GMMC Journal of Interdisciplinary Studies
Vol. 13, December 2024, pp. 182-211
ISSN : 2392-4519 (Print), 3021-9086 (Online)
Journal homepage: http://gmmcjournal.edu.np

Examining the Behavioral Biases Influencing on ESG Investing: A Systematic Review using PRISMA

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Received: May, 2024
Revised: August, 2024
Accepted: November, 2024
Available online: December, 2024
DOI: https://doi.org/10.3126/jis.v13i1.73352

ABSTRACT

The aims of this study are to review past research on the relationship between behavioral biases and decision making in environmental, social, and governance (ESG) investing. Data were collected from three databases (Google Scholar, JSTOR and Research 4 Life) using PRISMA in the context of behavioral biases and environmental, social, and governance (ESG) investing time frame from 2013 to 2023. The 2013 was the base period due to the cause of the Governance pillar in the Eurozone for ESG investing. The inclusion criteria for this review were publication published in the English language, open access articles, and only peer-reviewed articles. The findings of the study show that there is a significant relationship between behavioral biases and ESG investing. The researcher found that there are more male participants in the capital market and 35 distinct biases examining the ESG decision by investors with non-probability techniques to collect samples. This study extends the existing knowledge on the past study being research related to a relationship between behavioral biases and ESG investing. This study assists researchers, academicians, and policymakers in understanding the behavioral biases of investors while making ESG investing decisions. Further research can be carried out by researchers in other contexts pension funds, and life insurance as there are no studies undertaken in these areas.

Keywords: Behavioral biases, behavioral finance, environmental, social and governance (ESG) investing, socially responsible investment (SRI), systematic literature review

INTRODUCTION

This study examines the behavioral biases that influence Environmental, Social, and Governance (ESG) investing using the PRISM updated guidelines. This seeks to identify and analyze how psychological factors impact investor decision making and the integration of ESG investing. This provides a comprehensive study of how these biases influencing ESG investment behaviors and the effectiveness of socially responsible investing. Traditional finance, rooted in principles that are Modern Portfolio Theory (Markowitz, 1952) and the Efficient market hypothesis assumes rational investor behavior and efficient markets (Vaid & Chaudhary, 2022). Investors frequently exhibit irrationality, influenced by psychological factors (Kahneman & Tversky, 1979). Traditional finance premises of perfect investors' choices are influenced by cognitive biases and emotions (Meta, 2015), as well as social relationships and trust (Rahman et al., 2019). This interdisciplinary approach integrates finance, psychology and sociology to understand market anomalies (Nagy, 2017) and irrational behavior of investors (Shleifer, 2000). Understanding these factors is crucial for accurate financial analysis (Statman, 1995) enhancing predictions of market behavior and investor decisions.

Due to rapidly growing field of behavioural finance uses insights from psychology to understand how human behaviour influences the decisions of individual and professional investors, markets, and managers. All human which means that our behaviour is influenced by psychology (Ackert & Deaves, 2010). Behavioural finance is a subtopic of the broader subject of behavioural economics. The behavioural means that the behaviour of participants in the actual economy is fundamentally different than what most academic theorizing (Burton & Shah, 2013). Behavioural finance deals with the influence of psychology on behaviour of financial practitioners. It focuses on how investors interpret and act on macro and micro information to make investment decisions (Das, 2020). The irrational investment decisions affect the investors and stock market. Behavioural finance is a branch of finance that studies how the behaviour of agents in financial markets are influenced by psychological factor and the resulting influence on investor decision making while buying or selling the market and its outcome.

The rationale for conducting a systematic review on the influence of behavioural biases on ESG investing lies in the growing importance of understanding the underlying factors that drive investment decisions of ESG investing. In recent years, ESG investing has gained significant role, there is a gap in understanding how behavioural biases such as cognitive biases and emotional influences, effect on the particular investment domain. By examining rigorous

literature review, this review aims to contribute to the understanding of how behavioural biases may affect the performance of socially responsible investments (SRI). Furthermore, it seeks to identify potential implications for investors, asset managers, policymakers, and other stakeholders in the socially responsible investment society. Conventionally, the idea of investing that integrates social, ethical and environmental subjects (SEE), is stated to as the ethical investment (EI). At present, it is known as socially responsible investment (SRI). However, it is the method of investment decisions on social, ethics, and environment within the context of rigorous financial analysis (Adam & Shauki, 2014). For instance, it incorporates the subjective norms, perceived behavioural control, and moral norms affects investment decision activities (Dilla et al., 2016). The influence of environmental performance (an alternative investment perspective) and environmental performance return (a traditional investment perspective) on investors socially responsible investment. Later on, individuals invest in socially responsible companies since they perceive that investments world higher returns.

METHODS AND MATERIALS

This study has executed a systematic review using PRISMA for the analysis of relevant peer- reviewed articles in the context of behavioural biases and environmental, social and governance (ESG) investing. The time framing from 2013 to 2023. The time period 2013 was the base period due to the cause of Governance pillar in the Eurozone where the more emphasized for ESG investing. The Google scholar, JSTOR and research 4 Life databases has been used "Behavioural biases" AND "ESG investing" as strings. This review is from Google Scholar, since it is open access and JSTOR and research 4 life since they are required to log in for searching "Behavioural biases" AND "ESG investing".

Eligibility Criteria

All studies examining the relationship between behavioural biases and environmental, social and governance (ESG) investing were eligible under systematic literature. The enclosure criteria were(i) publication between 2013 to 2023 (ii) written in only English (iii) related to the association between behavioural biases and ESG investing (iv) conducted on the assessment of behavioural biases and ESG investing (v) Strings "Behavioural biases" AND "ESG investing". (vi) only open- access studies included under this systematic review (vii) only peer- reviewed articles included (viii) database: Google scholar, research4life and JSTOR. Previous studies were excluded from the systematic review using PRISMA updated guidelines. If they were (i) all the databases except those mentioned in this inclusion criteria (ii) not focused on the existing

research title (iii) review articles (iv) published not in peer- reviewed Journals (v) language except than English (vi) studies published before 2013 AD (vii) Ph.D./Masters/ Bachelors theses (viii) working paper/ conceptual paper/ conference paper (ix) not downloaded full text articles and (x) books/ reports/ essay.

Information Sources and Search Strategy

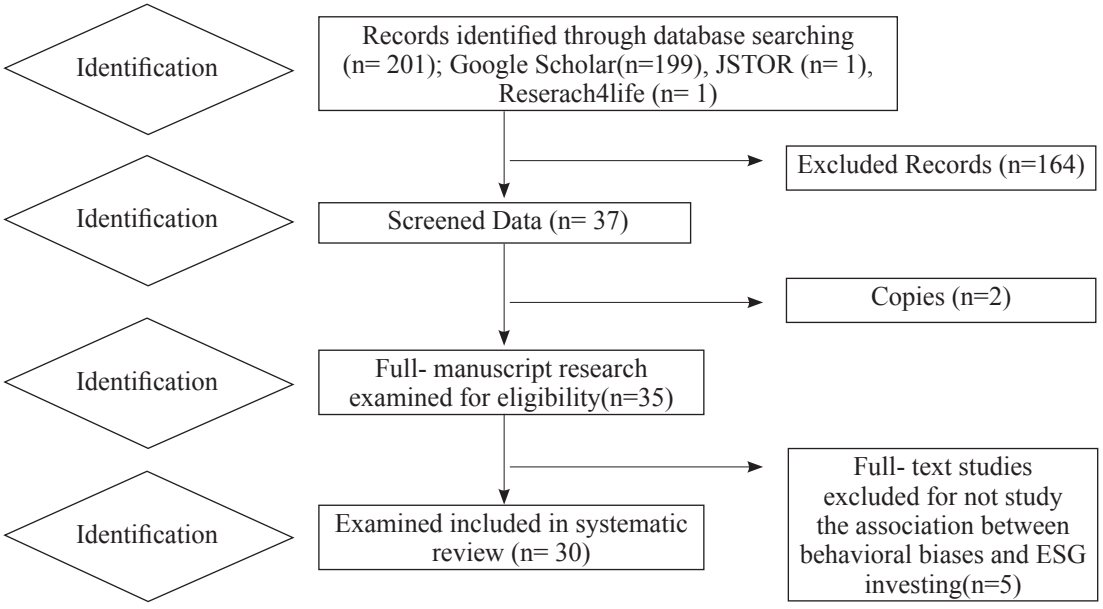
A literature searches for the systematic review using PRISMA updated guidelines was conducted in 2023 AD including the databases viz; Google scholar, JSTOR, and research 4 life. Single searching was directed in the previous – specified electronic databases and after carrying out different trials and mistakes the end search phrase for the study; "Behavioral biases" AND "ESG investing" as strings.

Selection Process and Information Collection Process

After completing the literature pursuits through various electronic databases based on the research title and abstract the pertinent studies were more examined and screened under the considerations of the suitability criteria for inclusion of the study under systematic review using PRISMA. The systematic literature review is presented in the following PRISMA flow diagram based on the detailed information regarding the selection of studies.

Figure 1

PRISMA Flow Diagram for the Process of Research Paper Selection Used in the Systematic Review



RESULTS

Study Selection

There are number of 201 studies were recognized in the process of preliminary examine search using "Behavioral biases" AND "ESG investing" as strings (Google Scholar, n = 199; JSTOR, n= 1 and Research 4 life, n= 1). After examining the title and abstract of all research studies being searched through different databases (n=164) research studies were excluded from the systematic review because of not suitability for this research study. Further, duplicates(n=2) studies were eliminated. As a consequence, (n= 35) studies were carefully chosen for the full- text eligibility stage of the study. Full- text examine studies were excluded due to not examining the association between behavioral biases and ESG investing, out of the studies designated for the eligibility of full-text (n= 5). Lastly, peer – reviewed studies (n=30) were selected for systematic literature review.

Study Characteristics

The general and specific properties of the 30 studies included in the analysis are summarized in Tables 1,2 and 3. These tables provide a detailed overview of key characteristics from all the studies including various aspects that are relevant to the analysis.

Table 1

Information Regarding Country, Context and Types of Behavioral Biases

Authors	Country	Context	Types of Behavioral Biases
(Upadhyaya et al., 2023)	India	ESG investment decision making	Beliefs, and values, social norms, confirmation bias, herd mentality, loss aversion
(Deka et al., 2023)	India	Indian retail investors	Availability bias, gambler's fallacy, herd mentality, loss aversion, overconfidence, and anchoring bias
(Rizani et al.,2023)	Indonesia	Capital market investors	Loss aversion, framing, overconfidence, and herd behavior
(Lee et al., 2023)	South Korea	Sustainability and business performance	Confirmation bias, overconfidence bias, and anchoring bias
(Andrew, 2020)	South Africa	Index/ Stock market	Overconfidence bias, confirmation bias, herding bias, anchoring bias, Status Quo bias, availability heuristic, and moral licensing bias

Authors	Country	Context	Types of Behavioral Biases
(Rooh et al., 2021)	Pakistan	Stock market	Overconfidence bias, loss-aversion bias, mental accounting bias, and herding behavior
(Rooh et al.,2023)	Pakistan	Stock Exchange with Portfolio Construction	Affinity bias, Gambler's fallacy, herding, loss aversion, mental accounting, and overconfidence
(Przychodzen et al.,2016)	US, Canada, Great Britian, Spain and Poland	Bank–affiliated mutual fund managers	Risk aversion, herding bias, and confirmation bias
(Thanki et al.,2022)	India	Socially responsible investment (SRI) on the stock market	Confirmation bias, herding behavior, and anchoring bias
(Loang, 2023)	Indonesia, Kuwait, Oman, Qatar, Saudi Arabia, UAE, Bahrain (Muslim/ GCC)	SDGs on behavioral biases in Sharia compliant Stocks	Herding behavior, and risk-averse behavior
(Thagaram et al., 2023)	N/A	Investors (individual and fund managers) on stock market	Heuristics, herd behavior, market inefficiencies, risk perception, emotions, regret aversion, biases in portfolio management
(Garg et al., 2022)	India	SRI/ Indian retail investors	Social responsibility bias, and reliance on expert bias
(Kulal et al., 2023)	N/A	ESG on stock prices and investment performance	Risk perception, overconfidence, and framing effects
(Hanifa & Atmini,2023)	Indonesia	Investors values on SRI	Risk aversion, loss aversion, overconfidence and herding behavior
(Aich et al.,2021)	N/A	Sustainable investing on ESG factors	Overconfidence, herd mentality, and loss aversion
(Lagerkvist et al., 2022)	Sweden	Demand and preferences of private investors in Sweden/SRI	Loss aversion, overconfidence, herd behavior , confirmation bias , availability heuristic , and status quo bias
(Raut & Kumar,2018)	India (Jharkhand, Bihar, Odisha, and West Bengal)	Indian stock market	Availability bias, herding, anchoring, representativeness, emotional contagion, and information Cascades
(Elahi et al., 2023)	Pakistan	Private investors in Pakistan on Stock market	Risk perception, risk taking propensity, and loss aversion

Authors	Country	Context	Types of Behavioral Biases
(Rooh & Hussian, 2022)	Pakistan	Stock market of Pakistan	Herding bias, loss aversion, mental bias, and overconfident bias
(Nwogugu, 2020)	US, Europe , and Asia	Financial instrument(SPAC, ESG finance , SME finance operate)	Overconfidence bias, herd behavior, confirmation bias, risk perception bias, anchoring bias, availability bias, status quo bias , and regret aversion bias
(Finger & Rosenboim, 2022)	N/A	ESG policies by financial institutions	Social desirability bias, confirmation bias, endowment effect, and anchoring bias
(Adrianto, 2023)	N/A	Stock market	Risk aversion, loss aversion, overconfidence, and anchoring bias
(Trisnowati et al., 2022)	Indonesia	ESG score, financial performance, and macroeconomic variables	Confirmation bias, availability bias, and overconfidence bias
(Hanifa & Nilsson,2023)	N/A	Retail investors in mutual funds	Confirmation bias, framing bias, and anchoring bias
(Farish & Karim, 2021)	Malaysia	Islamic socially responsible investment (stock market)	Confirmation bias, social norm bias, overconfidence bias, risk aversion bias, anchoring bias, environmental and societal concern bias
(Verma & Mohnot,2023)	US and GCC (Saudi Arabia and UAE)	Energy market sentiment on both stock returns and ESG index returns	Herding behavior
(Sahar & Ali shah,2017)	Muslim Majority Countries	Stock market of Muslim majority Countries	Herding behavior and overreaction bias
(Saxena et al., 2023)	N/A	Industry 4.0 technologies (IOT, AI, Block-chain, and big data)	Confirmation bias, and availability bias
(Adam & Shauki, 2014)	Malaysia	Malaysia Stock market	Subjective norms, perceived behavioral control, and moral norms
(Vyas et al., 2020)	Indian	Indian stock market	Risk tolerance, and collectivism

Table 2

Details Concerning Gender Distribution, Research Design, Sample Size, and Target Population

Authors	Gender Distribution	Research Design	Sample Size	Target Population
(Upadhyaya et al.,2023)	N/A	Quantitative	219	N/A
(Deka et al.,2023)	N/A	Quantitative	438	Indian retail investors above 18 years old who actively participate in the equity / stock market
(Rizani et al., 2023)	58.3 percent male	Mixed	60	Investor respondents in the Indonesian Capital market
(Lee et al., 2023)	54.2 percent male	Quantitative	323	Diverse range of travelers, including both domestic and international passengers
(Andrew,2020)	N/A	Qualitative	N/A	All listed financial services institutions in South Africa
(Rooh et al., 2021)	85.8 percent male	Quantitative research method	421	Total population of the individual investors in Pakistan = 56053
(Rooh et al., 2023)	85.75 percent male	Quantitative research design	400	Total population of the individual investors in Pakistan = 56053
(Przychodzen et al., 2016)	59.3 percent male	Quantitative research	138	N/A
(Thanki et al., 2022)	59.02 percent male	Cross-sectional descriptive research	449	Investors in India above the age of 18 years old participated in the survey
(Loang, 2023)	N/A	Quantitative	N/A	Investors in Sharia- Compliant stocks in Indonesia and GCC countries
(Thagaram et al., 2023)	N/A	Quantitative	554	Investors (Individual investors and fund managers)
(Grag et al.,2022)	64.90 percent male	Quantitative	433	Indian Retail investors
(Kulal et al., 2023)	N/A	Quantitative	N/A	Publically traded companies

Authors	Gender Distribution	Research Design	Sample Size	Target Population
(Hanifa &Atmini, 2023)	70.8 percent male	Quantitative	96	Short term individual investors in Indonesia
(Aich et al.,2021)	N/A	Qualitative data	N/A	Businesses , investors and policymakers
(Lagerkvist et al., 2022)	49.7 percent male	Quantitative research design	559	Private investors in Sweden who are actively involved in equity fund Savings/ equity funds
(Raut & Kumar,2018)	N/A	Quantitative	N/A	Active individual stock market participants from the specified states in India
(Elahi et al.,2023)	N/A	Quantitative	400	Private investors who have invested in the stock market in Pakistan(international= 1,886 and local institutional investors= 883)
(Rooh & Hussian, 2022)	N/A	Quantitative and deductive	200	All investors are residing in KP or belong to KP
(Nwogugu, 2020)	N/A	Quantitative	N/A	From institutional investors to retail investors, companies seeking funding, regulatory bodies
(Finger & Rosenboim, 2022)	55 percent female	Quantitative	277	Employees of financial institutions and customers of financial institutions
(Adrianto, 2023)	N/A	Quantitative	N/A	Individuals participating in the online experiment investors
(Trisnowati et al.,2022)	N/A	Quantitative research design	26 companies from the Sri- Kehati and IDX ESG leaders indexes	Companies listed on the Sri- Kehati abd IDX ESG leaders indexes in Indonesia between 2015 and 2022
(Hauff & Nilsson,2023)	N/A	Quantitative	The study uses two experiments with sample size of 261 and 437 participants respectively	Retail investors who are considering / investing in ESG-profiled mutual fund

Authors	Gender Distribution	Research Design	Sample Size	Target Population
(Farish & Karim , 2021)	N/A	Quantitative/ Correlation research design	N/A	Private investors that located in Kuala Lumpur and Selangor
(Verma & Mohnot, 2023)	N/A	Quantitative research design	N/A	Stock market indices (S& P 500, GCC stock markets) energy market sentiments and ESG index returns in the US and GCC economies
(Shar & Ali Shah, 2017)	N/A	Quantitative research design	Nine Muslim majority countries and three developed countries over 20-year period from July 1996 to February 2016	Stock markets of Nine Muslim countries and their developed counterparts
(Saxena et al.,2023)	N/A	Quantitative	N/A	Organizations and stakeholders involved in ESG reporting and sustainability evaluations
(Adam & Shauki, 2014)	N/A	Quantitative	N/A	996 subjects who registered for ITI courses from 8th may 2010 until 13th June 2010
(Vyas et al.,2020)	60.90 percent of male	Quantitative	438	1000 individual investors

Table 3

Details Concerning Data Collection, Data Analysis Tools, Results and Conclusion

Authors	Data Collection	Data Analysis Tools	Results and Conclusion
(Upadhyaya et al.,2023)	Well – structured questionnaire, convenience sampling	Regression analysis method	Behavioral aspect is significantly dependent on Environmental, social and governance factors. Behavioral aspects including risk and return, social influence, market sentiments and peer influence is influencing the investors decision while investing in ESG related products.

Authors	Data Collection	Data Analysis Tools	Results and Conclusion
(Deka et al., 2023)	Structured Questio nnaire	EFA, Correlation analysis, regression analysis, ANOVA, Partial least squares (PLS) Structural equation modeling (SEM)	The study examined a significant influence of risk perception on stock investment decisions and creates a significant relationship between the selected biases for the study and the perceived risk. The results also show a statistically significant association between ESG consciousness and the risk perception. In addition, higher ESG consciousness declines the positive relationship between investors' perceived biases and risk perception.
(Rizani et al., 2023)	Survey and interview design	Regression analysis, descriptive statistics,	The findings indicate that investors have a stronger fear of losses than a desire for profits which impacts sound decision making. This study revealed that the psychological factors that shape financial decisions and helping investors and market participants gain a deeper understanding of investor behavior.
(Lee et al., 2023)	ESG reports and structured questionnaires	Using a structural equation modeling (SEM)	Positive correlation between the implementation of ESG activities and business performance at Incheon International airport. Respondents perceived that ESG initiatives enhanced trust among stakeholders, improved public perception of the airport operations. ESG management practices positively impact business performance at Incheon International airport contributing to sustainable growth and competitive advantage.

Authors	Data Collection	Data Analysis Tools	Results and Conclusion
(Andrew, 2020)	Survey through questionnaires	Descriptive statistics	Asset managers supposed that there is growing focus on long period sustainability matters and enhanced risk and return opportunities. The widely held of local asset managers prompt that ESG aspects are considered in their investment decisions. ESG considerations into the investment decision procedure into considerations when supporting in identifying and justifying potential ESG risks to achieve sustainable long-term investment.
(Rooh et al.,2021)	Questionnaires	Structural equation modeling (SEM) using Smart PLS	Revealed that overconfidence, loss aversion, mental accounting and herding biases of individual investors positively affect in ESG investing. In conclusions, there is a positive effect on investment decisions related to ESG investing.
(Rooh et al.,2023)	Questionnaire survey	Using Smart PLS 3 (SEM)	The study reveals that investors on the Pakistan stock exchange are significantly influenced by ESG considerations when making investment decisions. Understanding investor behavior towards ESG can guide sustainable finance initiatives in developing countries. Investors have strong emphasis on ESG factors when investing for sustainability.
(Przychodzen et al.,2016)	Questionnaire survey	Regression analysis	The results revealed that factors such as risk aversion, short term forecasting horizons, and the influence of management significantly affect fund managers' decisions regarding ESG integrations. In conclusion, ESG criteria are primarily used by fund managers to manage the risks and aligns with behavioral finance theories.

Authors	Data Collection	Data Analysis Tools	Results and Conclusion
(Thanki et al., 2022)	Structured questionnaires	Two step structural equation modeling using Smart PLS3.2.9	The results indicated that collectivism, environmental awareness, financial performance, and knowledge of SRI all positively influence attitude towards SRI and investment intentions. Subjective norms and perceived behavioral control have a significant impact on individuals' intentions regarding SRI.
(Loang, 2023)	Panel data approach	Quantile regressions	The results reveled that SDGs 4,8,10,11, and 13 show significant and positive correlations with stock returns in Indonesia, Kuwait, Oman, and Qatar. SDGs 7 is significant for Sudi Arabia and UAE stock returns. Herding behavior and risk- adverse behavior, SDGs influence these behavioral biases through their impact on investors sentiments. In addition, the relationship between SDGs and behavioral biases (herding and risk averse bias) is mediated by changes in investors' sentiments. In conclusion, there is evidence of complete mediation where SDG influence investors sentiments, leading to herding and risk averse behaviors.
(Thagaram et al., 2023)	Survey Questionnaire, convenience sampling method	Exploratory factor analysis (EFA) , Regression analysis method , PCA(principal component analysis) , ANOVA, correlation analysis	The results revealed that confirmation bias, overconfidence, loss aversion, and herding behavior significantly influence ESG investing. In conclusion, all seven dimensions of behavioral finance serve as significant predictors of ESG investing.

Authors	Data Collection	Data Analysis Tools	Results and Conclusion
(Grag et al., 2022)	Convenience sampling method, Online Survey	Covariance- based structural equation modeling (SEM)	The results reveled that investors values contribute positively to intentions towards SRI. Investors with high social self- efficacy tend to have high intents towards SRI. The study suggests significant implications for concept and practice in the context of socially responsible investment among Indian retail investors.
(Kulalet al., 2023)	Secondary data (financial reports, ESG ratings agencies, and stock market data)	Descriptive statistics, regression analysis, correlation analysis	Companies with strong ESG performance have higher stock prices and better investment performance compared to those with weaker ESG performance. The study suggests that specific components of ESG such as environmental policies and government policies, significantly influence these outcomes. In conclusions, integrating ESG factors into investment decision making can lead to improved financial performance and stock market outcomes.
(Hanifa & Atmini,2023)	Convenience sampling method, Survey questionnaires	Structural equation modeling(SEM)	The results indicate that religiosity, altruism, and egoism do not have direct influences on sustainable and responsible based investment decisions among Indonesian individual investors. However, these values indirectly influence investment decisions through social investing efficacy(SIE). In conclusion, individual values influences investment decisions involves perceptions of social impact and efficacy.

Authors	Data Collection	Data Analysis Tools	Results and Conclusion
(Aich et al., 2021)	Purposive sampling , literature research and expert consultations	Interpretive structural modeling (ISM)	Results revealed that the use of ISM to explore relationships and interdependencies among ESG factors in investment decisions. The results are expected to provide insights into how these factors affect investment attractiveness and sustainability. In conclusion, ISM analysis, implications for sustainable investing strategies and recommendations for businesses and investors interested in ESG integration.
(Lagerkvist et al.,2022)	Choice experiment, structured questionnaire	Regression analysis, multinomial logit models	A significant proportion of private investors in Sweden prioritize sustainability strategies and environmental focus when choosing equity funds. The study revealed distinct investor segments based on behavioral characteristics and emotional responses towards to SRI. In conclusion, investors preferences for SRI in Sweden provides valuable insights into the factors influencing investment decisions context of sustainable finance. In addition, it identifies distinct investor segments based on behavioral characteristics and attitudes towards SRI.
(Raut & Kumar, 2018)	Survey approach adopted questionnaires, Stratified random sampling	Discriminant analysis, factor analysis and cross validation	The results revealed that there are differences in perception for behavioral biases between experienced and new investors. In conclusion, the herding behavioral as the most discriminatory factors influencing investment decisions making between two groups of individual investors.

Authors	Data Collection	Data Analysis Tools	Results and Conclusion
(Elahi et al., 2023)	Questionnaires	PLS- SEM	The results reveled that there is a significant relationship between investor behavior, risk aversion, and specific investment decisions influenced by sustainable business practices and EESG factors. This study concludes that there is discernible impact of SBP on investment decisions and how EESG factors interact with investor behavior and risk biases.
(Rooh & Hussian, 2022)	Survey adopted questionnaires	The SEM using Smart-PLS	Results reflect that herding, loss aversion and mental accounting biases of individual investor irrelevantly influence investment decisions on transaction performance and ESG performance. Overconfident have positively significantly influences trading performance on ESG performance. ESG issues mediate irrelevant association among herding, loss aversion, mental accounting, and trading performance's subjects mediate a positive association between overconfidence and trading performance.
(Nwogugu, 2020)	Interviews, and Surveys	Qualitative analysis framework (thematic analysis)	The results reveled that behavioral biases herd behavior and overconfidence can amplify market volatility within SPACs and emerging markets finance. ESG factors may lead investors to favor ESG investments. In conclusion, SPACs and similar entities require substantial new regulation. However, it can be modified to be used in ESG finance, SME finance, industry rollups and emerging markets finance.

Authors	Data Collection	Data Analysis Tools	Results and Conclusion
(Finger & Rosenboim, 2022)	Structured questionnaire,	Regression analysis, R-squared, adjusted R-squared, residual standard error, and F- statistic.	The results reflect that employees are willing to forgo 11 percent of their salary on average to work for a company that has adopted an ESG policy. Both employees and customers perceive significant value in ESG policies shows that potential economic benefits for financial institutions that adopt ESG policies. Therefore, the adoption of ESG policies can enhance employee satisfaction and loyalty as evidenced by willingness to accept lower salaries.
(Adrianto, 2023)	Online questionnaires, convenience sampling method	Mean, standard deviation, correlation, multiple regression test	ESG ratings influence both performance expectations and perceived risk levels among investor. Higher ESG ratings were associated with improved performance expectations and reduced perceived risk. The study concludes that ESG ratings play a significant role in shaping investor perceptions and expectations regarding company performance and risk.
(Trisnowati et al., 2022)	Secondary data	Stepwise regression method	The study revealed that debt to equity ratio had a positive and significant effect on stock returns. ESG score, return on assets, and firm size have an insignificant effect on stock returns. In conclusion, a model consists ESG score and financial performance variables is effective in explain stock returns for the selected companies in Indonesia. However, macroeconomic variables were unnecessary from the model.

Authors	Data Collection	Data Analysis Tools	Results and Conclusion
(Hauff & Nilsson, 2023)	Structured surveys, Convenience sampling methods	Descriptive statistics, ANOVA, regression analysis and Mediation analysis	The results revealed that the choice of ESG strategy significantly affects how investors perceive the quality of mutual funds. Therefore, how ESG factors are integrated into investment portfolios affects how investors perceive mutual fund quality. Investors may attribute different financial expectations to various ESG strategies influencing their perceptions of overall fund quality.
(Farish & Karim, 2021)	Online survey questionnaire	Multiple regression analysis	Islamic SRI has a good likely to be developed as an innovative Islamic financial tool. Thus, the findings will address the influential features, namely attitude, subjective norm, perceived behavioral control, environmental and societal concern, knowledge and religiosity that influence the intention to invest in Islamic SRI. SRI and insights for stakeholders aiming to foster sustainable and the ethical investment practices within the Islamic financial sector.
(Verma& Mohnot, 2023)	Energy market sentiments data, stock returns data and ESG index returns data (Secondary data)	Time series data analysis, mean standard deviation , CV, Maximum, minimum and regression analysis.	The results reflect that energy market sentiments on stock returns in the US and GCC countries, ESG investments preferred during bearish market conditions. There is negative impacts of stock sentiments and positive affect of energy sentiments on S & P 500 returns.
(Sahar & Ali Shah, 2017)	Data spans from July 1996 to February 2016 (Secondary data)	Vector Autoregressive(VAR), Descriptive statistics(mean, median , maximum, minimum, standard deviation, skewness, Kurtosis)	The results revealed that 36.5 percent connectedness in returns and 22.4 percent in volatility among Muslim majority countries. The study revealed that significant impacts from global financial crises and the Arab spring on volatility spillovers. There is significant returns and volatility spillover among the Muslim majority countries.

Authors	Data Collection	Data Analysis Tools	Results and Conclusion
(Saxena et al., 2023)	Real- time data collection, authentication, and prediction related to ESG metrics.	Emphasizes the technological aspects of Industry 4. 0	ESG investments has benefited from AI capabilities which have enhanced the accuracy and reliability of ESG reporting compared to traditional methods reliant on self- disclosed, annualized data prone to biases and inaccuracies. There issignificant concern among consumers and stakeholders about the accuracy and reliability of ESG data. Industry 4. 0 technologies can play a crucial role for addressing real- time , authenticated, and structured ESG data.
(Adam & Shauki, 2014)	Purposive sampling method	SEM, EFA ,R-squared , AVE, CR, Direct effect, indirect effect ,and total effect	The results reflect that investors suggest that attitude, subjective norms and moral norms have positive effect on intention which in turn positively affects behavior towards SRI.
(Vyas et al., 2020)	Standardized Questionnaire, purposive sampling method	Structural Equation Modelling (SEM) , CFA, CR, AVE	The study revealed the socially responsible behavior of individual investors when making investment decisions. Socially responsible investments (SRIs) have emerged as a unique category of investment opportunities for both individual and institutional investors. It also examines the relationship between the financial performance of small and large Corporations and their environmental, social, and governance (ESG) practices.

The Country in Which the Data were Collected

In this systematic literature review, concerning the geographical features of the studies included, six studies from India (Upadhyaya et al., 2023) ;(Deka et al., 2023) ; (Thanki et al., 2022) ; (Grag et al., 2022) ; (Raut & Kumar, 2018) and (Vyas et al., 2020) , three from Indonesia (Rizaniet al., 2023) ; (Hanifa &Atmini, 2023) and (Trisnowatiet al., 2022), four from Pakistan (Rooh et al., 2021); (Rooh et al., 2023); (Elahi et al., 2023) amd (Rooh & Hussian, 2022) ,

two from Malaysia (Farish & Karim, 2021) and (Adam & Shauki, 2014), One from Sweden (Lagerkvist et al., 2022) ,seven from N/A (Thagaram et al., 2023); (Kulal et al., 2023); (Aich et al., 2021); (Finger & Rosenboim, 2022) ; (Adrianto, 2023); (Hanifa & Nilsson, 2023) and (Saxena et al., 2023), two from South Africa (Lee et al., 2023) and (Andrew, 2020), three from Muslim , US and GCC (Loang, 2023); (Verma & Mohnot, 2023) and (Sahar & Ali Shah, 2017), two from US, Canada, Great Britain, Spain and Poland (Przychodzen et al., 2016) and (Nwogugu, 2020).

Types of Behavioral Biases

Based on the kinds of behavioral biases, this systematic literature review categorizes different kinds of behavioral biases that the earlier studies. There were 35 distinct types of behavioral biases that were earlier studied by various academicians, researchers and policymakers. Furthermost of the preceding studies dealt with herding behavior, overconfidence, loss aversion and confirmation bias, mental accounting, gambler's fallacy, risk aversion, risk perception, risk taking propensity and status quo bias. These biases reflect the relationship with ESG investing.

Methodological Characteristics

This systematic literature review articles recognized that most of the earlier studies were quantitative research design regarding methodological features being performed from previous studies by the researchers. Some of the preceding studies used qualitative and cross-sectional data for the achievement of the purposes of the concerning research**.** Majority of the previous studies, well – structured questionnaires and Survey questionnaires, online survey questionnaires were used by the researchers for collecting the data and testing of hypotheses of the study. Some of the past studies were conducted interviews by performing qualitative research design for collecting the data. Most of the past studies used descriptive statistics, correlation analysis, regression analysis, ANOVA analysis, structural equation modeling, and SEM using Smart- PLS for the analysis of the results regarding quantitative research approach. Some of previous studies also used multinomial logit models (Aich et al., 2021), interpretive structural modeling (ISM) (Lagerkvist et al., 2022), Exploratory factor analysis and principal component analysis (Thagaram et al., 2023) and quantile regressions (Loang, 2023)

Risk of Bias

All the previous studies were found biased regarding the sampling strategy as they follow non -random sampling methods for gathering their sample sizes while performing the way of assessing the risk of sampling bias. Most of the primary data-based studies used purposive, and convenience sampling techniques for collecting data for their studies. One of the studies

used stratified random sampling (Raut & Kumar,2018) for gathering required data. Majority of the past studies were male respondents than the female respondents. One study used more female respondent (Finger & Rosenboim,2022).

Context of the Previous Study

This systematic review examines the majority of the previous studies about the relationship among the behavioral biases and ESG investing decisions in the framework of the equity market or stock market or capital market or mutual funds**.** Some of the studies were in the context of socially responsible investment (SRI) on stock market (Upadhyaya et al., 2023), sustainability and business performance (Lee et al., 2023), sustainable investing on ESG factors (Aich et al., 2021) and ESG policies by financial institutions (Finger & Rosenboin, 2022). One of the studies was in the context of energy market sentiment on both stock returns and ESG index returns (Verma & Mohnot, 2023). The majority of past studies was done in India and follow it by Paskistan. Some of the studies have done in the developed countries like US, Canada, Great Britain, Spain and Poland (Przychodzen et al., 2016).

Characteristics of Participants

Previous studies predominantly included a larger male sample compared to female participants in their target population. There are 6103 total number of individual participants under systematic review study for primary data collection. Some of the studies were from 26 companies nine Muslim countries and three developed countries The majority of studies were adult samples for data collection.

DISCUSSIONS

This study presents a systematic review only peer-reviewed research articles are examining the relationship between behavioral biases and ESG investing. In this systematic review, all the studies reflect the presence of behavioral biases while making ESG investing by investors. This study extracted data from revised studies including data together from diverse countries, types of behavioral biases, methodological characteristics, risk of bias, context of previous study, and characteristics of participants.

Based on the geographical dispersion 19 studies were conducted from the parts of the Asian continent and the rest of the studies were four from the US and European countries. In the past studies, were 18 studies deal with the stock/equity/ capital market/ and the rest of the studies deal with mutual funds, sustainability and business performance, sustainable investing on ESG factors and ESG policies by financial institutions, energy market sentiment

on both stock returns and ESG index returns in the context of the market. With respect of the types of behavioral biases, the predominantly of the studies (n=23) observe the association between behavioral biases and ESG investing as combined or separately or by combining with other biases. Other types of behavioral biases with the past studies are affinity bias, emotions, representativeness bias, reliance on expert bias, social responsibility bias, biases in portfolio management, market inefficiencies, heuristics, moral licensing bias, beliefs and values, social normal bias, normal norms, perceived behavioral control, subjective norms , collectivism, risk tolerance, endowment effect , social desirability bias, risk taking propensity, information Cascades , and emotional contagion. The majority of studies were male participants in samples. The sample sizes in the studies included in the systematic literature review ranged from 60 to 559, with an average of 203 participants across 30 studies totaling 6,603 participants. The review also identified sampling bias due to the use of non- probability sampling methods in primary data collection. The majority of the studies employed convenience sampling and purposive sampling techniques. From the perspective of methodological characteristics, previous studies were used structured and survey for primary data collection. The major studies used descriptive statistics, regression analysis for examining the association between behavioral biases and ESG investing and also used SEM for the analysis of the results. Few numbers of past studies were used different models and regression analysis of this study.

The purpose of this systematic review research paper was to recognize the studies examining the association between behavioral biases and ESG investing decisions. The outcomes of the systematic review paper exhibits that 35 different behavioral biases have been examined with ESG investing decisions are given below;

Table 4

Behavioral Biases and their Relationship with ESG Investing

Behavioral Biases	Results /(Relationship between biases and ESG investing)	Related Study
Herding Behavior	Positive and significant relation/ significant impact	(Upadhyaya et al.,2023); (Deka et al., 2023); (Rizani et al., 2023); (Andrew, 2020);(Rooh et al .,2021); (Rooh et al.,2023); (Przychodzen et al.,2016); (Thanki et al., 2022) ; (Loang ,2023); (Thagaram et al., 2023); (Hanifa & Atmini,2023); (Aich et al., 2021); (Lagerkvist et al.,2022); (Raut & Kumar, 2018) ; (Rooh & Hussian, 2022); (Nwogugu, 2020); (Verma& Mohnot, 2023); (Shar & Ali Shah, 2017)

Behavioral Biases	Results /(Relationship between biases and ESG investing)	Related Study
Confirmation bias	Significant relation/ significant impact / significant and positive relation	(Upadhyaya et al., 2023); (Lee et al., 2023); (Andrew, 2020); (Thanki et al., 2022); (Thagaram et al., 2023); (Lagerkvist et al., 2022); (Nwogugu, 2020); (Finger & Rosenboim, 2022); (Trisnowati et al., 2022) ; (Hanifa & Nilsson ,2023); (Farish & Karin , 2021); (Saxena et al., 2023)
Loss Aversion	Significant relation / significant impact	(Upadhyaya et al.,2023); (Razani et al., 2023); (Rooh et al., 2021); (Rooh et al., 2023); (Hanifa & Atmini, 2023); (Aich et al., 2021); (Lagerkvist et al., 2022) ; (Elahi et al., 2023); (Rooh & Hussian, 2022) ; (Adrianto, 2023)
Availability Bias	Strong relationship/ significant influence/ positive impact	(Saxena et al., 2023); (Trisnowati et al., 2022); (Nwogugu, 2020); (Raut & Kumar, 2018); (Lagerkvist et al., 2023); (Andrew, 2020) ; (Deka et al., 2023)
Overconfidence Bias	Positive relation and significant impact	(Deka et al., 2023); (Rizani et al., 2023); (Lee et al., 2023); (Andrew, 2020); (Rooh et al., 2023); (Rooh et al.,2021) ; (Kulal et al., 2023) ; (Hanifa & Atmini., 2023); (Aich et al., 2021); (Lagerkvist et al., 2022); (Rooh & Hussian , 2022); (Nwogugu, 2020);(Adrianto, 2023); (Trisnowati et al., 2022); (Farish & Karin, 2021)
Anchoring Bias	Significant relation / affect	(Raut & Kumar, 2018); (Thanki et al., 2022); (Farish & Karim ,2021) ; (Hanifa & Nilsson, 2023); (Adrianto, 2023); (Finger & Rosenboim, 2022); (Nwogugu, 2020); (Andrew, 2020); (Lee et al., 2023) ; 9 Deka et al., 2023)
Risk aversion bias	Positive and significant affect / impact	(Farish & Karim, 2021); (Adrianto, 2023); (Hanifa & Atmini, 2023); (Loang, 2023); (Przychodzen et al., 2016); (Deka et al., 2023)
Mental accounting	Significant relationship / impact	(Rooh et al, 2021); (Rooh et al., 2023); (Rooh & Hussian, 2022)
Gambler's fallacy	Positive and significant impact	(Deka et al, 2023); (Rooh et al., 2023)
Framing bias	Significant impact	(Rizani et al., 2023); (Kulal et al., 2023); (Trisnowati et al., 2022)

Behavioral Biases	Results /(Relationship between biases and ESG investing)	Related Study
Status Quo bias	Significant relation	(Andrew, 2020); (Lagerkvist et al., 2022); (Nwogugu, 2020)
Risk perception	Moderating significant relation	(Thagaram et al., 2023); (Kulal et al., 2023); (Elahi et al., 2022) ; (Nwogugu, 2020)
Emotions	Positive and significant	(Thagaram et al., 2023)
Affinity bias	Insignificant relation/ impact	(Rooh et al., 2023)
Social norms bias	Significant relation/ impact	(Farish & Karim ,2021); (Upadhyaya et al., 2023)
Beliefs and values	Positive and significant relation/ affect	(Upadhyaya et al., 2023)
Moral licensing bias	Insignificant relation	(Andrew, 2020)
Heuristics	Significant / negative relation	(Thagaram et al, 2023)
Market inefficiencies	Significant relation	(Thagaram et al., 2023)
Regret aversion	The significant and positive effect	(Thagaram et al., 2023) ; (Nwogugu, 20200
Biases in portfolio management	Insignificant relation	(Thagaram et al., 2023)
Social responsibility bias	No significant relation/ impact	(Garg et al., 2022)
Reliance on expert bias	No significant impact	(Garg et al., 2022)
Representativeness bias	Significant relation	(Raut & Kumar, 2018)
Emotional contagion	Positive and significant relation/ impact	(Raut & Kumar, 2018)
Information Cascades	Positive relation	(Raut & Kumar, 2018)
Risk taking propensity	Mediating/ significant effect	(Elahi et al., 2023)
Social desirability bias	Significant relation	(Finger & Rosenboim, 2022)
Endowment effect	Positive and significant relation/ impact	(Finger & Roseboim, 2022)

Behavioral Biases	Results /(Relationship between biases and ESG investing)	Related Study
Risk tolerance	Insignificant relation/ mediating	(Vyas et al., 2020)
Collectivism	Significant relation	(Vyas et al., 2020)
Subjective norms	Positive and significant /impact	(Adam & Shauki, 2014)
Perceived behavioral control	Significant relation	(Adam & Shauki, 2014)
Normal norms	Significant relation/ impact	(Adam & Shauki, 2014)

In Table 4, some of the variables were used as a moderating between behavioral biases and ESG investing decisions like sustainable finance literacy and risk perception. Various variables were used as a mediating relationship between behavioral biases and ESG/ SRI decisions such as risk perception and risk-taking propensity. Most of the behavioral factors create a significant and positive association between the behavioral factors and ESG investing whereas some biases found no role of moderation, mediation and insignificant relationship between behavioral biases and environmental, social and governance investing decision. This systematic review recognized the limitations in the past studies such as gender distribution and sampling strategy.

Identified the Research Gap

After performing systematic literature review/ survey, it was found that most of the previous studies related to the topic were found in the context of the stock market/ equity market or capital market and mutual funds. Various of the preceding studies are found in the ESG practices and policies by financial institutions, energy market and Industry 4:0. Understanding the behavior of investors, it is necessary for research other like Pensions fund, life insurance and crypto currency market. This systematic literature review identified that furthermost of the earlier studies used non – probability sampling strategy for the primary data collection and only one study used probability sampling like stratified random sampling techniques in their study. Various of studies used proportionate samples regard to males and females. Most of the past studies used common biases. However, some biases were ignored for their study. Therefore, these gaps can be fulfilled by researchers in near future research.

CONCLUSIONS

In conclusion, the findings derived from the systematic literature review make more evidence that the Environmental, Social, and Governance (ESG) investing of herding behavior, overconfidence bias, loss aversion, confirmation bias, Gambler's fallacy, mental accounting, and risk aversion bias**.** The mainstream of work has been done in the context of behavioral factors influencing the ESG investing of investors in the Stock market/ equity market or capital market basically in the Asian Continents. This systematic review found 35 types of behavioral biases influencing on ESG investing of individual investors. This study also found that more males included in the study and investors behavior in the market. These studies recognized that various behavioral biases have a positive significant or negative significant or insignificant impact on ESG investing which depends upon the target population and study area of investment. Further research can be carried out by researchers in diverse other contexts like Pension funds, and life insurance as there is no studies undertaken in these areas. Future research can also be assumed in comparing the environmental, social and governance investing decisions by investors in several countries of the same continent. This study supports in understanding the cultural variations, norms, knowledge, values, and opinions of investors from different countries and continents. In addition, mediating and moderating influences can be examined by including other variables in forthcoming studies. Various studies might be missed due to including only selected databases searching for specific terms having open access, only English language and peer-reviewed articles during time framing from 2013 to 2023. Further studies could be assumed by researchers using the search term and including more databases and studies published in other languages. The implications of this study could be examining the behavioral factors on ESG investing in least developed and developing countries regards with stock market.

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