

Understanding Investors' Psychological Factors and Financial Literacy on Investment Decision Making: A Conceptual Paper

Ahmad Nazmi Bin Kamal Adzham¹, *Nor Irvoni Binti Mohd Ishar², Maryam Jameelah Binti Mohd Hashim³

¹ Redvest Wealth & Asset Management, Shah Alam 40150, Selangor, MALAYSIA. Email: 2025333793@student.uitm.edu.my

² Arshad Ayub Graduate Business School, Universiti Teknologi MARA, Shah Alam 40450, Selangor, MALAYSIA.

Email: irvoni@uitm.edu.my

³ Faculty of Business and Management, Universiti Teknologi MARA, Kampus Cawangan Selangor, Bandar Puncak Alam, 42300 Bandar Puncak Alam, Selangor, MALAYSIA. Email: jamieniz@uitm.edu.my

*Corresponding Author

Abstract:

This conceptual paper examines the impact of psychological factors and financial literacy influence on investment decision-making, with Robo-advisors introduced as a moderator. Drawing on Prospect Theory, the study examines how psychological factors influence investors' decisions, particularly among Generation Z (Gen-Z) investors. The study highlights common psychological factors such as loss aversion, overconfidence and Fear of Missing Out (FOMO), which often lead investors to make irrational or impulsive investment decisions. It posits that while traditional finance theories assume rational decision-making, these psychological distortions often lead to suboptimal investment behaviour. The study also examines the influence of financial literacy on investment decisions. It argues that financial literacy enhances investors' ability to understand risks and evaluate financial information, reducing psychological factors such as overconfidence, herding, or loss aversion, which can distort rational decisions. Additionally, Robo-advisors, as algorithm-driven platforms, offer a potential solution by providing objective, data-driven advice that reduces the emotional and cognitive biases affecting decision-making. To test the conceptual paper's hypotheses, future studies can employ a quantitative, survey-based design targeting Gen-Z investors in Malaysia. Data can be collected through a structured questionnaire using a five-point Likert scale, with relationships among variables analysed using Partial Least Squares Structural Equation Modelling (PLS-SEM). This approach enables simultaneous examination of direct, indirect, and moderating effects between financial literacy, psychological factors, and Robo-advisors on investment decision-making. This paper presents a conceptual framework that integrates Prospect Theory, psychological factors, financial literacy and Robo-advisors to offer a more comprehensive understanding of modern investment decisions, especially in the context of digital Robo-advisors and Gen-Z investors. The framework provides a more comprehensive understanding of how education and digital solutions can work together to promote rational decision-making, ultimately improving investment outcomes in today's dynamic financial environment.

ARTICLE INFORMATION

Received:	16	Sep 2025
Revised:	18	Sep 2025
Accepted:	27	Oct 2025
Published:	10	Nov 2025

Keywords: Psychological factors, Robo-advisor, Financial Literacy, Investment Decision

INTRODUCTION

Investment decision-making is the process by which investors allocate their financial resources among different asset classes and securities in order to maximise returns and manage risks. Investment decision-making has traditionally been explained through rational models such as the Efficient Market Hypothesis (Fama, 1970), Modern Portfolio Theory (Markowitz, 1952), and the Capital Asset Pricing Model (Sharpe, 1964). These frameworks assume that investors act rationally, evaluate all available information, and consistently seek to maximise returns relative to risk. These theories have guided decades of research on investment behaviour. For instance, Aprayuda et al. (2021) and Nasiri et al. (2021) applied rational asset-pricing and information-processing frameworks to study investment choices, while Ahmed et al.

(2021) demonstrated how financial literacy can reinforce rational decision-making within these traditional paradigms. While influential, such theories fail to capture the behavioural realities observed in investment decisions, where investors often deviate from rational expectations.

Prospect Theory, developed by Kahneman and Tversky (1979), offers a different perspective by demonstrating that investors evaluate outcomes relative to reference points and place disproportionate weight on losses compared to gains. The theory challenges the rationality assumption arguing that investors are irrational decision makers because they are influenced by psychological factors, especially when faced with gains or losses. Mahmood et al., (2024) and Subedi & Bhandari (2024) studies shows growing evidence that investors frequently deviate from rational behaviour due to psychological influences. This perspective explains why psychological factors such as loss aversion, regret aversion, and herding persist in investment decision-making, despite leading to inefficient outcomes. Ahmad (2025) highlighted how overconfidence and loss aversion distort risk perceptions, while Maheshwari and Samantaray (2025) observed that Generation Z investors are particularly prone to Fear of Missing Out (FOMO) driven trading. Recent studies by Maheshwari and Samantaray (2025) also suggests that these behavioural biases are particularly pronounced among younger cohorts, such as Generation Z (Gen-Z), whose financial choices are shaped by digital information sources and social influence.

At the same time, financial literacy has emerged as a critical factor shaping investment decisions. Financial literacy is defined as an individual's ability to understand, evaluate and apply financial knowledge and skills in making informed and sound decisions in regards to the management of personal finances (Johri et al., 2023; Suresh, 2024). Financial literacy has been identified as a key variable influencing rational investment decisions (Uddin et al., 2024; Suresh, 2024). Evidence shows that investors with stronger financial knowledge are better equipped to assess risks, diversify portfolios, and resist the influence of psychological distortions (Naqvi et al., 2025; Uddin et al., 2024). Financial literacy therefore acts as a counterbalance to psychological biases, supporting more rational investment outcomes. A more recent development in the investment landscape is the rise of Robo-advisors, an algorithm-driven platforms that provide low-cost, personalised, and data-driven investment objective recommendations and filtering out emotional influences. According to Financial Planning Association Journal (2024) article Customer Trust and Satisfaction with Robo-Adviser Technology projected that asset under management is expected to increase from approximately USD 870 billion in assets currently being managed by Robo-advisors in the U.S in 2022.

However, most studies have focused on these variables in isolation. Unlike traditional finance theories that assume consistent rationality, the Prospect Theory provides a behavioural lens for understanding suboptimal and emotionally driven investment decisions. This paper proposes a conceptual framework that integrates Prospect Theory with psychological factors, financial literacy, and Robo-advisors. By doing so, it advances existing theory in two ways; first, by extending Prospect Theory into the digital era where algorithmic investment advisory increasingly shapes decision-making; and second, by showing how behavioural limitations and financial knowledge interact in practice. The framework is particularly relevant for Gen-Z investors in emerging markets, where both financial literacy initiatives and digital financial services are expanding rapidly.

PROBLEM STATEMENT

Prospect Theory (Kahneman & Tversky, 1979) has long provided a behavioural explanation in understanding irrational investor behaviour under conditions of risk and uncertainty. By emphasising loss aversion and reference dependence, the theory captures the tendency of individuals to weigh losses more heavily than equivalent gains, leading to systematic biases such as holding on to losing investments or exiting winning positions too early. Past research has largely focused on psychological factors such as loss aversion, overconfidence, and herding, as demonstrated by studies such as Mahmood et al. (2024), Subedi & Bhandari (2024), and Fong (2025). These studies argue that psychological factors heavily influence investment behaviour, often leading to suboptimal decision-making. However, despite its enduring relevance, Prospect Theory has not fully evolved to address two emerging realities in modern investment contexts;

namely the role of financial literacy and the growing influence of digital financial technologies such as the Robo-advisors towards investors' decision-making.

First, the theory does not adequately incorporate the influence of digital financial technologies. Mahmood et al. (2024) and Ahmad (2025) studies highlighted that Prospect Theory effectively explains irrational behaviours such as overconfidence and herding, however it fails to account for the influence of digital financial technologies such as the Robo-advisors. The algorithm-driven platforms such as Robo-advisors have recently transformed the investment landscape and increasingly shape investors decision-making by offering objective, data-based recommendations that can counteract emotional trading and reduce behavioural distortions. Recent research highlights Robo-advisors ability to moderate psychological factors such as overconfidence, herding, and Fear of Missing Out (FOMO), yet these findings remain fragmented and insufficiently connected to Prospect Theory (Ahmad et al., 2025; Panakaje et al., 2025). Other studies by Subedi & Bhandari (2024) and Fong et al. (2025) further argues that Prospect Theory overlooks how Robo-advisors might reshape investor behaviour in the digital era.

Second, the Prospect Theory has not considered the role of financial literacy in shaping investors' decision-making. Psychological factors and financial literacy are central to understanding investment decisions in this evolving context. Psychological factors such as overconfidence, loss aversion, and herding bias distort how investors perceive risks and return, often leading to impulsive or irrational decisions (Mahmood et al., 2024; Ahmad, 2025). Conversely, financial literacy equips investors with the ability to evaluate information, diversify portfolios, and adopt risk-aware strategies. Naqvi et al. (2025) and Uddin et al. (2024) studies demonstrate that higher literacy reduces the negative impact of biases such as overconfidence and herding. However, few conceptual models have integrated financial literacy with the Prospect Theory to explain investment decision-making in a holistic manner. Naqvi et al. (2025) argue that Prospect Theory provides valuable insights into decision-making under uncertainty, however it does not fully address the role of financial literacy on investment decisions. This conceptual gap presents an opportunity to extend Prospect Theory by incorporating Robo-advisors as a moderating variable between financial literacy and investment decisions. Financially literate investors are better positioned to leverage Robo-advisory tools effectively, interpreting algorithmic recommendations, understanding portfolio risks, and aligning digital advice with personal investment goals.

Conversely, investors with lower financial literacy may depend excessively on Robo-advisors' automation without fully understanding its recommendations, potentially leading to poor decisions. Recent studies by Ahmad et al. (2025), Maheshwari & Samantaray (2025), and Mohapatra et al. (2025) highlight that Robo-advisors can enhance rational investment behaviour by mitigating these psychological factors, such as overconfidence and herding. Thus, Robo-advisors are posited to strengthen the positive effect of financial literacy on investment decisions by providing structured, data-driven, and bias-free guidance. Prospect Theory, however, does not account for this technological dimension, leaving a theoretical gap in understanding how digital financial tools moderate the relationship between investor cognition and behaviour.

These gaps are particularly relevant for Gen-Z investors in emerging markets. Hallie Spear, Sofia Eckrich, et. al (2024) World Economic Forum (WEF) White Paper titled "The Future of Financial Advice", shows that Gen-Z is heavily dependent on social media and digital platforms as well as unconventional information sources like financial influencers. As digital natives, Gen-Z are highly exposed to social media, online influencers, and real-time trading platforms. Psychological factors such as overconfidence, loss aversion, and FOMO (Fear of Missing Out) have been shown to distort investment decisions, leading to biases in risk perception and investment choices (Mahmood et al., 2024; Ahmad, 2025). At the same time, many young investors display uneven levels of financial literacy, making them more vulnerable to impulsive or speculative decisions. Robo-advisors, therefore, represent a timely intervention by providing accessible, low-cost guidance that can moderate both psychological distortions and knowledge limitations.

However, most research in this area remains centred around the direct effects of these variables without considering the moderating role of technology in mitigating these biases. The introduction of Robo-advisors into this framework represents a novel approach, as they provide an automated, data-driven solution to counteract emotional and psychological biases that often lead to irrational decisions. Recent studies by Panakaje et al. (2025) and Maheshwari & Samantaray (2025) have explored Robo-advisors' potential to reduce bias in investment decisions but have not thoroughly integrated these findings with the Prospect Theory. Meanwhile, Panakaje et al. (2025) and Carretta et al. (2025) studies have demonstrated that Robo-advisors can mitigate biases such as loss aversion and overconfidence, but the interaction between Robo-advisors, financial literacy, and psychological biases remains underexplored. This study, therefore, aims to address these gaps by examining the moderating role of Robo-advisors and their interaction with financial literacy and psychological factors in shaping investment decisions. By doing so, it extends behavioural finance theory into the digital era, clarifies the interaction between cognition and technology, and situates the analysis within the practical realities of Gen-Z investors in emerging markets. The novelty of this study lies in its attempt to merge behavioural finance theories with technological innovations, thereby contributing to a more holistic understanding of modern investment decision-making processes.

LITERATURE REVIEW

This section will cover psychological factors like overconfidence, loss aversion, and herding behavior, financial literacy as well as Robo-advisors as a moderating variable. Relevant literature was reviewed and four hypotheses were developed in this conceptual paper.

Financial Literacy and Investment Decision-Making

Financial literacy plays a pivotal role in shaping investors decision-making. Studies consistently show that higher financial literacy is associated with more diversified portfolios, stronger risk management, and fewer behavioural mistakes (Suresh, 2024; Vaghela et al., 2023). Conversely, low financial knowledge has been linked to impulsive decisions, portfolio underperformance, and vulnerability to emotional influences (Lulaj & Mekaniwati, 2025). Within the framework of Prospect Theory, financial literacy can be seen as a mitigating force, reducing the distortions caused by loss aversion or overconfidence by enabling investors to interpret information more rationally. Yet, evidence from emerging markets suggests that financial literacy levels remain uneven, particularly among younger investors, leaving them exposed to psychological factors such as overconfidence and loss aversion (Sapiri & Awaluddin, 2023; Uddin et al., 2024). Poor grasp and understanding of financial knowledge have been identified as one of the main variables preventing individual investors from making good investment choices. Despite significant efforts and initiatives by the government and various organizations to raise the financial literacy rate, a large number of people in the population still struggle to make good and informed financial and investment decisions. This has ultimately impacted their financial well-being and socioeconomic outcomes. Therefore, based on the above, the research hypothesised that:

Hypothesis 1 (H1): Financial literacy has a positive effect on investment decision-making among Gen-Z investors.

Psychological Factors and Behavioural Decision-Making

Prospect Theory identifies systematic deviations from rationality, including loss aversion, reference dependence, and probability weighting (Kahneman & Tversky, 1979). Building on this foundation, behavioural finance research has documented how psychological factors such as overconfidence, herding, and Fear of Missing Out (FOMO) influence investor behaviour. Overconfidence often leads investors to underestimate risks and trade excessively, while herding amplifies speculative trades in nature by driving individuals to follow collective sentiment rather than independent analysis (Mahmood et al., 2024; Maheshwari & Samantaray, 2025). FOMO, increasingly visible among Gen-Z investors active on social media, reflects the emotional urgency to participate in market trends without sufficient due diligence. These biases illustrate how investors systematically deviate

from rational decision-making, confirming the relevance of Prospect Theory in contemporary markets. However, while prior research has extensively described these biases, there remains limited exploration of how they interact with financial literacy and technological interventions. Therefore, based on the above, the following hypothesis is developed for further testing.

Hypothesis 2 (H2): Psychological factors (e.g., overconfidence, herding, loss aversion, and FOMO) have a positive effect on investment decision-making among Gen-Z investors.

Robo-Advisors as Moderator between Psychological Factors and Investment Decisions

The advent of Robo-advisors marks a technological shift in financial services, offering automated, low-cost, and algorithm-based investment recommendations. Unlike human decision-makers, Robo-advisors are not influenced by fear, overconfidence, or herding pressures, making them valuable tools for counteracting behavioural biases (Ahmad et al., 2025; Panakaje et al., 2025). Empirical evidence shows that investors using Robo-advisors display reduced loss aversion and lower susceptibility to short-term emotional trading (Maheshwari & Samantaray, 2025). Within the Prospect Theory framework, Robo-advisors can be conceptualised as external moderators that weaken the link between psychological factors and irrational investment decisions. Yet, the literature on this moderating role remains fragmented, with most studies addressing either specific biases or adoption factors rather than integrating Robo-advisors into behavioural finance models. Bhatia, A., et. al (2022) study found that Robo-advisory services are still incapable of significantly mitigating psychological factors such as overconfidence and loss aversion in investors' decision-making. A moderator variable affects the relationship that exists between the independent variable and the dependent variable. Psychological factors like overconfidence and loss aversion, for instance, can shape the decisions made by an investor. A Robo-advisor can act as a moderator by offering automated, algorithm-based investment advice that disregards these biases. Consequently, based on this insight, Robo-advisor will be considered as a moderator for the hypothesis stated.

Hypothesis 3 (H3): Robo-advisors positively moderate the relationship between psychological factors and investment decision-making among Gen-Z investors, such that the relationship is stronger when the use of Robo-advisors is high.

Robo-Advisors as Moderator between Financial Literacy and Investment Decisions

Beyond mitigating psychological factors, Robo-advisors can also shape how financial literacy translates into investment decisions. For less literate investors, Robo-advisors offer educational prompts, risk assessments, and simplified guidance that can substitute for missing knowledge (Kumar, 2025; Choo et al., 2023). For financially literate investors, Robo-advisors provide a complementary tool that reinforces rationality by presenting data-driven options aligned with long-term goals. This dual role highlights the importance of considering financial literacy and Robo-advisors together, rather than in isolation. Handini, S. (2024) study found that there is no significant relationship between financial literacy with investment decisions when motivation and knowledge are included. The findings imply that the link between financial literacy and investment decision-making may be conditional rather than direct. Therefore, the introduction of Robo-advisors as a moderating variable could explain the mixed empirical evidence. While previous research has explored the direct effects of financial literacy on investment decisions, the potential moderating influence of Robo-advisors within this relationship remains largely unexamined, highlighting a key theoretical gap in behavioural finance theory. Therefore, based on the above, the following hypothesis is developed for further testing.

Hypothesis 4 (H4): Robo-advisors positively moderate the relationship between financial literacy and investment decision-making among Gen-Z investors, such that the relationship is stronger when the use of Robo-advisors is high.

CONCEPTUAL FRAMEWORK

This conceptual framework investigates the influence of psychological factors, financial literacy, and Robo-advisors as moderator on investment decisions. The hypothesis built within this framework examine how financial literacy and psychological factors (such as overconfidence, loss aversion, and the Fear of Missing Out, or FOMO) shape investors' decision-making. Moreover, Robo-advisors are positioned as moderating variables that help mitigate biases in investment decision-making. With Kahneman and Tversky's Prospect Theory as the platform of conceptualisation, Figure 1 addresses the influence of Robo-advisor on investors' investment decision-making.

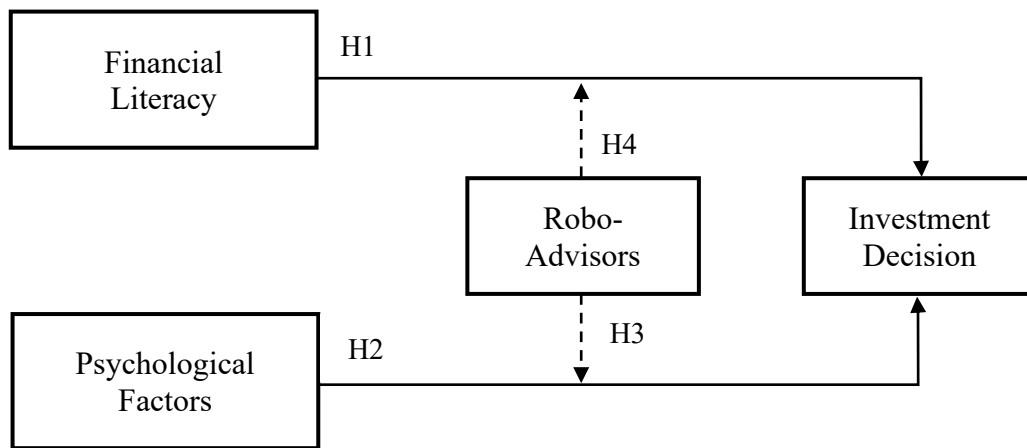


Figure 1: Conceptual Framework integrating Prospect Theory, Psychological Factors, Financial Literacy, and Robo-Advisors

First, financial literacy serves as a counterbalancing force. Financial literacy has long been a significant predictor of rational investment behaviour. Financial literacy is the ability to access and apply financial skills to manage one's financial resources. Young investors, especially Gen-Z, who are financially literate, understand the risks involved with different financial investment products. Their high financial knowledge enables them to make investment decisions aligned with their investment goals, horizon, and risk tolerance. Studies have consistently shown that higher financial literacy is associated with more informed investment decisions, as it equips individuals with the necessary skills to assess risk, diversify portfolios, and avoid impulsive decisions. For instance, Suresh (2024) and Uddin et al. (2024) emphasized that financially literate investors tend to make more diversified investments, leading to improved financial outcomes.

Second, Prospect Theory posits that investors deviate from rationality due to loss aversion, reference dependence, and other psychological distortions. These psychological factors including overconfidence, herding, and Fear of Missing Out (FOMO) directly influence investment choices by shaping perceptions of risk and return. For example, overconfidence can lead to excessive risk-taking, while loss aversion might result in the unwillingness to sell losing investments, even when such actions would be rational. Maheshwari and Samantaray (2025) found that Gen-Z investors, in particular, are prone to impulsive investment decisions driven by FOMO. Similarly, Mahmood et al. (2024) highlighted how herding behaviour, amplified by social media, leads to suboptimal investment choices among young investors. These psychological factors distort risk perceptions and often cause individuals to make decisions based on emotions rather than rational analysis. Investors tend to feel the pain of losses more strongly than the pleasure of equivalent gains. This bias often causes investors to hold on to losing investments in hopes of recovery, resulting in poor decisions. Studies such as Ahmad (2025) and Mahmood et al. (2024) confirm the pervasiveness of loss aversion, particularly among Gen-Z investors.

Third, Robo-advisors act as moderating mechanisms that reduce the impact of psychological biases. Robo-advisors, AI-driven platforms that provide algorithm-based investment advice, are designed to counteract the emotional biases that

typically influence investment decisions. By offering data-driven recommendations, Robo-advisors help investors make decisions based on objective information, rather than on psychological impulses such as fear or overconfidence. Studies such as those by Panakaje et al. (2025) and Maheshwari and Samantaray (2025) demonstrate that Robo-advisors are particularly effective in reducing biases like loss aversion and FOMO. These platforms offer a moderating role by removing emotional decision-making and promoting rational, long-term investment strategies. In essence, Robo-advisors function as a check against psychological distortions by guiding investors with objective, algorithmic advice (Carretta et al., 2025). By providing algorithm-driven, unbiased recommendations, Robo-advisors can weaken the influence of biases such as overconfidence or herding.

Lastly, Robo-advisors enhance the positive effects of financial literacy by simplifying complex concepts and reinforcing rational decision-making. They offer data-driven insights that help investors make better decisions by lowering their reliance on emotional or gut feelings. While financial literacy fosters better decision-making, Robo-advisors further enhance this process by offering personalized, automated investment advice based on financial goals and risk tolerance. Studies by Kumar (2025) and Cao et al. (2025) suggest that Robo-advisors can help investors, especially those with lower financial literacy, make more informed decisions by providing easy-to-understand financial guidance. Furthermore, Robo-advisors play a critical role in improving financial literacy by simplifying complex financial concepts through user-friendly interfaces and interactive educational tools (Choo et al., 2023). Therefore, this hypothesis posits that Robo-advisors act as a moderating factor, amplifying the positive impact of financial literacy on investment decisions, particularly for investors with limited financial knowledge

The proposed conceptual framework hypothesizes that Robo-advisors moderates the relationship between psychological factors (loss aversion, overconfidence, and Fear of Missing Out) and investment decisions. At the same time, Robo-advisors also act as a moderator between financial literacy and investment decisions. According to the suggested model, investors with higher financial literacy will be more impacted by Robo-advisors in terms of lowering psychological factors than investors with lower financial literacy. To fully comprehend how these factors affect investment decision-making in the modern financial landscape, this integrated framework integrates financial literacy, Robo-advisor with the Prospect Theory.

METHODOLOGY

Future studies can employ a quantitative survey and PLS-SEM analysis to empirically test this conceptual framework integrating Prospect Theory, financial literacy, psychological factors, and Robo-advisors. This methodological approach ensures robustness in identifying the moderating role of Robo-advisors and provides valuable insights into how Gen-Z investors make financial decisions in an increasingly digitalized environment.

Research Design

This study adopts a quantitative, survey-based research design to examine the relationships among psychological factors, financial literacy, and investment decision-making, as well as the moderating role of Robo-advisors. The design is appropriate given the study's objective to test hypothesized relationships and quantify the strength and direction of associations among variables. As a conceptual study grounded in Prospect Theory, the proposed framework integrates behavioural finance constructs with technological moderators to capture the complexity of modern investment behaviour, particularly among Gen-Z investors emerging countries such as in Malaysia.

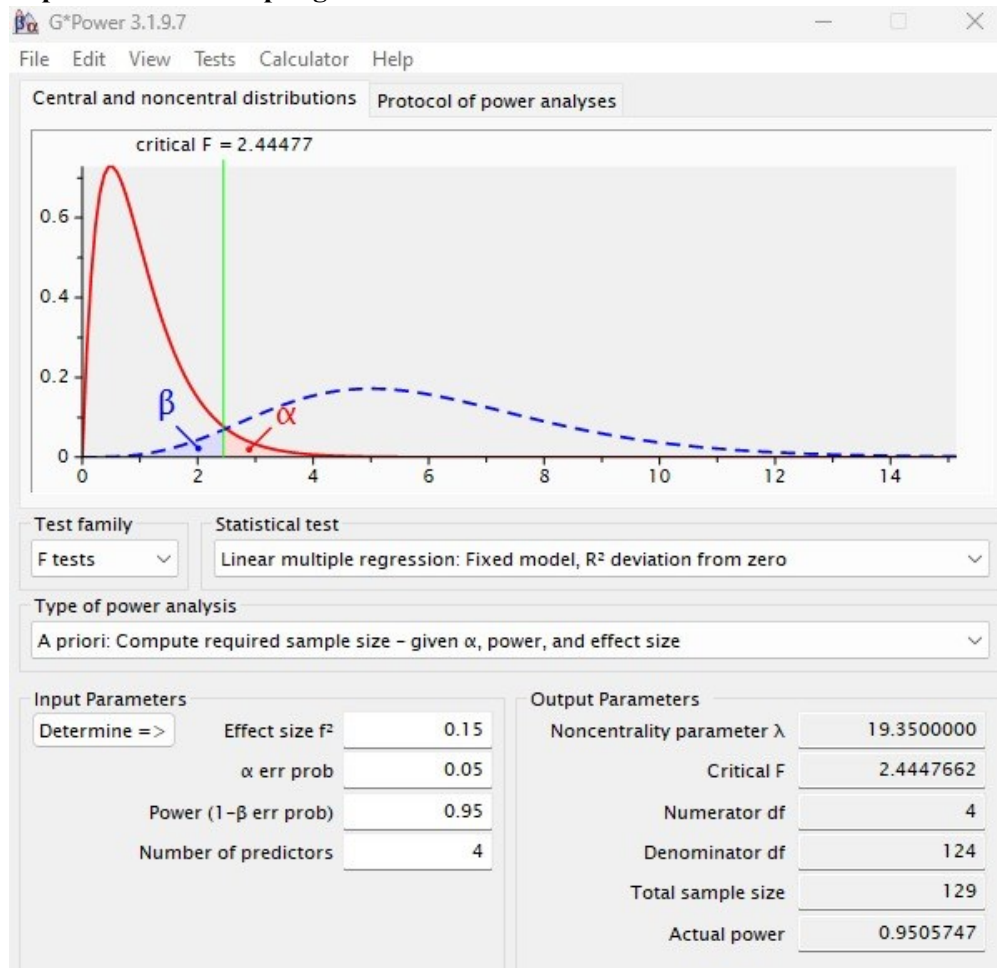
Research Approach

The research approach underpins this study, emphasizes empirical observation, measurement, and statistical testing. Data will be collected using a structured questionnaire designed to capture constructs such as financial literacy, psychological biases (overconfidence, loss aversion, herding, and FOMO), and perceptions of Robo-advisors. Primary data will be collected through a structured online questionnaire designed based on validated

constructs from prior literature. All questionnaire items will be measured using a five-point Likert scale ranging from 1 (“Strongly Disagree”) to 5 (“Strongly Agree”), ensuring consistency and ease of interpretation.

The relationships among these constructs will be tested using Partial Least Squares Structural Equation Modeling (PLS-SEM). This technique is selected for its suitability in handling complex models with moderating variables and latent constructs, as well as its robustness with smaller or non-normally distributed datasets. PLS-SEM is widely used in recent studies investigating behavioural finance and FinTech adoption (Maheshwari & Samantaray, 2025; Panakaje et al., 2025) supporting its application in this study.

Population and Sampling



The study targets individual investors in Malaysia, particularly Gen-Z (aged 18–29), who are active users of digital investment platforms or Robo-advisors. This demographic is chosen due to their high digital engagement and growing participation in financial markets. The sample size will be determined using G*Power version 3.1.9.7 (Faul et al., 2009) to calculate the minimum usable sample size required for this study. The analysis employed a multiple linear regression model characterised by four predictors, a medium effect size ($f^2 = 0.15$), and a target statistical power of 95%, revealing that a minimum sample size of 129 participants was necessary. This guarantees adequate power to identify significant correlations and moderating effects within the given model.

A purposive sampling method will be used to ensure that respondents have basic investment experience and familiarity with digital financial tools. Participants will be reached through online survey distribution via investment forums, financial literacy programs, and social media channels targeting young investors.

DISCUSSION

The conceptual framework advances behavioural finance studies in three ways:

First, it extends Prospect Theory into the digital era by recognising that investor behaviour is now shaped not only by psychological factors but also by algorithmic tools that can mitigate those biases. While Prospect Theory has long explained and argued on investors' irrational investment choices under risk, it has not accounted for the moderating role of financial technologies such as Robo-advisors. By incorporating these tools, the framework highlights how digital platforms can reduce loss aversion, herding, and overconfidence, offering a behavioural counterbalance to irrational tendencies. The role of Robo-advisors as moderators in the investment decision-making process offers a valuable contribution to the existing body of knowledge. Previous research has demonstrated the efficacy of Robo-advisors in mitigating psychological biases, such as overconfidence and loss aversion, which often lead to suboptimal investment choices (Maheshwari & Samantaray, 2025; Ahmad et al., 2025).

Second, the conceptual framework integrates financial literacy into Prospect Theory's scope. Traditional applications of Prospect Theory emphasise psychological distortions but often overlook the role of knowledge and skills. By including financial literacy, the framework recognises that investors with higher levels of understanding are more capable of making rational decisions, while those with lower literacy are more reliant on technological support. However, the moderating role of Robo-advisors in the relationship between financial literacy and investment decision-making remains underexplored, underscoring a significant theoretical gap in behavioural finance. This study fills that gap by illustrating that Robo-advisors not only reduce emotional and cognitive biases but also enhance the decision-making process for investors with varying levels of financial literacy.

Third, the framework situates these dynamics within the context of Gen-Z investors in emerging markets such as Malaysia. As digital natives with uneven financial literacy levels, Gen-Z investors are particularly vulnerable to behavioural distortions amplified by social media and speculative trading platforms. Robo-advisors therefore represent a practical and accessible solution for improving decision quality in this demographic, highlighting the framework's importance and significance.

PRACTICAL IMPLICATIONS

From a practical standpoint, this study provides valuable insights for both investors and financial services providers. For investors, the framework underscores the importance of combining financial literacy with the use of Robo-advisors to achieve more rational outcomes. Robo-advisors offer a low-cost, accessible solution to overcoming psychological biases that may otherwise hinder sound investment decisions. For financial service providers, it suggests that integrating educational features within Robo-advisory platforms could enhance both adoption and decision quality. For policymakers and educators, the findings reinforce the need to embed financial literacy programs in formal education while encouraging the responsible use of FinTech solutions to support investment behaviour.

LIMITATIONS AND FUTURE RESEARCH

As a conceptual paper, this study does not provide empirical testing of the proposed framework. Future research could validate the model through survey and questionnaires methods and structural equation modelling (SEM) that measure how financial literacy, psychological factors and Robo-advisors jointly influence investors decision-making. Cross-generational comparisons could also reveal whether the framework applies beyond Gen-Z

investors. Finally, cultural and market-specific factors in emerging economies warrant further exploration to determine the generalisability of the model.

CONCLUSION

In sum, this paper contributes to behavioural finance by extending Prospect Theory to incorporate financial literacy, psychological factors and Robo-advisors as critical determinants of modern investment decision-making. By doing so, it offers a comprehensive framework that addresses gaps in existing theory, aligns with the realities of digital financial markets, and provides actionable insights for investors, educators, and policymakers. The framework demonstrates that rational investment behaviour in today's century is no longer shaped solely by psychology but is increasingly influenced by the interaction of behavioural, knowledge, and technology.

Author Contributions: The main author wrote the introduction, literature review, research method, discussion, and conclusion. The first and second co-authors reviewed, edited, proofread, and provided technical support. The co-author completed the final revision and ensured compliance with the journal's requirements.

Funding: This research received no external funding.

Acknowledgements: The authors would like to acknowledge the support of Arshad Ayub Graduate Business School, Universiti Teknologi MARA, Shah Alam, Selangor, Malaysia, and the Faculty of Business Management, Universiti Teknologi MARA, Shah Alam, Malaysia, for providing the facilities and support for this research.

Conflicts of Interest: The authors declared no conflicts of interest regarding this work.

REFERENCES

- Abdi, A. A. A. (2024). Influence of financial literacy on investment decisions of managers of small and medium enterprises in Mogadishu, Somalia. *International Journal of Advanced and Applied Sciences*, 11(4), 30-34. <https://doi.org/10.21833/ijaas.2024.04.004>
- Abideen, Z. U., Ahmed, Z., Qiu, H., & Zhao, Y. (2023). Do behavioral biases affect investors' investment decision making? Evidence from the Pakistani equity market. *Risks*, 11 (6), 109. <https://doi.org/10.3390/risks11060109>
- Adil, M., Singh, Y., & Ansari, M. S. (2022). How financial literacy moderate the association between behaviour biases and investment decision?. *Asian Journal of Accounting Research*, 7(1), 17-30. <https://doi.org/10.1108/AJAR-09-2020-0086>
- Ahmad, U., Van Keulen, M., Briassouli, A., & Saad, M. (2025). Cognitive biases, Robo advisor and investment decision psychology: An investor's perspective from New York stock exchange. *Acta psychologica*, 256, 105048. <https://doi.org/10.1016/j.actpsy.2025.105048>
- Ahmed, Zaheer, et al. "What explains the investment decision-making behaviour? The role of financial literacy and financial risk tolerance." *Afro-Asian Journal of Finance and Accounting* 11.1 (2021): 1-19. <https://doi.org/10.1504/AJFA.2021.10033830>
- Aprayuda, R., Misra, F., & Kartika, R. (2021). Does the order of information affect investors' investment decisions? Experimental investigation. *Journal of Accounting and Investment*, 22(1), 150-172. <https://doi.org/10.18196/jai.v22i1.9965>
- Back, C., Morana, S., & Spann, M. (2023). When do robo-advisors make us better investors? The impact of social design elements on investor behavior.. <https://doi.org/10.1016/j.soccec.2023.101984>
- Banerjee, A., Kumar, R. P., & Mohnot, R. (2025). Embedding behavioral biases into robo-advisory platforms-case of UAE investors. *The Journal of Risk Finance*, 26(1), 41-55. <https://doi.org/10.1108/JRF-06-2024-0184>
- Bhatia, A., Chandani, A., Divekar, R., Mehta, M., & Vijay, N. (2022). Digital innovation in wealth management landscape: the moderating role of robo advisors in behavioural biases and investment decision-making. *International Journal of Innovation Science*, 14(3/4), 693-712. <https://doi.org/10.1108/IJIS-10-2020-0245>

- Cao, X., De Zwaan, L., & Wong, V. (2025). Building trust in robo-advisory: technology, firm-specific and system trust. *Qualitative Research in Financial Markets*. <https://doi.org/10.1108/QRFM-02-2024-0033>
- Carretta, A., Cucinelli, D., Fattobene, L., Leonelli, L., & Schwizer, P. (2025). Expectations of bank automation: the influence of consumer cognitive schema. *International Journal of Bank Marketing*, 43(1), 180-207. `
- Che Hassan, N., Abdul-Rahman, A., Ab. Hamid, S. N., & Mohd Amin, S. I. (2024). What factors affecting investment decision? The moderating role of fintech self-efficacy. *Plos one*, 19(4), e0299004. <https://doi.org/10.1371/journal.pone.0299004>
- Choo, M. R., Tsai, W. C., Hsiao, Y. J., & Yang, S. S. (2023). Financial Literacy and Robo-Advisor Adoption: Evidence from Taiwan. *Management Review*, 42, 19-42. [https://doi.org/10.6656/mr.202310_42\(4\).eng002](https://doi.org/10.6656/mr.202310_42(4).eng002)
- Darmayanti, N. P. A., Wiagustini, N. L. P., Artini, L. G. S., & Candraningrat, I. R. (2023). Driving Millennials To Be Investors: The Case Of Investment Decision Performance In Indonesian Capital Market. *Quality-Access to Success*, 24(196). <https://doi.org/10.47750/QAS/24.196.22>
- Darskuvienė, V., & Lissauskienė, N. (2021). Linking the robo-advisors phenomenon and behavioural biases in investment management: An interdisciplinary literature review and research agenda. *Organizations and Markets in Emerging Economies*, 12(2), 459-477. <https://doi.org/10.15388/omee.2021.12.65>
- Delavande, A., Rohwedder, S., & Willis, R. J. (2008). Preparation for retirement, financial literacy and cognitive resources. <https://doi.org/10.2139/ssrn.1337655>
- Faul, F., Erdfelder, E., Buchner, A., & Lang, A.-G. (2009). Statistical power analyses using GPower 3.1: Tests for correlation and regression analyses*. *Behavior Research Methods*, 41(4), 1149–1160. <https://doi.org/10.3758/BRM.41.4.1149>
- Fong, J. H. (2025). Financial literacy and household financial behavior in Singapore. *Pacific-Basin Finance Journal*, 90, 102651. <https://doi.org/10.1016/j.pacfin.2024.102651>
- Handini, S. (2024). The impact of financial literacy, investment knowledge, and investment motivation on investment decisions. *West Science Journal Economic and Entrepreneurship*, 2(1), 46-62. <https://doi.org/10.58812/wsjee.v2i01.553>
- Hong, X., Pan, L., Gong, Y., & Chen, Q. (2023). Robo-advisors and investment intention: A perspective of value-based adoption. *Information & Management*, 60(6), 103832. <https://doi.org/10.1016/j.im.2023.103832>
- Husaeni, U. A., Priyatno, D., Paminto, S. R., & Syaddad, H. N. (2024). Determinants of Public Investment Decision in Forex Robots Trading: Evidence from Indonesia. *Asian Journal of Business and Accounting*. <https://doi.org/10.22452/ajba.vol17no1.4>
- Johri, A., Islam, M. U., & Kamal, M. (2023). Assessment of financial literacy and its impact on investor's decisions in Saudi Arabia: A study in the context of enabling financial planning to strengthen economic development. *Discrete Dynamics in Nature and Society*, 2023(1), 9932444. <https://doi.org/10.1155/2023/9932444>
- Kang, W., & Yang, M. (2023). Investment decisions regarding internet financial products considering network externalities: a mixed-method approach. *Journal of Electronic Business & Digital Economics*, 2(1), <https://doi.org/10.1108/JEBDE-01-2023-0003>
- Kulal, A., Rahiman, H., Riha Parvin, S. M., Kambali, U., & Panakaje, N. (2024). Impact Of Trust-Building Strategies On Investment Decisions: Mediating Role Of The Financial Advisor-Client Relationship. [http://dx.doi.org/10.21511/imfi.21\(4\).2024.20](http://dx.doi.org/10.21511/imfi.21(4).2024.20)
- Kumar, I. (2025). Evolution of financial advisory market with the advent of robo-advisors. *Managerial Finance*, 51(5), 831-856. <https://doi.org/10.1108/mf-06-2024-1268>
- Lissauskienė, N., Darskuvienė, V., & Butkus, M. (2024). Passive vs active robo-advisors and disposition effect. Moderating role of gender and financial literacy. *Baltic Journal of Economics*, 24(2), 239-260. <https://doi.org/10.1080/1406099X.2024.2422673>
- Lulaj, E., & Mekaniwati, A. (2025). Financial Literacy Metrics for Financial Wellbeing in a Socioeconomic Environment: the FWI Model in a Circular Economy and Climate Finance. *Engineering Economics*, 36(1), 21-39. <https://doi.org/10.5755/j01.ee.36.1.35058>

- Mabwe, K., Aminu, N., Ivanov, S. H., & Dimov, D. (2025). Generative artificial intelligence chatbots in investment decision-making: a phantom menace or a new hope?. *foresight*. <https://doi.org/10.1108/FS-06-2024-0122>
- Maheshwari, H., & Samantaray, A. K. (2025). Beyond instinct: the influence of artificial intelligence on investment decision-making among Gen Z investors in emerging markets. *International Journal of Accounting & Information Management*. <https://doi.org/10.1108/IJAIM-10-2024-0371>
- Maheshwari, H., Samantaray, A. K., Panigrahi, R. R., & Jena, L. K. (2025). Financial literacy in predicting investment decisions: do attitude and overconfidence influence?. *International Journal of Social Economics*, 52(2), 220-235. <https://doi.org/10.1108/IJSE-05-2023-0370>
- Mahmood, F., Arshad, R., Khan, S., Afzal, A., & Bashir, M. (2024). Impact of behavioral biases on investment decisions and the moderation effect of financial literacy; an evidence of Pakistan. *Acta Psychologica*, 247, 104303. <https://doi.org/10.1016/j.actpsy.2024.104303>
- Makkulau, A. R., & Hajar, I. (2024). Influence of Financial Literacy, Investment Promotion, and Socioeconomic Status on Stock Investment Decisions Through Risk Perception. *Revista de Gestão Social e Ambiental*, 18(6), e06269-e06269. <https://doi.org/10.24857/rgsa.v18n6-138>
- Mohapatra, N., Shekhar, S., Singh, R., Khan, S., Santos, G., & Carvalho, S. (2025). Unveiling the Nexus Between Use of AI-Enabled Robo-Advisors, Behavioural Intention and Sustainable Investment Decisions Using PLS-SEM. *Sustainability*, 17(9), 3897. <https://doi.org/10.3390/su17093897>
- Naqvi, Nousheen Abbas, Danish Ahmed Siddiqui, and Muhammad Masood Mir. "Financial Literacy and Investment decisions of Investors of Islamic Banks in Pakistan: The Role of Intention to invest and Religiosity." *Interdisciplinary Journal of Management Studies (Formerly known as Iranian Journal of Management Studies)* 18.2 (2025): 225-239. <http://doi.org/10.22059/ijms.2025.366223.676233>
- Nasiri, M., Sarraf, F., Nourollahzadeh, N., Hamidian, M., & Noorifard, Y. (2021). Modeling asset pricing using behavioral variables: Fama-Macbeth approach. *Interdisciplinary Journal of Management Studies (Formerly known as Iranian Journal of Management Studies)*, 14(3), 547-564. <https://doi.org/10.22059/ijms.2020.303308.674087>
- Panakaje, N., Parvin, S. R., Sheikh, N., Irfana, S., Madhura, K., Raj, J., & Soubhari, T. (2025). Robo-advisors and investment decisions: Assessing the impact of the "snakebite" effect and social-emotional well-being & resilience. *Investment Management & Financial Innovations*, 22(1), 453. [http://dx.doi.org/10.21511/imfi.22\(1\).2025.34](http://dx.doi.org/10.21511/imfi.22(1).2025.34)
- Sapiri, M., & Awaluddin, M. (2023). Distribution of financial attitude, financial behavior, financial knowledge and financial literacy on the investment decision behaviour of young investors. *J. Distrib. Sci*, 21, 45-53. <http://dx.doi.org/10.15722/jds.21.11.202311.45>
- Seraj, A. H. A., Alzain, E., & Alshebami, A. S. (2022). The roles of financial literacy and overconfidence in investment decisions in Saudi Arabia. *Frontiers in psychology*, 13, 1005075. <http://doi.org/10.3389/fpsyg.2022.1005075>
- Shiva, A., Kushwaha, B. P., & Rishi, B. (2023). A model validation of robo-advisers for stock investment. *Borsa Istanbul Review*. 2023; 23: 1458–1473. 10.1016. *J. BIR*, 5. <https://doi.org/10.1016/j.bir.2023.09.005>
- Subedi, D., & Bhandari, D. R. (2024). Impact of psychological factors on investment decisions in Nepalese share market: A mediating role of financial literacy. *International Journal of Economics and Management*, 2(02), 124-138. <https://doi.org/10.54209/iem.v2i02.44>
- Suresh, G. (2024). Impact of financial literacy and behavioural biases on investment decision-making. *FIIB Business Review*, 13(1), 72-86. <https://doi.org/10.1177/23197145211035481>
- Susanto, Kiandra Putri, et al. "Financial Literacy, Technological Progress, Financial Attitudes and Investment Decisions of Gen Z Indonesian Investors." (2024). [http://dx.doi.org/10.21511/imfi.22\(1\).2025.03](http://dx.doi.org/10.21511/imfi.22(1).2025.03)
- Uddin, Moin, et al. "The effect of financial literacy on investment decision making in Kingdom of Saudi Arabia: An empirical study." *Journal of Infrastructure, Policy and Development* 8.10 (2024): 6732. <https://doi.org/10.24294/jipd.v8i10.6732>

- Ullah, R., Ismail, H. B., Khan, M. T. I., & Zeb, A. (2024). Nexus between Chat GPT usage dimensions and investment decisions making in Pakistan: moderating role of financial literacy. *Technology in Society*, 76, 102454. <https://doi.org/10.1016/j.techsoc.2024.102454>
- Usriyono, E., & Wahyudi, S. (2023). The investment decision of millennial generation: An analysis using financial literacy and financial behavior. *Corporate Governance and Organizational Behavior Review*, 7(2), 8-14. <https://doi.org/10.22495/cgobrv7i2p1>
- Vaghela, P. S., Kapadia, J. M., Patel, H. R., & Patil, A. G. (2023). Effect of financial literacy and attitude on financial behavior among university students. *Indian Journal of Finance*, 17(8), 43-57. <https://doi.org/10.17010/ijf/2023/v17i8/173010>
- Wang, G., Zhang, M., & He, B. (2024). Financial literacy and investment returns: The moderating effect of education level. *Finance Research Letters*, 67, 105781. <https://doi.org/10.1016/j.frl.2024./105781>