et al., 2023).

The contemporary research examines retail investors since they represent a distinct investor population whose economic influence keeps rising in the investment environment. Underperformance in financial professional guidance forces retail investors to make investment decisions with only their personal knowledge alongside their attitudes and tools. Such independence exposes retail investors to behavioral and informational constraints yet reveals numerous chances to study the effects of personal financial competencies and attitudes on outcomes (Young-Silva et al., 2024). This research examines the combined effects between financial literacy and risk tolerance and innovation adoption to analyze how retail investors make their investment decisions. The research explores the joined operation of these three constructs and evaluates which variable combinations offer better prospects for rational financial decision excellence. Retail investor knowledge and capabilities and investor risk tolerance dynamics and platform innovation levels need to be understood by academia and policy shapers and financial educators as well as technological developers who seek to develop well-informed retail investor environments (Rudkouskaya & Malik, 2024).

This research study faces importance because it serves as a basis to connect theoretical models with empirical evidence within practical applications. The study establishes an integrated approach that merges concepts about thinking patterns with psychological factors and behavior components to enhance investment research knowledge. The empirical analysis presents data from retail investors to develop additional knowledge in mainstream finance research which underrepresents these participants while becoming more prevalent in current market behaviors (Saluja, 2024). The study conducts methodology-based research which avoids simplistic linear and additive approaches by using sophisticated analytic methods for better investigative understanding of investor behavior. The practical implications from these findings will assist developers in building education applications with focused educational content and customized investment support systems and user-friendly fintech products. Profit profiles containing financially competent yet risk-averse people who resist innovation can benefit from specially designed interventions for overcoming investing hurdles (Wagner, 2024).

Understanding retail investment behavior at a policy level helps develop financial inclusivity by creating more stable systems. The increasing number of market participants requires comprehensive tools and knowledge and proper attitudes to create sustainable market development. Financial regulators together with educators need to understand how financial literacy affects psychological and technological elements because this knowledge will help them create complete investor protection plans (Nwosu & Ilori, 2024). Industrial disruptions caused by fintech require assessing how users can handle technology in meaningful ways alongside its technological availability. Fostering innovation through exclusion would intensify present-day social inequalities thus demanding detailed knowledge about fundamental behavioral requirements for successful innovation implementation. The current research enhances the existing dialogue regarding financial innovation improvements and economic growth that includes all stakeholders.

The study's ultimate objective seeks to enhance knowledge about retail investor decision-making processes which contain multiple interrelated factors. This research supplies an improved perspective into behavior because it examines how personal financial literacy interacts with risk tolerance while determining the acceptance of innovative practices. The analysis opposes one-dimensional research methods which split down variables because it supports a comprehensive analytical model that represents actual investor practices. The approach moves in line with financial inclusion research that seeks to understand financial analysis through human experiences involving knowledge and preferences and capability development. The change is significant since it affects practical matters regarding future financial system design regulation and support networks.

2.0 Literature Review

This research draws from the behavioral finance theory as well as innovation diffusion theory together with the theory of planned behavior to analyze investor behavior patterns. The rational-agent model of classical economics receives its opposite from Behavioral finance theory which includes psychological factors together with heuristics and cognitive biases as needed elements for financial decision analysis. The theory demonstrates that investors make decisions from irrational sources including bounded rationality and emotional biases because their financial knowledge and risk perception remains significant (Sathya & Gayathiri, 2024). Inside this structure financial literacy provides cognitive knowledge that helps people choose investments by reducing their emotionally-charged choices. According to the theory of planned behavior individuals form their behavior from their attitudes and subjective norms and their perceived control demeanor and these elements receive substantial influence from knowledge and affective orientations including risk tolerance. Diffusion of innovation theory demonstrates the adoption patterns of new technologies which depend on innovative behavior along with risk-taking tendencies of individuals (Ayelotan, 2024). The combined theoretical understanding of investment decision-making by retail investors requires analyzing financial education as conceptual knowledge alongside risk tolerance as affective threshold while innovation adoption represents behavioral potential for taking investment action.

Studies of financial literacy behavior demonstrate that proper financial education produces positive practices regarding saving together with budgeting and investment actions. Research has proven that people with elevated financial literacy tend to prepare for retirement while actively trading stocks in markets. The research group observed that financially knowledgeable people choose stocks over other investment alternatives as they understand how diversification reduces risks and provides long-term gains (Rehman & Mia, 2024). People who have literacy skills do not necessarily make rational investment choices unless their psychological frame of mind also shows preparedness and they are mentally open. According to research findings financial education programs successfully taught new information to participants yet their behavior remained unchanged unless intervention included motivational elements and confidence-building measures. The study shows participation in financial markets continues to stay low among financially literate individuals when trust or risk aversion reaches high levels demonstrating the need to understand how literacy functions within specific attitudes (Rehman & Mia, 2024).

Researchers have extensively studied risk tolerance throughout numerous studies focusing on investment behavior because this psychological trait plays a crucial role. Risk tolerance refers to the extent to which someone wants to face unknown situations and lose money but it demonstrates different levels between various population groups and psychological and cultural aspects. Statistics confirm that people who tolerate higher risks choose to put money in stocks while keeping less in cash and bonds (Mats, 2024). Subjects who assess their risk tolerance as higher tend to invest in high volatility assets and maintain longer time periods before reinvesting. Studies remain cautious about risk tolerance because the concept has been found to change due to experience or market conditions or through access to financial technologies. Risk tolerance exists in a mutual relationship with financial literacy because these elements combine into different results when people invest their money. According to they found that risky investors who lack financial awareness tend to put their money into unethical speculative opportunities but inadequate financial knowledge might act as either an adjustment tool or a mediating influence on risk tolerance-driven conduct (Tamara & Maharani).

Investment behavior's relationship to innovation adoption became significant because of fintech's widespread growth together with robo-advisors and digital brokerage services. The use of new financial tools and technologies demonstrates an investor's willingness to access markets using advanced platforms that improve decisions and cut down expenses. The Unified Theory of Acceptance and Use of Technology (UTAUT) links performance expectancy and effort expectancy and social influence as principal motivators behind technology adoption into investors' purchasing decisions through their financial literacy and risk perception levels (Mensah & Khan, 2024). Recent investment research indicates that individuals who welcome innovation will follow three investing practices including portfolio diversification and algorithm-based trading and real-time data monitoring. The adoption speeds show inconsistent patterns between different groups mainly because of digital skills and economic stability and age differences. Investors who are younger plus technologically advanced also have better financial understanding which drives them to utilize investment platforms powered by fintech according to Khan et al. (2023). Older adult investors with minimal financial education remained drawn to traditional advisory services.

A number of researchers have explored how these variables affect one another. Investment behavior among Indian retail investors exhibited a direct connection to their financial literacy although risk tolerance acted as a modifying factor between the two variables. Bayar et al. (2020) evaluated Turkish markets and discovered that investors with strong financial capability together with high risk tolerance preferences invested in equities and mutual funds. The studies neglected to evaluate innovation adoption separately from other main variables within their research design. A current research investigation combined digital financial behavior with its analysis to prove that people using fintech platforms showed increased financial product involvement through better financial literacy. The current research lacks an overall conceptual framework which unites these three aspects into a unified theoretical structure. Research in this field lacks investigation of how innovation adoption influences the relationship between financial literacy and investment behavior as well as risk tolerance and investment behavior (Mohta & Shunmugasundaram 2024).

Most literary studies inspect developed nations with developed financial infrastructure and well-established digital alongside financial understanding. Particular studies within emerging economies demonstrate conflicting findings which stem from heterogeneous socio-economic circumstances of those regions. Financially literate Israeli adults did not participate in stock market investments because of cultural traditions combined with risk-adverse behaviors according to Fang et al. (2022). This study about Indian millennials demonstrated that financial literacy together with innovation adoption practices directly influenced investments in equities and mutual funds. Multiple research findings about the variables' relations show that these relationships seem to vary according to environmental conditions made up of digital technology systems and monetary policies along with societal views on money and tech infrastructure. Cross-sectional data collection methods combined with self-reported measures characterize most of the available literature and these measurement techniques reduce the quality of determining cause-effect relationships and create biases in responses. Future research must conduct longitudinal studies together with contextual analysis and integrative approaches to show the complete network of relationships between financial literacy and risk-taking behavior when adopting innovation initiatives (Chen, 2024).

The current research analyzes the interactive effect of retail investors' financial literacy with their tolerance for risk and their willingness to adopt innovative investments toward their choice of investments. The research demonstrates how financial knowledge enhances investment decisions through better information processing ability together with alternative evaluation expertise and rational choice capabilities (Wijaya et al., 2024). Risk tolerance acts as a moderating factor which strengthens the connection between financial literacy and investment behavior while affecting individuals with higher tolerance better than those with lower tolerance. People with higher financial literacy levels have better chances to adopt innovative financial technologies since their better financial knowledge leads them to choose better investment decisions. Research shows innovation adoption contributes to risk-tolerance effects by demonstrating that individuals who take more risks tend to try innovative financial tools which make them more involved in investment activities (Reddy, 2024).

3.0 Methodology

The adopted research methodology applied a systematic approach to examine the relationship between retail investor investment choices and financial literacy level and risk tolerance as well as their adaptability to innovation in the Pakistani market. The research objectives demanded a quantitative research design because it generated systematic measurements of connections between different variables. This research followed the positivist research philosophy because it promotes the notion that objective reality becomes accessible when researchers observe and analyze phenomena logically. Under this philosophical framework researchers used structured evaluation tools and statistical methods to explore the connections between different variables that shaped their research subjects.

Retail investors from Pakistan served as the target population for the research since they invested in stocks, mutual funds, real estate along with other financial instruments while remaining independent from institutional advisor involvement. Individual investment behavior in Pakistan's emerging market could be best studied through these investors because they consisted of diverse groups based on their demographic profiles including age ranges, earning levels, educations and residential locations. Research participants needed to exceed age 18 and they performed independent investment choices within the previous twelve months. Experienced participants from the target group with living financial decision-making history were selected during data collection to strengthen data validity.

A representative population subset was obtained through the use of non-probability purposive sampling strategy. The research design was appropriate for this study as Pakistan lacked a complete sampling framework for retail investors because official records remained fragmented and incomplete. Participant recruitment focused on finding available respondents whose information matched the study requirements and specifically considered individuals with different backgrounds including age groups, gender distributions and educational qualifications and investment experience. The final number of research participants reached 400 based on minimum requirements for SEM modeling which consider both proposed model complexity alongside recommended ratio specifications.

A structured survey questionnaire used data collection while drawing its content from established scales from previous research. The research instrument contained five fundamental components including demographic attributes, financial knowledge evaluation, tolerance of risk exposure and adoption of novel methods alongside choices for investing money. The financial literacy measurement utilized items which drew from Lusardi and Mitchell (2014) to assess concepts about interest rates, inflation, diversification and risk-return tradeoffs. The willingness of individuals to face financial risks was evaluated through the scale developed by Grable and Lytton (1999). The research instrument contained items that measured fintech utilization, acceptance of modern financial resources and the use of digital systems based on Venkatesh et al. (2012) model constructs. This component examined investment decisions through questions about participant investment patterns together with their choice types and justification for each decision. The survey instrument included a Likert scale with five points that participants used to express their agreement or disagreement to specific statements.

SmartPLS 4 software served to analyze the data through Structural Equation Modeling (SEM). SEM was selected because it assists researchers to evaluate numerous relationships between both observed and latent variables that helps measure complete direct and indirect effects simultaneously. Assessment of construct reliability and validity through Convergent Validity and Discriminant Validity began with a two-step analysis process. This evaluation used criteria including Cronbach's alpha, composite reliability (CR) and average variance extracted (AVE) and Fornell-Larcker criterion. The assessment of the measurement model allowed the researcher to validate it for further testing of the structural model which analyzed the relationships between financial literacy and risk tolerance as well as innovation adoption and investment decision-making. The relationships evaluated used Path coefficients together with t-values, p-values along with R^2 values to determine the strength and statistical significance of the relationships. The study evaluated the effects of mediation and moderation through analysis of 5,000 bootstrapping resamples for statistical reliability enhancement.

The research process followed all necessary ethical principles with special attention to detail. Subject participation remained entirely optional while the study informed volunteers about its research purpose along with survey parameters and withdrawal rights without consequences. The survey maintained an informed consent form that appeared before participants to begin their question responses and restricted entry to survey participants. All data storage followed secure practices for academic research purposes and received rigid protection through anonymity combined with complete confidentiality. Before starting data collection the author obtained necessary ethical approval from the institutional review board which guaranteed that research practices aligned with international social science ethics standards.

The research methods of this study received meticulous alignment with the research objectives combined with theory. Through combination of structured survey methodology with purposive sampling technique and SEM analysis the research generated a comprehensive understanding of the relationship between financial literacy and risk tolerance alongside innovation adoption behavior and their consequences on investment decisions for Pakistan's retail investors. Methodological precision together with ethical sincerity guaranteed that the findings maintained academic and policy-making and professional significance.

4.0 Findings and Results

4.1 Reliability Analysis

Table 1 Reliability Analysis

Construct	Cronbach's Alpha	Composite Reliability (CR)	Average Variance Extracted (AVE)
Financial Literacy	0.84	0.88	0.58
Risk Tolerance	0.79	0.85	0.54
Innovation Adoption	0.86	0.90	0.63
Investment Decisions	0.83	0.88	0.59

The constructs established reliable internal consistency because Cronbach's alpha together with composite reliability exceeded 0.70. The constructs maintained acceptable convergent validity because their AVE values surpassed 0.50. The measurement assessment demonstrates that the used indicators correctly measure their underlying constructs across multiple assessments.

4.2 Discriminant Validity: HTMT Ratio

Table 2 Discriminant Validity

Constructs	FL	RT	IA	ID
Financial Literacy (FL)	1			
Risk Tolerance (RT)	0.62	1		
Innovation Adoption (IA)	0.58	0.65	1	
Investment Decisions (ID)	0.61	0.67	0.71	1

Discriminant validity emerges among all constructs because all HTMT values remain under the conservative threshold of 0.85 (Henseler et al., 2015). The measurement model exhibits empirical separateness between every construct and its peers according to the observed values.

4.3 Collinearity Statistics (VIF)

Table 3 Collinearity Statistics (VIF)

Indicator	VIF
FL1 to FL4 (Financial Literacy Indicators)	1.80 - 2.10
RT1 to RT4 (Risk Tolerance Indicators)	1.70 - 2.05
IA1 to IA4 (Innovation Adoption Indicators)	1.65 - 1.98
ID1 to ID4 (Investment Decision Indicators)	1.75 - 2.15

The research demonstrates no multicollinearity issues between reflective indicators since all Variance Inflation Factor (VIF) values remain below 5.0. The VIF values below 5.0 confirm the structural model has reliable and consistent patterns for hypothesis testing purposes.

4.4 Model Fit Indices (PLS-SEM Specific)

Table 4 Model Fit Indices

Fit Index	Value	Threshold
SRMR (Standardized Root Mean Square Residual)	0.048	< 0.08 (acceptable)
NFI (Normed Fit Index)	0.91	> 0.90 (good)
Chi-square / df	2.01	< 3.00 (good)
R^2 for Investment Decisions	0.62	—
Q^2 (Predictive Relevance) for ID	0.41	> 0 (relevant)

The model exhibits an adequate fit according to SRMR < 0.08 and NFI > 0.90. Seventy-two percent of the variables used to measure investment decisions can be explained through the combination of financial literacy factors and risk tolerance assessments with innovation adoption methods. The predictive strength of the model is demonstrated by high values of Q^2 which validates its explanatory ability.

4.5. Structural Equation Model Results

Table 5 Structural Equation Model

Hypothesis	Path	Beta (β)	t-value	p-value	Result
H1	Financial Literacy → Investment Decisions	0.31	5.12	<0.001	Supported
H2	Financial Literacy × Risk Tolerance → Investment Decisions	0.14	2.33	0.020	Supported
H3	Financial Literacy → Innovation Adoption	0.36	6.20	<0.001	Supported
H3	Innovation Adoption → Investment Decisions	0.29	4.75	<0.001	Supported
H4	Risk Tolerance → Innovation Adoption	0.27	3.89	<0.001	Supported

The statistical significance of all hypothesized paths reaches $p < 0.05$ and their t-values exceed 1.96. Financial literacy has a positive influence on investment decisions which develops through innovation adoption measures. The level of risk tolerance directly affects both innovative adoption as well as it controls the link between financial literacy and investment choices. The study results validate both the four hypotheses and prove the proposed conceptual model's mediating and moderating elements.

5.0 Discussion and Conclusion

This research has produced essential knowledge about Pakistani retail investment decisions through its analysis of financial literacy together with risks and innovation practices. The research findings validated that investment decisions have positive correlations with financial literacy because knowledgeable investors make better financial choices. A body of research confirms that financially knowledgeable people better understand markets and risks while making decisions that lead to strategy development (Lusardi & Mitchell, 2014). Financial education initiatives in Pakistan become essential because historical financial exclusion has been followed by low awareness levels but we see a positive relationship between financial literacy and investment decisions.

The relationship between financial literacy and investment decisions shows strong moderation from risk tolerance according to the research findings. Lower risk tolerance works as a predictor of stronger positive effects when financial literacy meets specific investor characteristics. Although financially literate investors with low risk tolerance avoid high-return investments because they face psychological obstacles as well as emotional setbacks. Prospect theory matches behavioral finance assumptions because it explains how investors conduct themselves despite their selection between risk tolerances and knowledge bases. Behavioral aspects determine investment decisions through interactions with logical factors.

Financial literacy stood as a key direct indicator which generated positive results in innovation adoption patterns. The evidence indicates that investors who understand financial concepts tend to adopt new digital services in investing through robo-advisors and fintech applications and digital investment platforms. The developments reduce information difficulty while expanding investment choices which leads investors toward better investment decisions. Libraries regarding financial innovations caused investment decision readiness while functioning as a mediator between financial literacy and genuine investor choices. Digital transformation plays an increasingly crucial role in investments so these results highlight the necessity of technological skills as an additional resource to fundamental monetary knowledge.

The study established that innovation adoption receives direct positive effects from risk tolerance levels. Individuals who demonstrate tolerance toward risk tend to try new financial instruments and platforms thus their willingness to explore new technology helps them connect better with contemporary investment opportunities. Developing economies such as Pakistan need to address this finding because technology is presently transforming their financial sector. The combination between behavioral risk tolerance with financial literacy and innovation adoption creates a complete framework to understand investor behavior instead of viewing knowledge as the sole decision source.

The research extends current knowledge by validating this multidimensional model that explains financial literacy and risk attitudes and innovation acceptance for investment decisions among Pakistani retail investors. The tested hypotheses both validate behavioral finance and innovation diffusion theories and create connections between economic models' rational framework and investors' true purchasing behaviors. Investment effectiveness comes from both educational background and technological openness as well as risk management skill.

Multiple usable recommendations result from this research. The improvement of financial education demands greater effort from government financial institutions which should focus their programs on underdeveloped areas using digital learning strategies specifically tailored to educate the populace. Basic financial concepts must be taught while these programs need to develop economic self-assurance and address monetary uncertainties of individuals. Investment solution design must incorporate different risk profiles of individuals as an essential element according to financial advisors and product developers. Products that reflect investor risk preferences improve both trust relationships with clients while boosting their satisfaction levels. Financing literacy education should implement innovation adoption programs to enhance effectiveness. Investors become more capable of data-based investment decision-making through their familiarity with digital assets that strengthen their financial success.

Multiple consequences arise from the research outcomes. The academic community receives comprehensive analysis through this study since it develops an empirical research model which combines psychological factors with informational and technological aspects to explain investor conduct. This research demonstrates how practitioners need to move their focus toward investors by learning to understand behavioral traits along with product knowledge. The findings appeal to policymakers to construct financial systems that will unite information literacy with variable human behaviors and technological advancement to expand access for all investors.

Instead of simply progressing toward financial inclusion and digitalization Pakistan can apply the study insights to develop strategies that keep retail investors well-informed about financial markets.

Sahibzada Qadeerullah: Problem Identification and Theoretical Framework
Najib Ullah Khan: Data Analysis, Supervision and Drafting
Javed Ullah khan: Methodology and Revision

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References

Al-Okaily, A. (2025). Financial innovation: predicting determinants of blockchain technology adoption and its impact on financial firms performance. *International Journal of Innovation Science*.

Ayelotan, O. I. (2024). *Influence of Social Capital, Innovation and Creativity Skills on Entrepreneurial Intention and Readiness of Undergraduate Students of Public Polytechnics* Kwara State University (Nigeria)].

Bayar, Y., Sezgin, H. F., Öztürk, Ö. F., & Şaşmaz, M. Ü. (2020). Financial literacy and financial risk tolerance of individual investors: Multinomial logistic regression approach. *Sage Open*, *10*(3), 2158244020945717.

Chen, Y. (2024). Examining the dynamics of entrepreneurial knowledge and firm performance: a longitudinal study of start-ups in emerging markets. *Journal of the Knowledge Economy*, 1-33.

Cooper, M. (2024). *Counterrevolution: Extravagance and Austerity in Public Finance*. Princeton University Press.

Fang, J., Hao, W., & Reyers, M. (2022). Financial advice, financial literacy and social interaction: what matters to retirement saving decisions? *Applied Economics*, *54*(50), 5827-5850.

Issacs, J. (2024). Balancing Competition and Stability in the Era of Gamified Investing: An Analysis of the Financial Conduct Authority's Competition Mandate on Mobile Trading Apps and Its Impact on Financial Stability and Consumer Protection. *UCLJLJ*, *13*, 1.

Karsokiene, R., & Giedraitis, A. (2023). Systematic Post Crisis Tourism Supply Chain Transformation Towards Resilience in the Context of Tour Operators. *European Journal of Studies in Management & Business*, *28*.

Katnic, I., Katnic, M., Orlandic, M., Radunovic, M., & Mugosa, I. (2024). Understanding the Role of Financial Literacy in Enhancing Economic Stability and Resilience in Montenegro: A Data-Driven Approach. *Sustainability*, *16*(24), 11065.

Khan, M. T. I., Liew, T. W., & Lee, X. Y. (2023). Fintech literacy among millennials: The roles of financial literacy and education. *Cogent Social Sciences*, *9*(2), 2281046.

Khera, P., Ng, S., Ogawa, S., & Sahay, R. (2022). Measuring digital financial inclusion in emerging market and developing economies: A new index. *Asian Economic Policy Review*, *17*(2), 213-230.

Lavanya, R., & Mamilla, R. (2024). Empowering women's financial well-being: the role of financial literacy and decision making in wealth creation. *International Journal of Process Management and Benchmarking*, *18*(1), 16-35.

Mats, V. (2024). Hedge performance of different asset classes in varying economic conditions. *Radioelectronic and Computer Systems*, *2024*(1), 217-234.

Mensah, I. K., & Khan, M. K. (2024). Unified theory of acceptance and use of technology (UTAUT) model: Factors influencing mobile banking services' adoption in China. *Sage Open*, *14*(1), 21582440241234230.

Mohta, A., & Shunmugasundaram, V. (2024). Moderating role of millennials' financial literacy on the relationship between risk tolerance and risky investment behavior: evidence from India. *International Journal of Social Economics*, *51*(3), 422-440.

Nwosu, N. T., & Ilori, O. (2024). Behavioral finance and financial inclusion: A conceptual review and framework development. *World Journal of Advanced Research and Reviews*, *22*(3), 204-212.

Phillips, W., Roehrich, J. K., & Kapletia, D. (2023). Responding to information asymmetry in crisis situations: innovation in the time of the COVID-19 pandemic. *Public Management Review*, *25*(1), 175-198.

Reddy, C. D. (2024). Nations' share of innovative entrepreneurs: financial systems to the rescue in difficult institutional settings. *Journal of innovation and entrepreneurship*, *13*(1), 74.

Rehman, K., & Mia, M. A. (2024). Determinants of financial literacy: a systematic review and future research directions. *Future Business Journal*, *10*(1), 75.

Rudkouskaya, V., & Malik, F. A. (2024). Financial Management Degree for Innovation-Driven Business: Its Challenges and Prospects. *Fostering Industry-Academia Partnerships for Innovation-Driven Trade*, 234-248.

Saluja, O. B. (2024). Crowd-funding to promote women entrepreneurship: a systematic literature review of the empirical studies conducted in the last decade (2012–2023). *International Journal of Gender and Entrepreneurship*, *16*(4), 500-535.

Sathya, N., & Gayathiri, R. (2024). Behavioral biases in investment decisions: An extensive literature review and pathways for future research. *Journal of Information and Organizational Sciences*, *48*(1), 117-131.

Tamara, D., & Maharani, A. How Millennials Make Investment Decisions: Financial Literacy and Financial Behavior. *Economics and Finance in Indonesia*, *70*(2), 4.

Tang, X. (2022). New schemes for investment in of small and medium-sized enterprises of China: Role of access to finance, innovation, and sustainability. *Frontiers in Psychology*, *13*, 857193.

Wagner, F. (2024). Determinants of conventional and digital investment advisory decisions: a systematic literature review. *Financial Innovation*, *10*(1), 18.

Wijaya, H. R., Hati, S. R. H., Ekaputra, I. A., & Kassim, S. (2024). The impact of religiosity and financial literacy on financial management behavior and well-being among Indonesian Muslims. *Humanities and Social Sciences Communications*, *11*(1), 1-13.

Young-Silva, Y., Berenguera, A., Juvinyà-Canal, D., Martí-Lluch, R., Arroyo-Uriarte, P., Tamayo-Morales, O., Marcilla-Toribio, I., Elizondo-Alzola, U., Méndez-López, F., & Chela-Àlvarez, X. (2024). Exploring personal aptitudes and personality traits that, together with social determinants, shape health behaviors and conduct: a thematic analysis based on the Capability, Opportunity, Motivation and Behavior (COM-B) change system. *Frontiers in public health*, *12*, 1387528.

Zekos, G. I., & Zekos, G. I. (2021). Risk management developments. *Economics and law of artificial intelligence: Finance, economic impacts, risk management and governance*, 147-232.