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Examining the Impact of Behavioral-Psychological Components of Investors' Model for Decision-Making Based on Environmental Drivers in the Tehran Stock Exchange

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A B S T R A C T

Objective: This study aims to develop and validate a behavioral-psychological model of investors' decision-making influenced by environmental drivers in the Tehran Stock Exchange.

Methodology: The study employed a grounded theory approach using Strauss and Corbin's methodology, with data collected from semi-structured interviews conducted in 2021 and 2022. The participants comprised 384 investment managers and experts from the Tehran Stock Exchange, selected through random-cluster sampling based on Morgan's table. Data were collected using a 5-point Likert scale questionnaire to assess perceptions and behavior patterns and were analyzed through structural equation modeling (SEM) using SmartPLS software.

Findings: The results revealed that investors' decisions are shaped by several dimensions, including causal factors (such as diagnostic ability and sentiment analysis), contextual factors (including positive and negative environmental drivers and regulatory requirements), intervening factors (such as behavioral outcomes, cultural characteristics, investor beliefs, and government economic policy), and strategic factors (like strategic financial planning). These dimensions collectively impact the central phenomenon of behavioral-psychological decision-making. The model's outcomes were also validated, showing enhancements in investors' perceptual levels, strengthened long-term perspectives, and expanded investment goals. The model's reliability and validity were confirmed using Cronbach's alpha, composite reliability, and AVE measures, with all indicators falling within acceptable ranges.

Conclusion: Recognizing these drivers and investor biases allows for a more comprehensive understanding of market dynamics, suggesting that investment firms and policymakers should consider these behavioral patterns in strategic planning.

Keywords: *Behavioral-psychological model, investor decision-making, environmental drivers, Tehran Stock Exchange, structural equation modeling*

1 Introduction

Numerous studies in the financial domain reveal that proponents of "behavioral finance" firmly believe that understanding "psychological tendencies" in the field of investment is essential and requires serious expansion of the study's scope. For those who consider psychology's role in finance as a significant factor influencing stock markets and investor decisions, it is difficult to question the validity of "behavioral finance" (Zanjir Dar et al., 2013). In other words, behavioral finance describes actual human behavior in economic decision-making (Asiabi et al., 2021). For retail investors, investment decision-making is of high importance and can lead to significant profits or losses. Therefore, investors need to be aware of the factors affecting these decisions.

Many factors, including economic and psychological ones, can influence investor decision-making. Before investing, investors generally understand economic factors such as expected income, the financial status of companies, recent price movements, risk, return, and so on. However, most investors cannot accurately evaluate all of these factors. Psychological factors play a significant role in decision-making, as individuals tend to have preferences or aversions (Momeni & Rezaei Ghal'e, 2018). Today, such behaviors are also considered in financial transactions, given their crucial role in decision-making. Undoubtedly, investors act based on market sentiment, but they also rely on their personal emotions (Abbasi Mosleu & Tehrani, 2019).

Studying behavioral biases among stock market investors is essential to prevent irrational and destabilizing behaviors in capital markets (Seydian Monir et al., 2019). While neoclassical theories assume that economic agents act rationally, evidence shows they do not always behave entirely rationally due to preferences and cognitive errors. Personality traits, culture, religion, ideology, and emotions are among the factors that significantly impact individual behavior and reactions in decision-making situations (Mirbozorgi et al., 2022). The success of risk management activities enables firms to enhance their value and effectively manage risk. Such activities reduce operating and final costs and decrease uncertainty regarding stock market returns, thus increasing profitability for firms (Aref Manesh et al., 2022).

In many financial models, it is assumed that individuals are risk-averse. Typically, risk aversion in financial models is symmetric, meaning it applies equally to gains and losses. In contrast, behavioral finance theories propose that risk aversion differs in the context of gains versus losses, with individuals assigning much greater weight to a specific loss compared to a similar gain (Bakar & Chui Yi, 2016). Perception is inherently dependent on the observer's viewpoint and can influence judgments (Ronen & Lewinstein Yaari, 2021). Awareness of potential future risks in investment drives many shareholders to identify environmental drivers and triggers to determine their investment horizon (Daneshi & Esmailzadeh, 2022).

Although numerous studies have examined investor behavior, no valid model for the behavioral-psychological pattern of investors' decision-making based on environmental drivers in the Tehran Stock Exchange has been identified after reviewing studies conducted in Iran. The absence of investor awareness about such models can pose significant risks and challenges for investors. Behavioral patterns are one aspect of behavioral finance, representing investors' subjective judgment of risk, which may be overestimated or underestimated compared to actual risk (Mirlohi & Mohammadi Tudeshki, 2020). Various models exist to measure investors' sentiments regarding future returns and risks. Using modifications of the implied volatility index of options, Jering and Martinez (2016) developed a metric called the Risk Sentiment Index for measuring market sentiment in options trading (Jering et al., 2016). Ebrahimi Lifshagard, Pakizeh, and Reisi Far (2019) indicated that in cases where investors become anxious or fear prevails, real information does not alleviate their concerns, leading them to respond intensely to trivial issues, exhibiting unusual behaviors that would not typically occur under normal circumstances (Ebrahimi Lifshagar et al., 2019). In these situations, investors' emotions override their rationality, causing systemic disruptions in the stock market. Moreover, investors' emotions and states, along with behavioral and cognitive biases, influence their perceptions, thereby affecting their decisions (Saadatzadeh Hisar et al., 2021).

Jabari Khoozani et al. (2022) found that most investor decisions are driven by factors such as appearance-based judgments, overconfidence, emotional and social commitments, social pressures, inconsistency, low self-esteem, and mental structures (Jabari Khoozani et al., 2022). Barabari and Akbari (2019) identified variables like reliance and adjustment, conformity, familiarity, self-attribution, and competence as significant influences on investor behavior (Barabari & Akbari, 2019). Chavoshi and Falah-Tonnejad (2017) concluded that a significant difference exists between

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the importance of various investor decision-making behaviors, ranked as validation, analytical behavior, exploratory behavior, and behavioral biases (Chavoshi & Foulatoon Nejad, 2017). In their study on the impact of behavioral biases on stock price bubbles, Bashiri Manesh and Shahnazi (2023) found that investor biases (emotional and herd behavior) and managerial biases (excessive short-sightedness and narcissism) contribute to the gap between intrinsic and market stock values, creating price bubbles (Bashiri Manesh & Shahnazi, 2022). Abdolrahimian et al. (2018) identified culture as a fundamental factor in investor behavior, with cognitive biases preceding emotional ones in causing herding behavior among individual investors (Abdolrahimian et al., 2018), while Alabass (2019) highlighted numerous irregularities in trading behavior impacting stock market value (Alabass, 2019). Petit et al. (2019) demonstrated that investor emotions and excitement can direct group decisions and alter individual investment behavior, with current tools available to potentially influence investor behavior (Petit et al., 2019). Barzegari Khanqah et al. (2017) found a meaningful relationship between stock market participation, stock selection, and media use, with investors relying heavily on the internet and media for investment choices (Barzegari Khanqah et al., 2017). Raki et al. (2020), using agent-based computational modeling and simulating an artificial stock market, showed that loss aversion bias contributes to stock market dynamics and significantly influences financial pricing (Raki et al., 2020). Farhadi Sharifabad and Douaei (2021), using fuzzy Delphi and DEMATEL methods, emphasized the importance of psychological factors in investment inclinations, concluding that cognitive biases and psychological factors—such as attachment, self-attribution, ambiguity aversion, overconfidence, mental accounting, regret aversion, conservatism, illusion of control, hindsight, optimism, herd behavior, pessimism, overreaction, and short-sightedness—form the final model of investor tendencies in Tehran Stock Exchange (Farhadi Sharif Abad & Doaei, 2012). Finally, Mahboobi et al. (2023) utilized a structural vector autoregression (SVAR) model to reveal that fluctuations in exchange and interest rates positively and significantly impact stock returns, while per capita GDP does not (Mahboobi et al., 2023).

Investment decisions and behavior, without knowledge of the environmental factors influencing investors' decisions, may contain errors. Given the importance of understanding how an investor's behavior aligns with environmental drivers at a specific time based on the investor's behavioral, emotional, and cognitive characteristics, this article aims to validate and fit a behavioral-psychological model of investors' decision-making based on environmental drivers in the Tehran Stock Exchange.

2 Methods and Materials

The sample for this study consisted of managers and experts from the Tehran Stock Exchange who possessed relevant expertise and organizational knowledge in investor behavior. These participants, selected in 2021 and 2022, were recognized as knowledgeable informants in the field, allowing for a thorough and reliable validation and fit of the proposed behavioral-psychological model. Using a random-cluster sampling method and based on Morgan’s formula, a sample size of 384 individuals was determined as adequate to represent the population.

Data were collected through a questionnaire designed to capture perceptions across key variables, with items rated on a 5-point Likert scale ranging from "very high" to "very low." This approach enabled a comprehensive examination of each variable’s influence and interdependence over a specific period. For data analysis and model fit assessment, structural equation modeling (SEM) was performed using the SmartPLS software, allowing for the evaluation of relationships between observed variables and the latent constructs of the model.

3 Findings and Results

The conceptual model of this study is the behavioral-psychological pattern of investors for decision-making based on environmental drivers in the Tehran Stock Exchange, developed using grounded theory and Strauss and Corbin's approach through semi-structured interviews with 15 experts in investment and behavioral finance in the Tehran Stock Exchange during 2021 and 2022 (Table 1).

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Table 1

Components of the behavioral-psychological pattern of investors for decision-making based on environmental drivers

Dimensions	Component	Number
Causal Factors	Behavioral analysis and investor sentiment	1
	Investors' perceptual and scientific acumen	2
Contextual Factors	Positive environmental drivers	3
	Negative environmental drivers	4
	Requirements and regulations	5
Central Phenomenon	Behavioral-psychological decisions of investors	6
Intervening Factors	Behavioral consequences of investors	7
	Cultural and discursive characteristics of investment	8
	Investors' behavior and beliefs	9
	Government economic policies	10
Strategic Factors	Financial strategic planning	11
Outcomes	Enhancing investors' perceptual level	12
	Strengthening long-term investor perspective	13
	Expanding investment objectives	14

After data collection, the Kolmogorov-Smirnov test was used to examine data distribution for selecting an appropriate statistical method. According to the Kolmogorov-Smirnov test, if the significance level for all independent and dependent variables is greater than the 5% error level, hypothesis H0 is accepted, indicating a normal distribution. However, as shown in Table 2, the significance level for all variables is below 0.05, rejecting H0 and accepting H1. Thus, the data distribution is non-normal, necessitating the use of non-parametric methods to analyze the relationships between research variables and test hypotheses.

Table 2

Normality Test for Examined Variables

Variable	Sample Size	Test Statistic	Significance Level	Result
Causal Dimensions and Components	384	0.121	0.000	Non-normal
Central Dimensions and Components	384	0.111	0.000	Non-normal
Contextual Dimensions and Components	384	0.139	0.000	Non-normal
Intervening Dimensions and Components	384	0.104	0.000	Non-normal
Strategic Dimensions and Components	384	0.255	0.000	Non-normal
Outcome Dimensions and Components	384	0.140	0.000	Non-normal

Given the non-parametric distribution of the data, Pearson's correlation test was used to examine the relationship between the main variables.

Table 3

Correlation Among Research Variables

Variable	1	2	3	4	5	6	7
1. Causal Dimensions	1	.491	.569	.495	.461	.546	.562
2. Central Dimensions	.491	1	.699	.537	.406	.476	.475
3. Contextual Dimensions	.569	.699	1	.712	.390	.516	.505
4. Intervening Dimensions	.495	.537	.712	1	.601	.537	.500
5. Strategic Dimensions	.461	.406	.390	.601	1	.528	.530
6. Outcome Dimensions	.546	.476	.516	.537	.528	1	.755
7. Behavioral-Psychological Pattern	.562	.475	.505	.500	.530	.755	1

All $p < 0.01$

Table 3 indicates that all variables have a significant relationship.

Model fit was evaluated in two stages: first by assessing the fit of the measurement model and then by evaluating the structural model fit.

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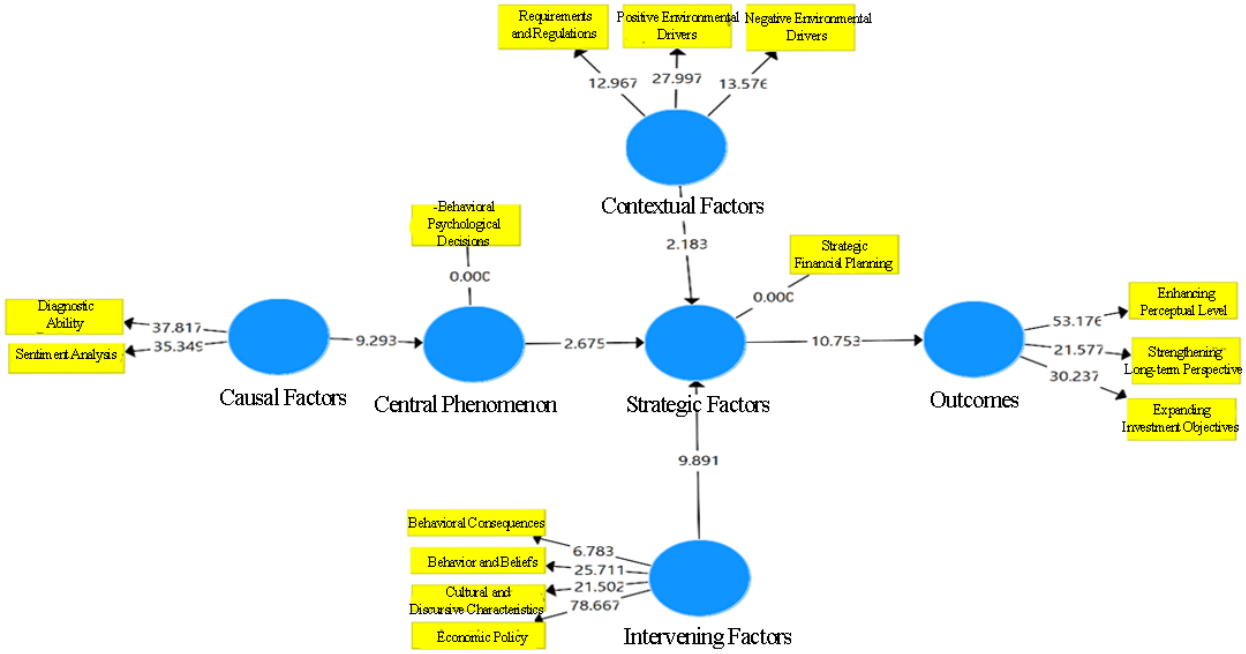
Figure 1

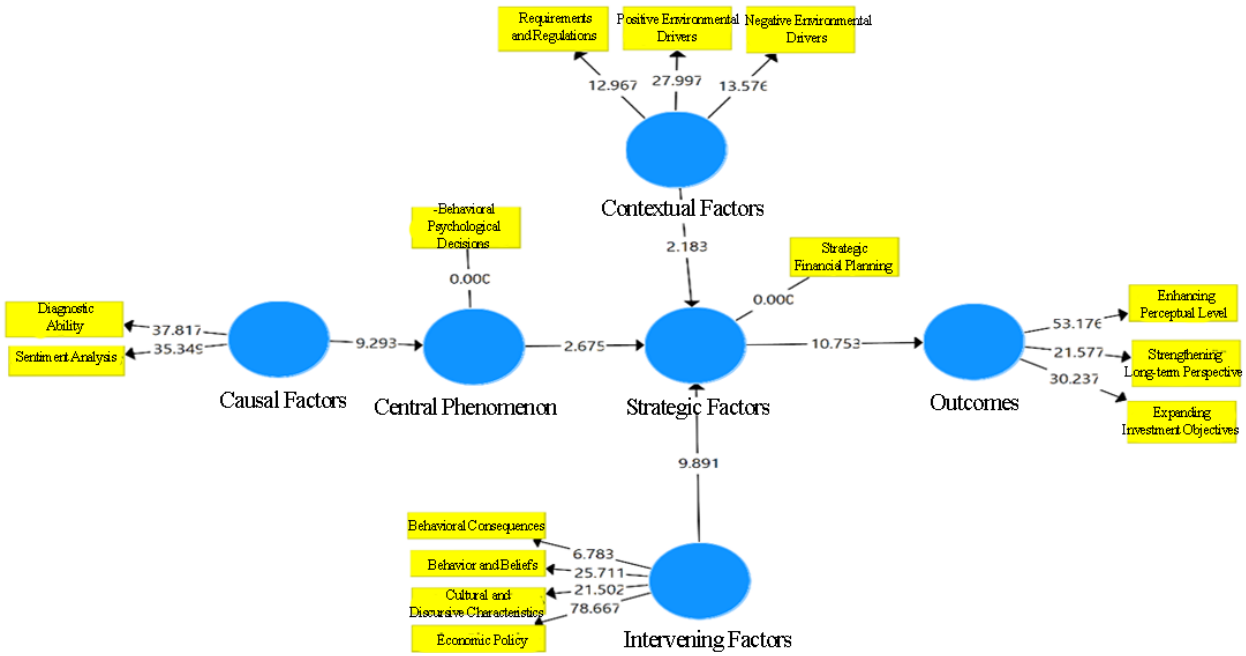
Standard Factor Loadings



Factor loadings were calculated by measuring the correlation between a construct and its indicators. If the factor loading is 0.4 or higher, it confirms that the variance between the construct and its indicators exceeds the measurement error variance, indicating acceptable reliability in the measurement model. If any factor loading is below 0.4, the researcher must revise or exclude those items (survey questions) from the research model.

Figure 2

Factor Loadings Based on Significance Coefficients



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The above charts illustrates the confirmatory factor analysis and structural equations in terms of the absolute values of the significance coefficients for the model. According to the presented model, the t-statistic is greater than 1.96, and the path coefficient is significant at the 95% confidence level.

To assess the reliability and convergent validity of the research model, three criteria were used: Cronbach's alpha, composite reliability, and AVE. As shown in Table 4, all values of Cronbach's alpha, composite reliability (internal consistency), and AVE are within the acceptable range, confirming the model's reliability and convergent validity.

Table 4

Results of Cronbach's Alpha, Reliability, and Convergent Validity Criteria

Variable	Cronbach's Alpha (Alpha > 0.7)	Composite Reliability (Cr > 0.7)	Average Variance Extracted (AVE > 0.5)
Strategic Dimensions and Components	1.000	1.000	1.000
Contextual Dimensions and Components	0.649	0.805	0.580
Causal Dimensions and Components	0.626	0.843	0.728
Intervening Dimensions and Components	0.723	0.824	0.551
Central Dimensions and Components	1.000	1.000	1.000
Outcome Dimensions and Components	0.776	0.870	0.690

The Fornell-Larcker criterion is used to calculate discriminant validity in the partial least squares structural equation model. Fornell and Larcker (1981) proposed this index to evaluate discriminant validity for each construct in the partial least squares model (Table 5).

Table 5

Fornell-Larcker Test Results for Research Variables

Variable	Strategic Factors	Contextual Factors	Causal Factors	Intervening Factors	Central Phenomenon	Outcomes
Strategic Factors	1.000					
Contextual Factors	0.425	0.762				
Causal Factors	0.231	0.583	0.853			
Intervening Factors	0.580	0.549	0.447	0.742		
Central Phenomenon	0.384	0.600	0.512	0.404	1.000	
Outcomes	0.499	0.647	0.377	0.705	0.411	0.831

Table 6 shows the model fit indices, indicating that the collected data are adequate and that the model estimation results are reliable and trustworthy.

Table 6

Model Fit Indices for the Research Model

Variables	Acceptable Range	Observed Value	Result
SRMR	Less than 0.08	0.048	Adequate Fit
d-ULS	Less than 0.95	0.526	Adequate Fit
d-G1	Less than 0.95	0.514	Adequate Fit
d-G2	Less than 0.95	0.750	Adequate Fit
Chi-square	Greater than 1.96	81.950	Adequate Fit
NFI	Greater than 0.25	0.588	Adequate Fit
GOF	Greater than 0.25	0.580	Adequate Fit

According to hypothesis testing results shown in Table 7, all hypotheses have a critical value above 1.96, indicating

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that each hypothesis is significant at the 5% error level. All independent variables have a positive and significant effect on the dependent variables.

Table 7

Regression Coefficients of Research Hypotheses Variables

Independent Variable	Standardized Coefficients	Standard Error	Significance Coefficients	Significance Level	Statistical Result
Strategic Factors -> Outcomes	0.499	0.046	10.753	0.000	Hypothesis Confirmed
Contextual Factors -> Strategic Factors	0.174	0.063	2.183	0.000	Hypothesis Confirmed
Causal Factors -> Central Phenomenon	0.512	0.055	9.293	0.000	Hypothesis Confirmed
Intervening Factors -> Strategic Factors	0.481	0.049	9.891	0.000	Hypothesis Confirmed
Central Phenomenon -> Strategic Factors	0.145	0.054	2.675	0.008	Hypothesis Confirmed

Table 8 presents the indirect effects of research variables. Based on the regression coefficients and the critical area values exceeding 1.96, the indirect effects of research variables are positive and significant at the 5% error level.

Finally, analyzing the total effects of research variables, regression coefficients, and critical area values confirmed all hypotheses at the 5% error level, with positive and significant effects of independent variables on dependent variables, as shown in Table 9.

Table 8

Indirect Effects of Research Variables

Independent Variable	Standardized Coefficients	Standard Error	Significance Coefficients	Statistical Result
Contextual Factors -> Outcomes	0.137	0.259	2.131	Hypothesis Confirmed
Causal Factors -> Strategic Factors	0.074	0.006	2.769	Hypothesis Confirmed
Causal Factors -> Outcomes	0.037	0.007	2.706	Hypothesis Confirmed
Intervening Factors -> Outcomes	0.240	0.000	6.489	Hypothesis Confirmed
Central Phenomenon -> Outcomes	0.072	0.008	2.676	Hypothesis Confirmed

Table 9

Total Effects of Research Variables

Independent Variable	Standardized Coefficients	Standard Error	Significance Coefficients	Statistical Result
Contextual Factors -> Outcomes	0.271	0.033	2.131	Hypothesis Confirmed
Causal Factors -> Strategic Factors	0.074	0.027	2.769	Hypothesis Confirmed
Causal Factors -> Outcomes	0.037	0.014	2.706	Hypothesis Confirmed
Intervening Factors -> Outcomes	0.240	0.037	6.489	Hypothesis Confirmed
Central Phenomenon -> Outcomes	0.072	0.027	2.676	Hypothesis Confirmed

4 Discussion and Conclusion

According to previous research, financial markets are influenced by reactive behaviors of investors, but it is evident that disregarding individual investor behavior in the Tehran Stock Exchange can harm this growing market and its investors. Additionally, future interventions, environmental drivers, and similar factors can influence investment trends in the capital market by triggering behavioral biases. A limited timeframe analysis of investor behavior shows that their behavior is shaped by environmental drivers and various actors, including economic actions (such as currency fluctuations, increases in industrial goods prices, rising insurance costs, and higher bank interest rates), political actions (such as international

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sanctions, political resolutions, internal conflicts among national parties, and statements by politicians), social actions (such as public demonstrations, protests, and mass sentiments), and regional actions (such as war, famine, and diplomatic relations). These drivers and actors significantly influence investment behavior. In the present study, the researcher aimed to validate and fit the behavioral-psychological model of investors' decision-making based on environmental drivers in the Tehran Stock Exchange. Based on the results of various tests, the central phenomenon includes investors' behavioral-psychological decisions; causal factors include behavioral analysis, investor sentiment, and perceptual and scientific discernment, aligning with Dadar and Jafari's (2020) research. Contextual factors include positive and negative environmental drivers, requirements, and regulations (Dadar & Jafari, 2020). Intervening factors consist of behavioral outcomes of investors, cultural and discursive characteristics of investment, and investor beliefs and behaviors, consistent with prior findings (Abdolrahimian et al., 2018; Mirbozorgi et al., 2022). Strategic factors include investors' financial strategic planning, while outcome factors involve enhancing investors' perceptual levels, strengthening long-term perspectives, and expanding investment goals.

Based on the findings, the following recommendations are proposed for Tehran Stock Exchange participants and policymakers in this field:

- Conduct behavioral analysis of investors according to demographic characteristics, including education level, gender, specialization, etc.
- Guide and manage investors based on their risk tolerance approaches.
- Investment companies should consider both positive and negative external drivers.
- Consider investors' perceptions and awareness when facing environmental risks.
- Promote discourse and culture on investment approaches aligned with environmental risks.
- Define behavioral characteristics of investors in the capital market.
- Identify and analyze investors' behavioral outputs in the capital market.

Suggestions for future research include:

- Examining how investors confront environmental risks in the investment field.
- Identifying and prioritizing factors that mitigate investment losses in the Tehran Stock Exchange from a behavioral perspective.
- Diagnosing emotional investor behaviors in response to environmental risks.
- Providing preventive strategies for investment companies to manage environmental risks.

Authors' Contributions

All authors have contributed significantly to the research process and the development of the manuscript.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

The authors report no conflict of interest.

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Ethical Considerations

In this research, ethical standards including obtaining informed consent, ensuring privacy and confidentiality were observed.

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