Are Investors Beyond Rationality? Uncovering Behavioral Finance in Stock Investment Decision Making: A Comprehensive Systematic Literature Review

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Abstract

Humans have complex natures, cannot be predicted or followed by theory. The emotional and cognitive aspects that play a role in financial decision making, especially stock investment, are very important to study. The contribution of this theory will be very useful in mitigating the risk of biased decision making. This article is based on the Systematic Literature Review (SLR) method. This systematic literature review examines a large number of studies on behavioral finance from 11 leading and reputable financial journals published between 2020 and 2024. Articles are collected through Harzing's Publish or Perish with Scopus and Google Scholar article data sources. This SLR research uses the keywords "behavioral finance", "stock" and "investment decision" and is selected using the PRISMA Systematic Literature Review Flow Chart, then analyzed using VOSviewers. The purpose of this article is to offer a comprehensive analysis of the existing literature by providing an overview of the publication pattern of articles over the past 5 years, a geographic map of contributing research, a list of top articles and journals, current topic trends and future research agendas that will greatly assist future researchers in exploring empirical research in the future.

Keywords: behavioral finance, investment decision, bias, stock, systematic literature review.

Abstract

Manusia memiliki sifat yang rumit, kompleks, tidak dapat diprediksi maupun diikuti oleh teori. Aspek emosi dan kognitif yang berperan dalam pengamnbilan keputusan keuangan, khususnya investasi saham sangat penting untuk dipelajari. Kontribusi teori ini akan sangat bermanfaat dalam mitigasi risiko pengambilan keputusan yang bias. Artikel ini berbasis metode Systematic Literature Review (SLR). Tinjauan pustaka sistematis ini meneliti sejumlah besar studi tentang keuangan perilaku dari 11 jurnal keuangan terkemuka dan bereputaasi baik yang diterbitkan antara tahun 2020 hingga 2024. Artikel dikumpulkan melalui Harzing's Publish or Perish dengan sumber data artikel Scopus dan Google Scholar. Riset SLR ini menggunakan kata kunci "behavioral finance", "stock" dan "investment decision" dan diseleksi menggunakan Flow Chart Systematic Literature Review PRISMA, lalu dianalisis menggunakan VOSviewers. Tujuan artikel ini yaitu untuk menawarkan analisis komprehensif atas literatur yang ada dengan memberikan gambaran pola publikasi artikel selama 5 tahun terakhir, peta georgrafis penelitian yang berkontribusi, daftar artikel dan jurnal papan atas, tren topik terkini dan agenda penelitian masa depan yang akan sangat membantu peneliti-peneliti selanjutnya dalam mengeksplorasi riset empiris di masa yang akan datang.

Keywords: behavioral finance, keputusan investasi, perilaku bias, saham, systematic literature review.

INTRODUCTION

The market is faced with various interesting current phenomena such as the market bubble event in Turkey in 2024 which arose due to the speculative attitude of investors and caused stock price movements to increase even though the implementation of fundamental science was weak (Kaya et al., 2024). Other empirical research shows the existence of European investor overreaction to negative market news which has an impact on market volatility and irrational stock sales (Fernandes & Venkatesh, 2020). Another unique phenomenon was identified with research results that prove that 60% of investors from 13 European countries believe they have higher capabilities above average in projecting market performance, and empirical studies in the United States stock market show that male investors experience a loss of profit of 4% greater than female investors due to being aggressive and overconfident in investing (Barber & Odean, 2019). These various phenomena confirm that there is a deviation from the logical rules of the capital market in the market mechanism carried out by market players, because they are unable to rationally digest the availability of information (Vitmiasih et al., 2021).

The Efficient Market Hypothesis (EMH) theory pioneered by Fama (1970) states that the market is always efficient in reflecting perfect information and investors are always rational (Thaler & Barberis, 2014; Kamoune & Ibenrissoul, 2022) is no longer accurate. Until finally in the 1980s, behavioral finance emerged as a new study that combines sociological and psychological behavior in economic and financial decision making. The inventors of the behavioral finance theory, Kahneman and Tversky (1979), criticized the utility theory and produced a prospect theory consisting of three factors, namely regret aversion, loss aversion, and mental accounting. Behavioral finance theory is considered more capable of describing the psychological dynamics of investors and offering further perspectives on the impact of behavioral and emotional biases on financial decision making (Hon et al., 2021; Vandenplas et al., 2022). In modern economics, behavioral finance is considered a very crucial substance, because it is competent in offering answers regarding the reasons behind the differences in each individual's decisions from what traditional economics believes (Pujara & Joshi, 2020).

Human reasoning is called "Bounded Rationality" which means that the process of assimilating information has limitations (Barber, 2009). Biased behavior from within an individual cannot be avoided, even though investors consider themselves rational, because logical deviations and individual emotions cannot be parameterized. Investors rely on rules of thumb when facing unpredictable and uncertain situations, but cognitive and emotional aspects are used by investors when evaluating investment alternatives, so that investors' logical behavior in the decision-making process can disappear (Hassan et al., 2023). Meanwhile, investor decision-making in the stock market plays a vital role in determining market trends, which then affect the economy (Wamae, 2013). Rationality in stock investment decision making is crucial in macro market stabilization, achieving long-term financial goals, optimizing returns, and mitigating the risk of loss, especially in highly

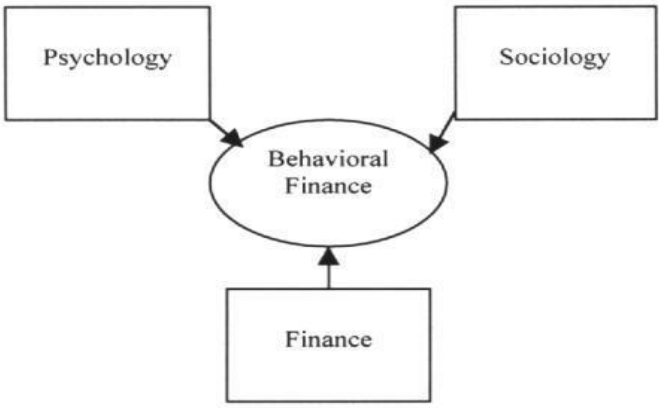
volatile and unpredictable markets (Chakrabarty & Wason, 2018; Rahim et al., 2020; Smith & Linsley, 2021; Kumar & Ghosh, 2022; Fernandes et al., 2023).

Contextually, so far research that accommodates dominant behavioral finance is still largely contributed by researchers in developed countries, so in-depth research with a focus on developing countries is still minimal, and this has great potential to be a novelty in research. It is important to explore what behavioral finance factors influence stock investment decision-making. Second, the potential for unconscious biased behavior from investors is also a positive signal and has a high urgency to be explored. Third, it would be better to move towards multidisciplinary research in the vision of revealing current trends and topics related to behavioral finance and stock investment decisions, in order to find certain issues, seek solutions and mitigate risks from the impact of behavioral finance. The appropriate method for a rigorous review of current topics is through systematic literature review-based research (Shaffril et al., 2020). In detail, this SLR study provides a comprehensive literature review covering key issues and theoretical arguments, providing theoretical and methodological contributions with a systematic literature review of behavioral bias and stock investment decisions, offering new ideas on potential research areas by identifying research gaps, as well as research fundamentals to build research novelty (Rosyidah & Pratikto, 2022).

Researchers focused on articles published in the last 5 years, namely 2020 to 2024, the selection of this analysis period is in accordance with Campanario (2011). Researchers consider SLR to be the right solution because this article can contribute by offering output in the form of an overview of the latest topics or issues being researched by academics, journals and main articles, and content analysis results that will be very useful as references for future research. SLR also allows for mapping and accessing existing intellectual areas, in addition to determining research questions to develop the existing body of knowledge (Tranfield et al., 2003).

THEORITICAL REVIEW

The early history of behavioral finance was motivated by the presence of theoretical research around the 1980s that explored conventional financial market models that considered the existence of irrationality (Barberis & Thaler, 2003). The expected utility theory examines how individuals behave in the face of uncertainty and shows that individuals behave rationally by considering inherent risks and always trying to maximize utility (Neumann & Morgenstern, 1944). Subsequent research by Fama (1970) provided contradictory results that in certain situations, the market is not completely efficient. Over time, the paradigm of classical economic theory began to shift and a new financial theory emerged, namely behavioral finance theory. This theory shows that individuals do not always behave rationally, because the decision-making process is influenced by cognitive biases and heuristics (Tversky & Kahneman, 1974).



Source: Ricciardi and Simon (2002)

Figure 1.
Behavioral Finance Concept

Clearly, this theory strongly refutes Fama's theory (1970) which states that the market is always efficient, meaning that the information available in the market will not be a guarantee that the market price is a full reflection of all available information. Lintner (1998) in his book entitled "*Behavioral Finance: Why Investors Make Bad Decisions*" explains the definition of behavioral finance as a study of how humans interpret and take action in reaction to information to make informed investment decisions. Ricciardi and Simon (2000) in their book "*What is Behavioral Finance?*" define behavioral finance as a study that attempts to uncover and learn about the archetype of investor logic that causes bias in determining financial decisions because it is influenced by emotional factors.

RESEARCH METHODS

This article is based on the Systematic Literature Review (SLR) method, where this method is useful for reviewing, identifying, interpreting and evaluating all available research on the topic of the area of interest to the phenomenon, with certain relevant research questions (Rosyidah & Pratikto, 2022). A systematic literature review (SLR) is a series of evaluation stages to systematic and comprehensive data analysis, minimizing selection bias by using clear inclusion and exclusion criteria to select articles to be analyzed (Tranfield et al., 2003; Pope et al., 2007). Through this approach, researchers can summarize various research findings and identify patterns or trends that might be missed in traditional reviews (Snyder, 2019). By integrating evidence from various studies, SLR also provides a strong basis for the development of theory and policy in the field being studied (Littell et al., 2008). Thus, this study seeks to answer the following questions:

RQ1 : How has the development of financial behavioral publications affected stock investment decision making?

RQ2 : Which geographical regions have contributed and what is the role of developed and developing countries?
RQ3 : What are the top articles and journals that have had the most influence in the last 5 years?
RQ4 : What are the most trending research topics to research?
RQ5 : What is the picture of potential and interesting research ideas for future research agendas?

All included articles had evidence-based recommendations as part of the analytical work, empirical data, or both (Aguinis et al., 2018). After defining the search criteria, a search string was determined, and an appropriate search engine was identified to find and assess as much relevant literature as possible. Based on the pre-defined keywords and terms, we created a search string for our database search. The search string used Boolean operators to ensure that the identified papers matched the researcher's qualifications. i.e. "Behavioral Finance" OR "Behavioral Bias*" AND Stock AND Invest* AND Decision*. To conduct an interdisciplinary and systematic literature review, a computerized literature search was conducted through Publish or Perish as the selected database search engine. Scopus and Google Scholar were used as databases.

Table 1.
Inclusion and Exclusion Criteria

Criteria	Eligibility	Exclude
Timeline	2020-2024	<2020
Language	English	Non English
Topic of context	Behavioral Finance and Stock Investment Decision Making	Irrelevant to topic
Literature type	Peer-reviewed articles and indexed journals	Book, book chapter, conceptual papers, conference proceedings, systematic literature review, thesis, dissertation

Source: Processed data (2025)

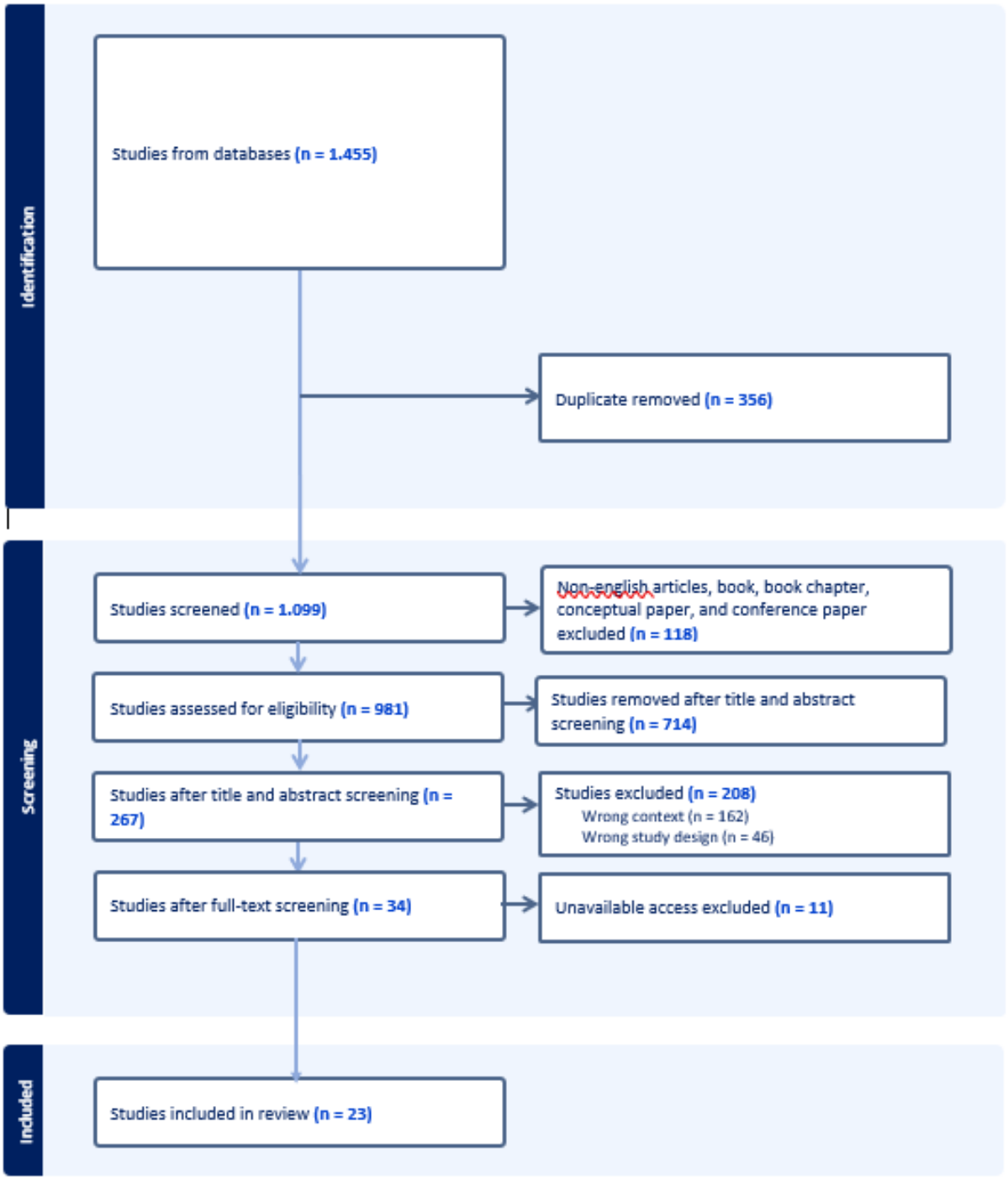


Figure 2.
PRISMA Diagram of Systematic Literature Review

In accordance with the benefits of SLR, namely reducing research bias by using established premises as a guide in conducting systematic reviews (Valcanover, 2020), the stages of the SLR research protocol were taken using the PRISMA Diagram of Systematic Literature Review (Figure 2). Researchers conducted a broad search according to the specified keywords and produced identified outputs of 1,455 articles, entering the next systematic stage, namely article screening by checking duplicate articles. Researchers found that scientific articles still overlapped, so duplicate articles were removed with a total of 356 articles eliminated, leaving 1,099 articles. After that, the first content analysis was carried out by screening titles and abstracts, in order to produce a screening of articles that did not meet the inclusion criteria or did not provide answers to research questions. After screening the titles and abstracts, 714 articles were removed. Next, the remaining 267 articles entered the screening stage by selecting based on the entire article text. A total of 208 articles were reduced because they did not meet the requirements, then 11 articles could not be analyzed further because they were not accessible. The final total of articles is 23 articles that are considered worthy and relevant according to the researcher's analysis criteria. The last step is content analysis with the aim of providing a comprehensive literature review related to behavioral finance in stock investment decisions and answering questions.

RESULTS AND DISCUSSION

Publication Patterns of Financial Behavior in Stock Investment Decision Making

The results of this study have been carried out through the SLR protocol strictly and systematically. The selected articles are structured and produce outputs, namely a description of the publication pattern of articles discussing financial behavior in stock investment decisions in the last 5 years, namely 2020-2024. The goal to be achieved is for this research to provide a theoretical study related to the realm of investor financial behavior in making stock investment decisions. In addition, this research contributes because it provides visualization and at the same time a benchmark for how far the existence of behavioral finance has been studied. This is because according to Figure 1. It can be observed and analyzed that the trend of the topic of investor financial behavior in making stock investment decisions is still quite fluctuating, in 2020 4 articles (17%) were found, then 2 articles (9%) in 2021 and 2022 then there was an increase in relevant research in 2023, namely 9 articles (39%), then in 2024 only 6 articles (26%) were found. Reviewing the publication pattern on this topic, this SLR research provides an overview for further researchers because studies on this topic are still relatively few and open up potential opportunities in the future to explore this research topic further.

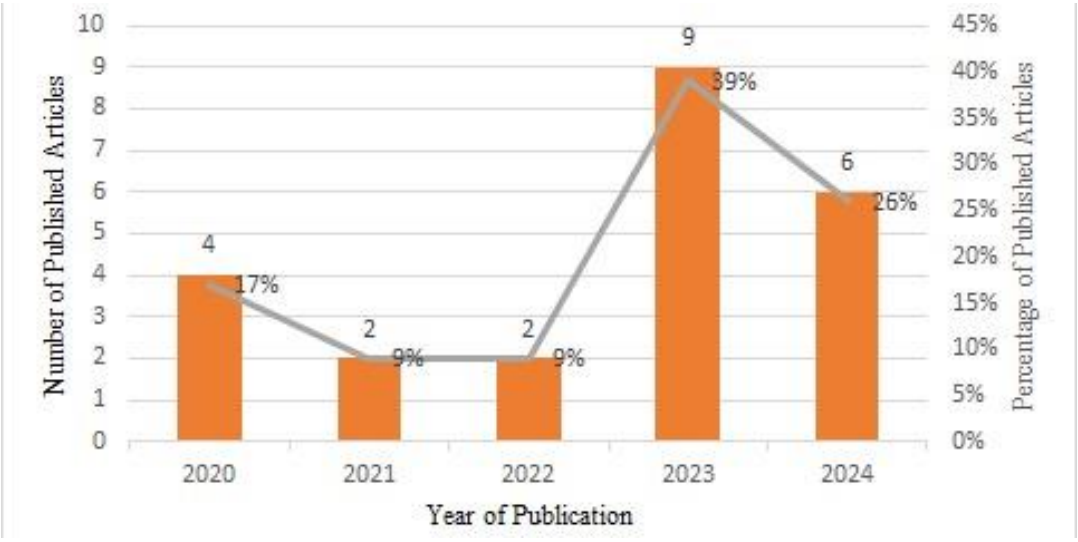
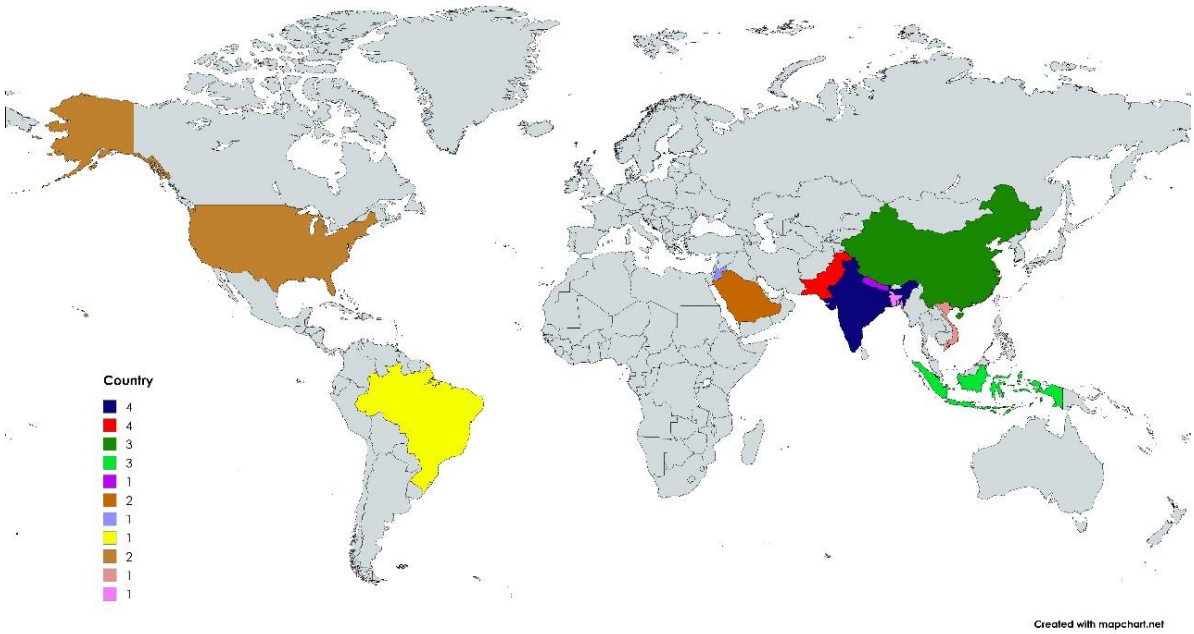


Figure 3.
Publication Patterns of Financial Behavior in Stock Investment Decisions

Geographical Distribution Map of Financial Behavior in Stock Investment Decision Making

Literature review allows researchers to map and access existing intellectual territory and develop a body of knowledge (Tranfield et al., 2003). Research on behavioral bias and financial decisions for 23 articles was contributed by affiliated authors from 11 countries. Figure 4 illustrates the contribution by country, based on the illustration above, it can be seen how the geographical distribution map shows the contribution of countries that have studied and reviewed the topic of behavioral bias and stock investment decisions. Research that meets the SLR criteria in this article is dominated by India and Pakistan at 17% with a total of 4 articles each. The second position is occupied by China and Indonesia at 13% with a total of 3 articles each, then the ranking below is Saudi Arabia, and the USA at 9% with a total of 2 articles each. Several countries that are still few to study more deeply on this topic, namely Nepal, Jordan, Brazil, Vietnam, and Bangladesh at 4% with a total of 1 article each. In conclusion, this article has offered scientific insight that research on the topic of behavioral finance in stock investment decision making is still very potential to be held more.



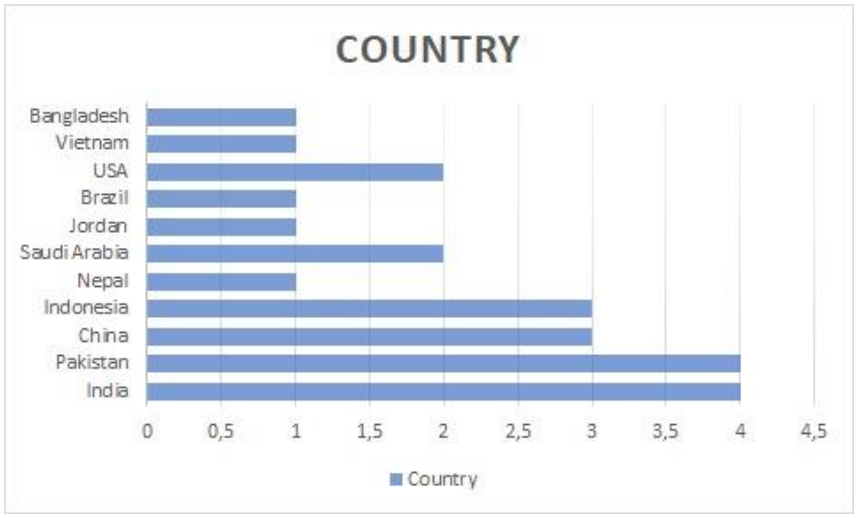


Figure 4. and Figure 5.
Geographical Area Distribution Map of Financial Behavior in Stock Investment Decisions

Top Articles and Journals

SLR helps highlight the most important papers, journals, authors, and countries that have studied behavioral finance today. SLR can guide researchers in selecting the best and most relevant articles to cite, in finding which authors have covered the topics they are interested in, and in seeking guidance when needed (Valcanover et al., 2020). This systematic literature review article offers a comprehensive literature review on behavioral

finance in stock investment decision making. Articles that have been selected according to the criteria in a structured and systematic manner through PRISMA are tabulated into table 2, which shows the output of the list of the most cited articles by various researchers. These theoretical source articles can be a reference source for other researchers to generate the latest research ideas, find research contributions and generate research novelties.

Table 3.
Top 10 Most Cited Relevant Articles

No.	Researcher	Article Title	Journal	Year	Number of Citations
1	Ahmad, M., & Shah, S.Z.A.	Overconfidence heuristic-driven bias in investment decision-making and performance: mediating effects of risk perception and moderating effects of financial literacy	Journal of Economic and Administrative Sciences	2020	285
2	Cao, MM, Nguyen, NT, & Tran, TT	Behavioral Factors on Individual Investors' Decision Making and Investment Performance: A Survey from the Vietnam Stock Market	The Journal of Asian Finance, Economics and Business	2021	119
3	Shiva, A., Narula, S., & Shahi, S.K	What drives retail investors' investment decisions? Evidence from no mobile phone phobia (Nomophobia) and investor fear of missing out (I-FoMo)	Journal of Content, Community and Communication	2020	90
4	Rahayu, S., Rohman, A., & Harto, P.	Herding Behavior Model in Investment Decision on Emerging Markets: Experimental in Indonesia	The Journal of Asian Finance, Economics and Business	2021	78
5	Suresh, G.	Impact of Financial Literacy and Behavioral Biases on Investment Decision-making	FIIB Business Review	2024	72
6	Almansour, BY, Elkrghli, S., & Almansour, AY	Behavioral financial factors and investment decisions: A mediating role of risk perception	Cogent Economics & Finance	2023	63
7	Abideen, Z. U., Ahmed, Z., Qiu, H., & Zhao, Y.	Do Behavioral Biases Affect Investors' Investment Decision Making? Evidence from the Pakistani Equity Market	Risks	2023	41
8	Dewi, V.I., Febrian, E., Effendi, N., & Anwar, M.	Does Financial Perception Mediate the Financial Literacy on Financial Behavior? A Study of Academic Community in Central Java Island, Indonesia	Montenegrin Journal of Economics	2020	30
9	Jain, J., Walia, N., Singla, H.,	Heuristic Biases as Mental Shortcuts to Investment Decision-Making: A	Risks	2023	25

	Singh, S., Sood, K., & Grima, S.	Mediation Analysis of Risk Perception			
10	Yasmin, F., & Ferdaous, J.	Behavioral biases affecting investment decisions of capital market investors in Bangladesh: A behavioral finance approach	Investment Management and Financial Innovations	2023	19

Source: Processed data (2025)

Research from Ahmad et al. (2020) entitled " *Overconfidence heuristic-driven bias in investment decision-making and performance: mediating effects of risk perception and moderating effects of financial literacy* " has a quantitative research type using primary data obtained using a questionnaire. The population of this study includes individual investors in the stock exchange in Pakistan with a total of 183 investors. This study has a Dependent Variable, namely investment decisions and investment performance of individual investors on the Pakistan Stock Exchange (PSX). The Independent Variables in this study are overconfidence, financial literacy, and risk perception. The moderating variable in this study is financial literacy and the mediating variable in this study is risk perception. The data analysis method used in this study uses SPSS and Amos with the Validity test, Cronbach's alpha test, Descriptive Statistics, correlation analysis and regression analysis. The Baron and Kenny method is used to test the mediating effect of risk perception and the moderating effect of financial literacy, the results are authenticated through the process and structural equation modeling (SEM). The results of this study are that risk perception fully mediates the relationship between overconfidence heuristic and investment decisions and performance of individual investors in Pakistan Stock Exchange. Financial literacy is identified as a moderating factor that influences the relationship between overconfidence and investment decisions and performance. Overconfidence is shown to be detrimental to decision quality and investment performance, while higher financial literacy and better risk perception can improve decision quality. The results show that financial literacy has a significant positive effect on investment decisions and performance of individual investors in PSX.

Research from Cao et al. (2021) entitled " *Behavioral Factors on Individual Investors' Decision Making and Investment Performance A Survey from the Vietnam Stock Market* " has a quantitative research type using primary data obtained using a questionnaire. The population of this study includes 250 investors in the Vietnamese stock market. This study has Dependent Variables, namely investment decisions and investment performance on the Vietnam Stock Exchange. Independent Variables in this study include Heuristics, Prospects, Markets, and Herding. The data in this study were tested using SPSS and AMOS, the main analysis methods included Exploratory Factor Analysis (EFA), Confirmatory Factor Analysis (CFA), and Structural Equation Modeling (SEM) by identifying four key factors, Heuristics, Prospects, Markets in decision making and investment performance. The results of this study found that behavioral factors such as Heuristics, Prospects, Markets, and Herding have a direct and positive effect on investment decision making and investment performance in the Vietnamese stock market. Among these

factors, the Prospect factor has the strongest influence on investment decision making (β = 0.275) and investment performance. Heuristic is the second strongest factor influencing investment decision making (β = 0.257), followed by Herding (β = 0.202) and Market (β = 0.189), which have the weakest effects. The study also shows that the Prospect factor has a higher level of impact on investment performance compared to Heuristic, Herding, and Market. This study uses Exploratory Factor Analysis (EFA), Confirmatory Factor Analysis (CFA), and Structural Equation Modeling (SEM) to analyze data collected from 250 investors. The hypotheses tested in this study confirm that all behavioral factors positively influence investment decision making and performance.

Research from Shiva et al. (2020) entitled " *What Drives Retail Investors' Investment Decisions? Evidence From No Mobile Phone Phobia (Nomophobia) And Investor Fear Of Missing Out (I -Fomo)* " has a quantitative research type using primary data. The population of this study includes 265 retail investors in the financial market exchange in India. This study has a Dependent Variable, namely the investment decisions of retail investors in the Indian stock market. The Independent Variables in this study are No Mobile Phone Phobia (Nomophobia) and Investor Fear Of Missing Out (I -Fomo). Investor Fear Of Missing Out is a mediating variable in this study. This study uses Partial Least Square Structural Equation Modeling (PLS-SEM) for data analysis, specifically using SmartPLS version 3.3.2. The PLS-SEM method was chosen because of its flexibility in handling complex models that include reflective and formative constructs. In addition, Importance Performance Map Analysis (IMPA) was applied to investigate important factors that influence investor behavior. This study found that No-Mobile-Phobia (Nomophobia) significantly impacts retail investors' investment decisions, leading to overtrading tendencies due to fear of missing out on important information. Investor-related Fear-of-Missing-out (i-FOMO) was identified as a mediating factor between Nomophobia and investor behavior, suggesting that Nomophobia may lead to increased i-FOMO. The predictive relevance of i-FOMO was found to be moderate, suggesting that similar results may occur in diverse contexts and financial markets. This study used Partial Least Square Structural Equation Modeling (PLS-SEM) to analyze data from 265 retail investors, confirming the reliability and validity of the constructs involved. These findings highlight the significant role of smartphones in influencing investor behavior, emphasizing the need for investment advisors and brokers to consider the impact of mobile technology on decision-making.

Table 4.
List of Scopus and Non-Scopus Indexed Publication Journals

Journal Name	Journal Type	
	Scopus	Non-Scopus
Psychological Act	✓	
Asian Journal of Accounting Research	✓	
Cogent Economics & Finance	✓	
Corporate and Business Strategy Review	✓	
FIIB Business Review	✓	
Frontiers in Psychology	✓	
Investment Management and Financial Innovations	✓	
Journal of Behavioral and Experimental Finance	✓	
Journal of Content, Community and Communication	✓	
Journal of Economic and Administrative Sciences		✓
Journal of Economics, Finance and Administrative Science	✓	
Airlangga Journal of Economics and Business		✓
Montenegrin Journal of Economics	✓	
PLOS ONE	✓	
Research in International Business and Finance	✓	
Risks	✓	
Sage Open	✓	
Journal of Asian Finance, Economics and Business	✓	

Source: Processed data (2025)

Based on Table 4. and Figure 5., this study proves that the SLR approach is suitable for offering an overview of journals publishing articles that have met the requirements along with the quality of article references used in this research. As much as 99% of articles come from Scopus journal publications (Q1-Q4) and only 1% non-Scopus journals, which means that the resulting literature review is of very high quality and reputable, so that further research can also refer to the list of Scopus publication journals that have been provided in this article.

Most Trending Research Topics

As a contribution, the results of the SLR research with Vosviewers have offered a practical and comprehensive overview of the literature review related to the topic of financial behavior in stock investment decision making which was detected to produce 11 cluster outputs. The colors of clusters 1 to 11 are respectively red, dark green, dark blue, yellow, dark purple, light blue, orange, brown, pink, light purple, light green.

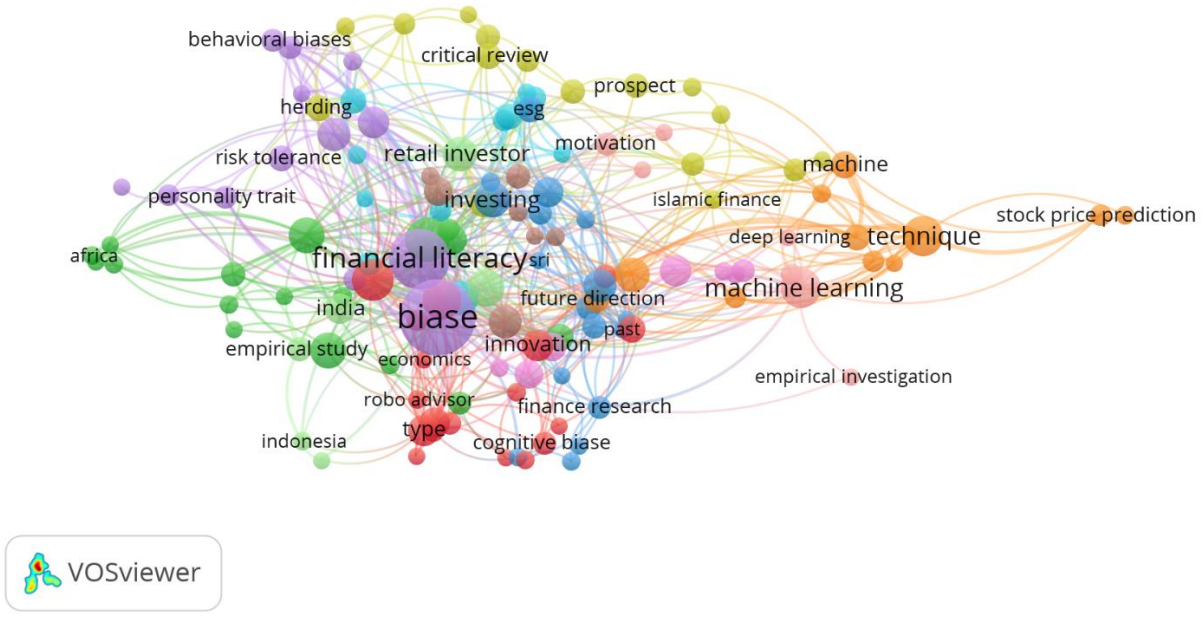


Figure 6.
Vosviewers Data Analysis Results

The most frequently appearing keyword is: “individual investor” with a total of 23 occurrences and a link strength of 34 (Cluster 1). In cluster 2, the most frequently appearing keyword is “covid” with a total of 25 occurrences and a link strength of 34. In cluster 3, the most frequently appearing keyword is “sustainable finance” with a total of 15 occurrences and a link strength of 24. In cluster 4, the most frequently appearing keyword is “herding” with a total of 9 occurrences and a link strength of 19. In cluster 5, the most frequently appearing keyword is “bias” with a total of 74 occurrences and a link strength of 66. In cluster 6, the most frequently appearing keyword is “overconfidence” with a total of 9 occurrences and a link strength of 15. In cluster 7, the most frequently appearing keyword is “technique” with a total of 21 occurrences and a link strength of 34. In cluster 8, the most frequently appearing keyword is “intention” with a total of 14 occurrences and a link strength of 22. In cluster 9, the most frequently appearing keyword is “bibliometric review” with a total of 7 occurrences and a link strength of 9. In The 10 most frequently occurring keywords cluster is “machine learning” with a total of 21 occurrences and a link strength of 34. In the 11 most frequently occurring keywords cluster, it is retail investor with a total of 16 occurrences and a link strength of 25.

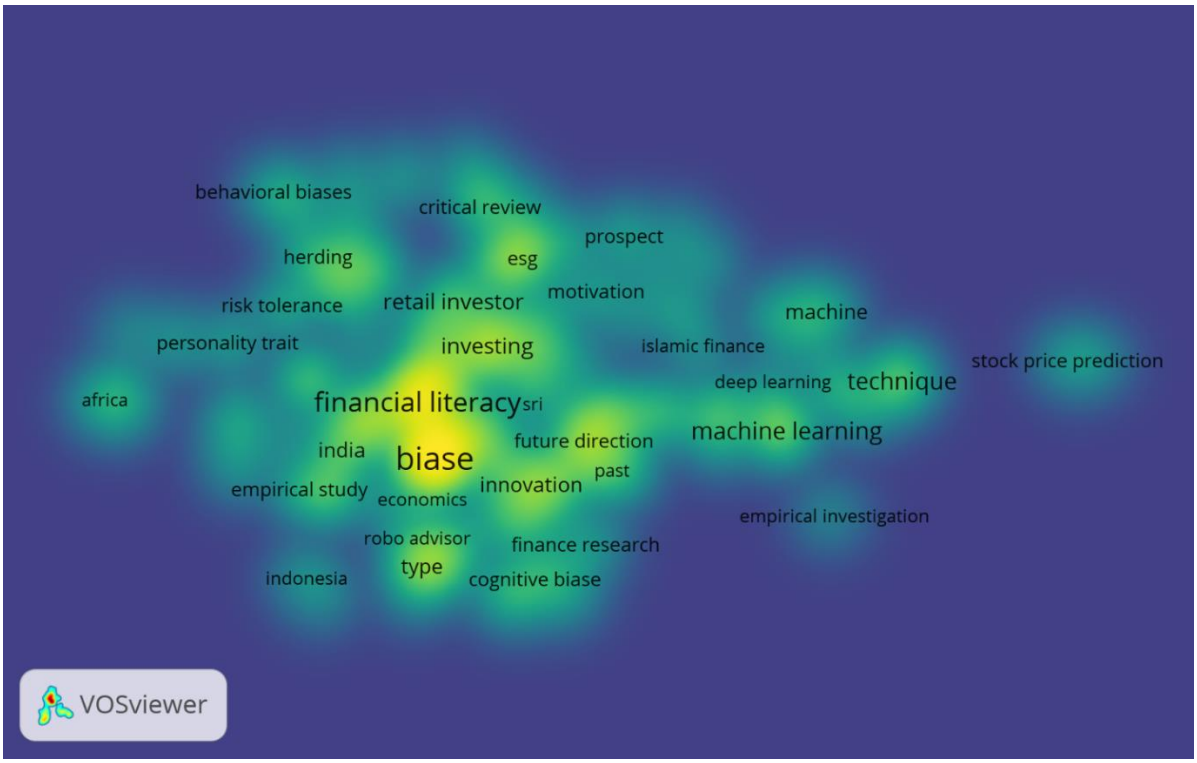


Figure 6.
Density Vosviewers Results

Future Research Agenda

In order to provide potential contributions in both theoretical and methodological contributions, researchers analyze new ideas and opportunities for future research by identifying keywords that are interconnected between one cluster and other clusters. The following are research recommendations (RR) related to very potential and interesting topics to be explored further for future research by referring to the results of VOSviewers (Figures 5 and 6).

Research Recommendation 1 (RR1), elaborating the personality trait construct in exploring the influence of bias behavior on individual investors. This is because the keyword "bias" in Cluster 1 is related to the keywords "personality trait", "individual investor", "relationship" in Cluster 5. Further research can examine the impact of personality traits or make these variables as moderating or mediating variables.

Research Recommendation 2 (RR2), the keyword "herding" in cluster 4 with the keyword "corporate governance" in cluster 6 has a link strength of 1, meaning that these topics have still been researched very little. Referring to this relevance, there is potential for future research that examines the relationship between bias herding behavior and corporate governance. Second, it needs to be reviewed and studied more deeply, whether the construct of corporate governance also allows it to act as a moderating variable.

Research Recommendation 3 (RR3), another interesting thing is found from the minimal link strength between the keywords "machine learning" from Cluster 10 and

"cognitive bias" from Cluster 4 where the link strength is only 1. This means that this topic is very potential to be explored further and conducted a more in-depth study of the machine learning approach to cognitive bias and it can also be studied whether machine learning can play a role as a moderation. Moreover, behavioral biases included in cognitive bias are various, including overconfidence bias, hindsight bias, anchoring bias, mental accounting, loss aversion, framing effect, illusion of control (Barberis & Thaler, 2003; Shefrin, 2005; Baker & Ricciardi, 2014).

Research Recommendation 4 (RR4), the keyword "gender" is not directly connected to the keyword "behavioral bias" or "bias", meaning that the data bank selected in this study has not found an article that tests the influence of gender differences or tests the difference between male and female genders in the topic of behavioral finance on stock investment decision making. Another recommendation is that further research can choose a research focus on one gender but classified into 2 different groups, for example professional male investors and non-professional male investors. The results of research with this concept will provide empirical insight into whether professional investors are also indicated to be influenced by behavioral bias.

CONCLUSION

This systematic literature review has successfully investigated the development of literature review in the field of behavioral finance and stock investment decision making. Overall, this article has offered comprehensive study results that answer all questions in this study. A total of 99% of the articles used in this article come from Scopus indexed journals, which this study will be very helpful for further researchers to find quality article and journal references. Geographically, 11 countries have been identified as having contributed to this research topic and India and Pakistan are ranked first. This means that research with the same topic is still very potential to be carried out in other developing and developed countries, with the aim of increasing scientific studies in mitigating the risk of biased investor decision making. In addition, through the PRISMA diagram, initial articles with predetermined keywords totaling 1,455 articles were obtained, then the title and abstract were screened, the articles were excluded that did not meet the inclusion criteria or provide answers to questions. The final result was 23 articles that had been screened for the entire article text. Through VOSViewers analysis, researchers have provided scientific mapping results and followed up by offering several future research agendas by looking at the relationship or strength of links between one keyword and another.

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