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Modeling the Effects of Behavioral Biases and Personality Traits of Investor Types on Their Decision-Making under Capital Market Uncertainty

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Abstract

Objectives: This study aims to model the impact of behavioral biases and personality traits on individual and institutional investors' decision-making under conditions of uncertainty in the capital market.

Methodology/Design/Approach: The present study adopts a mixed-method approach. In the qualitative section, opinions of 17 experts (faculty members and market participants) were collected and analyzed through Interpretive Structural Modeling (ISM). In the quantitative section, data from 384 investors were gathered using a questionnaire in 2024 and analyzed via Structural Equation Modeling (SEM).

Findings: In the qualitative phase, the Delphi technique, ISM, and MICMAC software were used to identify and classify the dimensions and components. Results indicated that cognitive and emotional biases, cultural dimensions, personal characteristics, personality types, and demographic features significantly influenced investor decision-making. Cognitive biases, personal traits, personality types, and demographic features were identified as key foundational factors. In the quantitative phase, SEM analysis confirmed the significant positive impact of behavioral biases and personality traits on the decision-making of both individual and institutional investors under market uncertainty.

Conclusion: The results reveal a complex and multifaceted set of psychological, cognitive, emotional, demographic, cultural, and behavioral factors that hierarchically influence investor behavior.

Innovation: By presenting a structured framework of factors affecting investor decisions, this study enriches the behavioral finance literature and provides practical guidelines to improve investment behavior under uncertainty.

Keywords: Interpretive Structural Modeling (ISM), Behavioral Biases, Personality Traits, Investor Decision-Making, Capital Market Uncertainty..

1. Introduction

Many studies on investment decision-making indicate that there is insufficient knowledge regarding why individuals invest and how they make decisions. Therefore, investors need to understand the reasons behind their behavior to make informed choices that help them achieve their investment goals. This issue is particularly relevant in developing countries, especially Iran, where the stock market is inefficient, and any political or economic changes can quickly affect the stock exchange, causing volatility and preventing stock prices from reflecting their intrinsic value.

A central feature of investment is its inherent reliance on the future. Investors naturally aim to select investments that maximize expected returns based on the available financial capital, which requires forecasting the future of each option. Factors influencing investor decision-making relate both to investor characteristics and environmental factors. Environmental factors include laws and regulations, fluctuations in key economic variables such as inflation, exchange rates, and parallel market returns; additionally, political and economic instability in the market environment increases investment risk.

Prior studies also indicate that personality traits, investment knowledge, and environmental factors influence investor behavior. Moreover, government policies, whether fiscal or related to the investment culture of each country, also affect investment decisions. These factors at least partially govern market behavior and explain why investors may act irrationally (Asiayi Aghdam et al., 2021).

Interpretive Structural Modeling (ISM) is one of the system design methods, particularly for economic and social systems, where mathematics, computers, and expert participation are used to design large and complex systems. The structural-interpretive analytical method was proposed by Warfield (1974). This method is an interactive process in which a set of interconnected elements is structured into a systematic and comprehensive model. ISM helps organize complex relationships among system elements. In other words, ISM is an evolutionary learning process that interprets experts' opinions to understand relationships among concepts of a problem and creates a comprehensive structure of a complex set of concepts. It specifies the precedence and influence of elements on one another, as well as the direction and strength of relationships within a hierarchical structure.

Despite theoretical advancements in behavioral finance, there is a significant research gap in modeling the comprehensive effects of behavioral biases and personality traits on investor decision-making. Particularly, the use of advanced methods such as ISM and MICMAC analysis for examining complex interactions between these factors under capital market uncertainty has received limited attention.

Theories and prior research indicate that multiple studies have examined investor decision-making in financial markets. Over the past decades, financial theories have evolved into two main approaches: the neoclassical approach and the behavioral finance approach. The neoclassical approach, rooted in models such as the Efficient Market Hypothesis (EMH) and Capital Asset Pricing Model (CAPM), assumes market efficiency and rational investor behavior based on available information. This perspective emphasizes economic logic and describes investor behavior as predictable and optimal. Classical models such as Expected Utility Theory and Arbitrage Pricing Theory analyze investor behavior based on maximizing returns and minimizing risk. However, empirical observations in financial markets—such as unexplained volatility, deviations from intrinsic value, and irrational reactions to new information—show that investor decisions do not always align with rational models. These inefficiencies led to the emergence of behavioral finance, which emphasizes the role of psychological factors, cognitive, and emotional biases in decision-making (Kartini & Nada, 2021).

The behavioral finance approach, initiated by Kahneman and Tversky in the 1970s, demonstrates that investors are influenced by biases such as the disposition effect, loss aversion, overconfidence, and

herding behavior, leading to decisions that deviate from economic rationality. Prospect Theory, a cornerstone of behavioral finance, explains that investors evaluate gains and losses asymmetrically and exhibit stronger tendencies to avoid losses than to acquire gains. Additionally, heuristic biases, including anchoring, representativeness, and availability, represent mental shortcuts investors use under uncertainty, often resulting in systematic errors. Personality traits, such as risk aversion, independence, tolerance for ambiguity, and risk propensity, also play a significant role in shaping investor behavior. For example, investors with high ambiguity tolerance may perform better under uncertainty, whereas overconfident individuals may take excessive risks, resulting in substantial losses (Singh et al., 2024).

In emerging markets such as Iran's capital market, characterized by low efficiency, high price volatility, and sensitivity to political and economic factors, understanding the determinants of investor decision-making is particularly important. In such markets, government policies, exchange rate fluctuations, inflation, laws and regulations, and investment culture present additional challenges for individual and institutional investors. Studies show that under uncertainty, investors often make decisions influenced by cognitive biases, such as mental accounting and conservatism, as well as emotional biases, including loss aversion and excessive optimism (Kola, 2022). Framing effects, which determine how information presentation influences decisions, and anchoring, reflecting investors' reliance on initial reference points, are examples of these biases. Moreover, herding behavior, in which investors follow others' decisions regardless of fundamentals, is a key factor in volatile markets (Tsemen et al., 2024).

Investors' personality traits, based on Five-Factor or Myers-Briggs models, significantly affect decision-making. For instance, traditional investors may perceive financial opportunities differently from innovative individuals, influencing investment strategy selection. Psychological traits, including anxiety, narcissism, or innovation, are associated with trading styles and investment performance (Arisoy et al., 2024). Additionally, demographic factors such as age, gender, and education level influence investment decisions. Higher-educated investors may perform more precise analyses, while age affects risk tolerance. These factors gain greater importance in emerging markets characterized by information opacity and environmental instability.

The present study aims to fill the identified research gap and examine the effects of behavioral biases and personality traits of individual and institutional investors on decision-making under capital market uncertainty. This study employs a mixed-methods approach, including the Delphi method, ISM, MICMAC analysis, and Structural Equation Modeling (SEM), to develop a comprehensive framework for identifying key dimensions and components, analyzing relationships among them, and validating the model. In the first phase, effective factors were identified using Delphi and expert opinions. In the second phase, relationships among these factors were analyzed through ISM and MICMAC, and finally, model validation was performed using SEM.

The significance of this research lies in its contribution to understanding psychological and behavioral factors affecting decision-making and in providing a structural model offering practical guidance to policymakers, market managers, and investors. Considering the direct impact of investor decisions on market dynamics, economic stability, and capital attraction, the results can improve investment processes, reduce the effects of irrational biases, and strengthen informed decision-making in volatile markets. Furthermore, by localizing the model in Iran's capital market, the study identifies market-specific characteristics and provides contextually appropriate solutions.

2. Literature Review

Cognitive biases exert a significant influence on investors' decision-making and often lead to irrational choices. Mental accounting, in which investors

mentally categorize financial resources into separate accounts, causes decisions to be made based on artificial classifications rather than the overall portfolio return. The disposition effect drives investors to sell winning stocks prematurely and hold losing ones, thereby limiting potential profits. Conservatism, understood as resistance to changing beliefs in light of new information, prevents timely reactions to market changes. Representativeness heuristics, relying on simplistic patterns, guide investors toward unrealistic predictions based on limited evidence. Mental budgeting, by determining illogical budgets for investments, disrupts optimal risk management. One-dimensional analysis, by focusing on a single piece of information, ignores other key factors such as risk or economic conditions (Alaham, Johnson, & Lee, 2024).

Personality traits also play a vital role in investment decision-making. Change-averse individuals prefer low-risk investments such as bonds and avoid high-risk opportunities. Independent individuals, relying on personal analysis, are interested in complex investments but may face high risks due to limited experience. Confident individuals gravitate toward high-risk investments such as technology stocks, while anxious individuals act more conservatively and miss profitable opportunities. Followers, who mimic market trends or others' decisions, incur losses in volatile conditions. Introverted individuals lean toward long-term strategies with in-depth analysis, whereas extroverts are attracted to dynamic, high-risk markets (Jiang, Wang, & Smith, 2024).

Emotional biases—including overconfidence, regret, herding behavior, endowment effect, loss aversion, myopia, excessive optimism, representativeness, and risk aversion—amplify irrational decisions. Overconfidence leads to risky trades, while loss aversion results in holding losing assets. Herding behavior and the endowment effect can amplify bubbles or large sell-offs. Myopia and excessive optimism, by focusing on short-term gains and ignoring real risks, reduce returns (Shabri, Kumar, & Patel, 2024; Arisoy, Demir, & Kaya, 2024).

Individual and demographic characteristics also affect decision-making. Futures literacy, financial intelligence, and financial management skills enable more precise analysis and better risk management. Greater wealth increases risk tolerance. Younger individuals favor risky assets, while older individuals prefer safer investments. Women tend to act more conservatively, whereas men exhibit higher risk-taking. Higher education facilitates detailed analysis, and occupation and marital status influence risk tolerance (Falk, Schneider, & Thomas, 2024).

Salehi (2024), in a study titled Behavioral Finance Factors and Investment Decisions: The Mediating Role of Risk Perception, examined the topic. Results indicate that herding behavior, disposition effect, and blue-chip bias significantly positively influence risk perception. Overconfidence positively affects investment decision-making but not risk perception. Risk perception is significantly positively related to investment decisions. All four behavioral finance factors have significant indirect effects on investment decisions via risk perception. However, this study focused only on four behavioral factors, and other factors may also influence risk perception and investment decisions.

Khatabi and Gharghi (2024), in a study titled Identifying and Ranking Factors Affecting Investors' Performance in the Tehran Stock Exchange, found that, according to the DEMATEL technique, capital market regulation risk, economic indicators, and financial literacy are influential criteria. Ranking of sub-criteria based on impact revealed that investors' lack of anxiety and stress during trading, returns from parallel markets, absence of greed, and reliance on fundamental analysis were the top four factors affecting investor performance.

Darabi and Zohrabi (2024), in a study titled Effects of Risk Management on Firm Value and Investment Decisions in Iran's Capital Market, found that risk management significantly and directly affects firm value at a 95% confidence level, while investment decisions' effect on firm value was not significant. Additionally, the mediating role of investment

decisions between risk management and firm value was significant at the 0.05 level.

Zeinivand et al. (2023) examined behavioral biases and investment decisions of individual and institutional investors under uncertainty in the Tehran Stock Exchange. Results showed that behavioral biases differently affect investment decisions for these two groups, and the impact of each bias varies under market uncertainty. Predictive models were proposed for both investor types using their behavioral biases.

Mousavi (2022), in a study titled The Impact of Financial Behavior on Investment Decisions, explored the relationship between financial behavior and investment decisions. F-test results indicated that financial behavior significantly affects investment decisions.

Yazdanian and Saeedi (2022), in The Effect of Investors' Behavioral Biases on Their Investment Decisions in Stocks, Currencies, Fixed-Income Securities, and Bank Deposits, found that cognitive and emotional biases directly and significantly influence investors' preferences for various assets. Emotional biases mainly influenced riskier assets like stocks and currencies, while cognitive biases impacted low-risk assets such as fixed-income securities and bank deposits.

Shunmugasundaram et al. (2024), in The Impact of Behavioral Biases on Investment Decisions: A Serial Mediation Analysis, reported that behavioral biases affect investment decisions of life insurance policyholders.

Dhingra et al. (2024), in The Impact of Behavioral Factors on Investment Decisions and Investment Performance in the Croatian Stock Market, found that overconfidence, prospect theory elements, emotions, and personality dimensions (stability and flexibility) positively influenced investment decisions, whereas herding behavior negatively impacted them. Investment decisions favoring long-term investments positively affected satisfaction with investment performance.

Lindner et al. (2023) examined social motivations in investment decisions, showing that intrinsic motivation increases risk-taking. Investor behavior was mainly determined by reputational motivations and risk tolerance. Professionals showed stronger intrinsic motivation than non-professionals, though valid incentives could elicit similar behaviors in less-experienced individuals.

Samal and Mahapatra (2022) found that behavioral biases—regret aversion, herding, fear of missing out, overconfidence, and cognitive dissonance—significantly influence investment decisions.

3. Methodology

The present study is exploratory in terms of its objectives and employs a mixed-method approach, combining qualitative and quantitative elements. Based on data type and analysis style, it can be classified as a qualitative-quantitative study with documentary data collection. From a methodological perspective, the research is of a mixed and analytical-descriptive type.

In this study, to determine the decision-making patterns of individual and institutional investors under capital market uncertainty, based on behavioral biases and personality traits of accounting investors, the first phase focuses on identifying the dimensions of the investors' decision-making model through a review of past research, the Delphi method, questionnaire distribution, and aggregation of expert opinions. In the second phase, MICMAC analysis was used to evaluate interactions within the investor decision-making model. Finally, in the third phase, Structural Equation Modeling (SEM) was employed to examine the effects of variables.

The qualitative population consisted of university faculty members and active capital market participants. A snowball sampling technique was used to select 17 academic and professional experts to complete the questionnaire until theoretical saturation was reached. Expert selection criteria included faculty membership, relevant research experience, teaching or analysis in capital market subjects, and academic background in accounting or financial management.

The quantitative population and sample included individual investors (over 60 million active trading codes in 2023) and institutional investors (58 portfolio managers and 130 brokerage firms) in the Tehran Stock Exchange. Using the Cochran formula, a sample of 384 participants (individual and institutional investors) was selected as a convenience sample. Out of 390 distributed questionnaires, 384 were valid and used to measure behavioral biases and investor traits, resulting in a response rate of 98%.

To determine the sample size, the Cochran formula was applied as follows:

(1)

$$n = \frac{N \times z^2 \ {}^{\alpha}/_{2} \times \delta^2}{(N-1)\varepsilon^2 + z^2 \ {}^{\alpha}/_{2} \times \delta^2}$$

(2)

$$n = \frac{50000 \times 1.96^2 \ .5/_{2} \times .5^2}{(50000-1).05^2 + 1.96^2 \ .5 \times .5^2} = 384$$

Where:

- nnn = sample size
- NNN = population size
- Zα/2Z_{\alpha/2}Zα/2 = normal variable corresponding to the desired confidence level (for 95% confidence, Z=1.96Z = 1.96Z=1.96)
- σ\sigmaσ = population variance (assumed 0.5)
- ε\varepsilonε = permissible error (0.05)

Thus, the sample size obtained using the Cochran formula was 384.

Table 1. Descriptive Statistics of Demographic Factors

Category	**Frequency**	**Percentage**
Male	237	61.72%
Female	147	38.28%
Total	384	100.00%
Education	**Frequency**	**Percentage**
Bachelor's degree and below	284	73.96%
Master's degree and above	100	26.04%
Total	384	100.00%
Work experience	**Frequency**	**Percentage**
Less than 5 years	38.02%	146
Between 5 and 10 years	58.33%	224
More than 10 years	3.65%	14
Total	100.00%	384
Job position	**Frequency**	**Percentage**
Manager	120	31.25%
Expert	150	39.06%
Analyst	60	15.63%
Employee	54	14.06%

4. Research Questions

1) What are the components and dimensions influencing the decision-making of individual and institutional investors under capital market uncertainty, based on behavioral biases and personality traits?
2) How can the decision-making of individual and institutional investors under capital market uncertainty, considering behavioral biases and personality traits, be modeled using the Interpretive Structural Modeling (ISM) approach?

3) What is the extent of influence and susceptibility of the dimensions affecting the decision-making of individual and institutional investors under capital market uncertainty, based on behavioral biases and personality traits?
4) To what extent is the proposed model validated from the users' perspective?

5. Findings

To conduct the present study, a systematic process was designed based on the Meta-Integration (Fara-Tarkib) approach to identify the components and dimensions affecting the decision-making of individual and institutional investors under capital market uncertainty, with an emphasis on behavioral biases and personality traits. This research follows the seven-step model proposed by Sandelowski and Barroso (2007), which requires a thorough review and systematic integration of prior studies.

Implementation Steps of ISM in this Study

Step 1: Identification of Dimensions and Components
The first step involved formulating the research question. This question considered the study population (scientific sources including peer-reviewed articles examining the impact of behavioral biases and personality traits on investor decision-making), research objectives (identifying relevant elements, components, and indicators), methodology (reviewing sources, prioritizing factors, analyzing, and categorizing concepts), and time frame (sources published between 2005 and 2024). The main research question is:

"What are the dimensions and components affecting the decision-making of individual and institutional investors under capital market uncertainty, based on behavioral biases and personality traits?"

Next, a systematic literature review was conducted. This step included systematic searches in reputable national and international databases, scientific journals, and public sources of relevant organizations to identify valid and relevant documents. Key search terms such as "behavioral biases," "personality traits," and "investor behavior" were used individually or in combination. This process ensured the comprehensiveness and validity of sources, focusing on the specified time frame (Sandelowski & Barroso, 2007).

Table 2. Components Affecting Decision-Making of Individual and Institutional Investors under Capital Market Uncertainty Based on Behavioral Biases and Personality Traits

Code	Selected Component	Source	Journal	Reliability coefficient
Mental Accounting	Mental Accounting	Yazdanian & Saeidi (2022)	Scientific-Research Quarterly of Investment Knowledge	05/0
		Chandani, et al. (2020)	Journal of Data and Network Science	2/1
		Narenji Azar (2015)	Investment Knowledge	4/0
Disposition Effect / Reversed Disposition Effect	Disposition Effect	Yazdanian & Saeidi (2022)	Scientific-Research Quarterly of Investment Knowledge	05/0
		Jamshidi, & Ghalibaf Asl (2020)	Financial Research Journal	6/0
		Jamshidi, et al. (2019)	Financial Research Journal	6/0
Conservatism / Prudence	Conservatism	Gakhar, & Pragash (2017)	Journal of Behavioral and Experimental Finance	1
		Yazdanian & Saeidi (2022)	Scientific-Research Quarterly of Investment Knowledge	05/0
Representativeness Heuristic	Representativeness	Yazdanian & Saeidi (2022)	Scientific-Research Quarterly of Investment Knowledge	05/0

Code	Selected Component	Source	Journal	Reliability coefficient
Mental Budgeting Bias	Mental Budgeting Bias	Chandani, et al. (2020)	Journal of Data and Network Science	2/1
One-dimensional Analysis	One-dimensional Analysis	Zeinivand, et al. (2021)	Quarterly Journal of Financial Economics	7/0
Status Quo Bias / Resistance to Change	Status Quo Bias	Aghajani, et al. (2020)	Journal of Modern Psychological Research	3/0
Independent / Individualistic	Independent	Aghajani, et al. (2020)	Journal of Modern Psychological Research	3/0
Confident (or Anxious) / Doubtful / Worry-Prone	Confident (or Anxious)	Kashif Rashid, et al. (2021)	Economics and Business	8/0
Follower / Herd Investor	Follower / Herd Investor	Aghajani, et al. (2020)	Journal of Modern Psychological Research	3/0
Introverted (Extroverted)	Introverted (Extroverted)	Nazari Pour, & Zaki Zadeh (2023)	Financial and Behavioral Research in Accounting	
Overconfidence / Self-deception / Excessive Trust / Overestimation	Overconfidence	Yazdanian & Saeidi (2022)	Financial and Behavioral Research in Accounting	05/0
		Narenji Azar (2015)	Financial and Behavioral Research in Accounting	4/0
		Kashif Rashid, et al. (2021)	Journal of Data and Network Science	8/0
		Jamshidi, & Ghalibaf Asl (2020)	Organizational Culture Management	6/0
		Kashif Rashid, et al. (2021)	Journal of Behavioral and Experimental Finance	8/0
Regret Aversion / Avoidance of Regret / Regret Avoidance	Regret Aversion / Avoidance of Regret	Yazdanian & Saeidi (2022)	Financial and Behavioral Research in Accounting	05/0
		Chandani, et al. (2020)	Financial Research Journal	2/1
		Narenji Azar (2015)	Journal of Accounting and Finance in Emerging Economies	4/0
		Erikat, et al. (2019)	Journal of Accounting and Finance in Emerging Economies	4/0
Herding / Collective Behavior / Imitation / Herd Behavior / Following the Crowd	Herding / Collective Behavior	Narenji Azar (2015)	Journal of Accounting and Finance in Emerging Economies	4/0
		Erikat, et al. (2019)	Journal of Accounting and Finance in Emerging Economies	2/1
		Yazdanian & Saeidi (2022)	Financial and Behavioral Research in Accounting	05/0
		Kimeo (2016)	Journal of Behavioral and Experimental Finance	1
		Abadpour et al. (2017)	Organizational Culture Management	29/0
Endowment Effect	Endowment Effect	Yazdanian & Saeidi (2022)	Journal of Scientific Research in Investment Knowledge	05/0

Code	Selected Component	Source	Journal	Reliability coefficient
		Chandani et al. (2020)	Journal of Data and Network Science	2/1
Loss Aversion / Perceived Loss / Perceived Risk	Loss Aversion	Chandani, et al. (2020)	Journal of Data and Network Science	2/1
		Erikat et al. (2019)	Journal of Data and Network Science	2/1
		Erikat et al. (2019)	Journal of Behavioral and Experimental Finance	1
Myopia / Short-sightedness	Myopia / Short-sightedness	Zeinivand et al. (2021)	Journal of Financial Economics	7/0
High Confidence / Optimism / Over-optimism / Excessive Optimism	Excessive Optimism / Over-optimism	Kashif Rashid, et al. (2021)	Economics and Business	8/0
		Zeinivand, et al. (2021)	Journal of Financial Economics	7/0
Extrapolation Bias / Trend Generalization Bias	Extrapolation Bias / Trend Generalization Bias	Jamshidi, et al. (2019)	Financial Research	6/0
Fear of Loss / Risk Aversion / Financial Resilience	Risk Aversion	Kimeo (2016)	Journal of Behavioral and Experimental Finance	1
Investor Foresight Knowledge	Investor Foresight Knowledge	Fouladi, et al. (2021)	Financial and Behavioral Research in Accounting	23/1
Financial Intelligence / Financial Literacy / Investor Financial Perception /	Financial Intelligence	Fouladi, et al. (2021)	Financial and Behavioral Research in Accounting	23/1
Financial Management Experience / Financial Skills / Financial Literacy / Money and Savings Management	Financial Management Experience	Fouladi, et al. (2021)	Financial and Behavioral Research in Accounting	23/1
Wealth Level / Individual Investor Income	Wealth Level	Fouladi, et al. (2021)	Financial and Behavioral Research in Accounting	23/1
Age	Age	Fouladi, et al. (2021)	Financial and Behavioral Research in Accounting	23/1
		Tekjeh (2016)	Journal of Data and Network Science	2/1
		Abadpour, et al. (2017)	Organizational Culture Management	
		Gakhar, & Pragash (2017)	Journal of Behavioral and Experimental Finance	1
Gender	Gender	Fouladi, et al. (2021)	Financial and Behavioral Research in Accounting	23/1

Code	Selected Component	Source	Journal	Reliability coefficient
		Jamshidi, & Ghalibaf Asl (2018)	Financial Research	6/0
		Abadpour, et al. (2017)	Organizational Culture Management	29/0
		Gakhar, & Pragash (2017)	Journal of Accounting and Finance in Emerging Economies	23/3
		Tekjeh (2016)	Journal of Accounting and Finance in Emerging Economies	23/3
		Khan (2017)	Journal of Accounting and Finance in Emerging Economies	23/3
Education / Financial Expertise / Knowledge and Talent	Education	Tekjeh (2016)	Journal of Accounting and Finance in Emerging Economies	23/3
		Fouladi, et al. (2021)	Financial and Behavioral Research in Accounting	25/1
		Khan (2017)	Journal of Behavioral and Experimental Finance	1
		Abadpour, et al. (2017)	Organizational Culture Management	29/0
		Tekjeh (2016)	Journal of Behavioral and Experimental Finance	1
Geographic Work Location / Workplace / Level of Development of Work and Living Area	Workplace / Work Location	Gakhar, & Pragash (2017)	Journal of Behavioral and Experimental Finance	1
Marital Status	Marital Status	Gakhar, & Pragash (2017)	Journal of Accounting and Finance in Emerging Economies	1
Feminist Orientation	Feminist Orientation	Khan (2017)	Economics and Business	8/0
Uncertainty Avoidance / Ambiguity Aversion	Uncertainty Avoidance / Ambiguity Aversion	Khan (2017)	Economics and Business	8/0
Adventurous Personality / Recklessness / Sensation Seeking	Sensation Seeking	Jamshidi, & Ghalibaf Asl (2018)	Financial Research	6/0
Self-serving / Self-assessment / Self-attribution	Self-assessment	Jamshidi, & Ghalibaf Asl (2018)	Financial Research	6/0

Answer to Research Question 1: What are the components and dimensions influencing the decision-making of individual and institutional investors under conditions of capital market uncertainty, based on behavioral biases and personality traits?

In the present study, the components and dimensions affecting investor decision-making were first identified through a comprehensive review of the theoretical literature and relevant scholarly articles. Subsequently, these identified components and dimensions were

subjected to evaluation and validation by 17 professional and academic experts using the Delphi method. The Delphi technique is a structured approach designed to facilitate a systematic group communication process, enabling a collective body of experts to address complex problems. The primary objective of this method is to achieve a reliable consensus among experts' opinions through iterative rounds of focused questionnaires accompanied by controlled feedback, thereby ensuring rigor and validity in the elicitation of expert judgments.

Table 3.Average Points Factors Effective On Decision_Making Investors.

Row	Component	Average	low Very	Low	Medium	A lot	Too much
1	Change of direction	294 .4	0	1	2	4	10
2	Independent	176 .4	0	1	2	5	9
3	Confident (anxious)	118 .4	0	1	3	4	9
4	Follower	824 .3	0	2	3	5	7
5	Introvert (Extrovert)	824 .3	0	2	3	5	7
6	knowledge and Investors' foresight	412 .4	0	1	1	4	11
7	Financial intelligence	471 .4	0	1	1	3	12
8	Financial management skills	412 .4	0	1	1	4	11
9	Amount of wealth	000.4	0	1	3	5	8
10	Marital status	706 .3	0	2	4	5	6
11	Workplace	706.3	0	2	4	5	6
12	age	824.3	0	2	3	5	7
13	Nationality	706.3	0	2	4	5	6
14	Collections	176 .4	0	1	2	5	9
15	Mental accounting	471 .4	0	1	1	3	12
16	Dispositional effect	294 .4	0	1	2	4	10
17	Conservatism	412 .4	0	1	1	4	11
18	Representative testimony	176 .4	0	1	2	5	9
19	Mental budgeting bias	176 .4	0	1	2	5	9
20	One-dimensional analysis	000.4	0	1	3	5	8
21	Overconfidence	412 .4	0	1	1	4	11
22	Avoiding regret and regret	294 .4	0	1	2	4	10
23	Mass	176 .4	0	1	2	5	9
24	Effect of ownership	176 .4	0	1	2	5	9
25	Loss aversion	471 .4	0	1	1	3	12
26	Shortsightedness	176 .4	0	1	2	5	9
27	Excessive optimism	176 .4	0	1	2	5	9
28	Exhibitionism	000.4	0	1	3	5	8
29	Risk aversion	412 .4	0	1	1	4	11
30	Feminist tendencies	706 .3	0	2	4	5	6
31	Avoiding uncertainty	294 .4	0	1	2	4	10
32	Excitement	824 .3	0	2	3	5	7
33	Self-assessment	176 .4	0	1	2	5	9

At this stage, the mean scores were obtained by dividing the total score (calculated as the product of the number of respondents in Table 1 and the assigned weights—5 for "Very High," 4 for "High," 3 for "Moderate," 2 for "Low," and 1 for "Very Low") by the total number of respondents (17). Factors that achieved a score above the average threshold of 3 were considered, from the perspective of experts and professionals, as influential components in investors' decision-making. Since all items received scores above 3, the validity of the criteria was confirmed. Accordingly, through achieving group consensus among the experts, the dimensions and indicators

affecting investors' decision-making were finalized into seven dimensions, as presented in Table 4.

Table 4. Dimensions and components affecting the decision- making of real investors and Legal in Conditions Uncertainty Market Capital based on behavioral biases and Capital's personality traits Makers

Component	Dimensions	Category
Change of direction	Personality Types (C1)	Personality traits : Real investors and Legal
Independent		
Confident (anxious)		
Follow me		
Introvert (Extrovert)		
Investors' futures knowledge	Individual characteristics of investors (C_2)	
Financial intelligence		
Financial management skills		
Amount of wealth		
Marital status	Demographic characteristics of investors (C_3)	
Workplace		
Age		
Gender		
Education		
Mental accounting	Cognitive biases (C_4)	Behavioral biases: Real investors and Legal
Dispositional effect		
Conservatism		
Representative testimony		
Mental budgeting bias		
One-dimensional analysis		
Overconfidence	Emotional biases (C_5)	
Avoiding regret and regret		
Mass		
Effect of ownership		
Loss aversion	Cultural dimensions of investors (C_6)	
Shortsightedness		
Excessive optimism		
Exhibitionism		
Risk aversion		
Feminist tendencies	Investor Behavioral Components (C_7)	
Avoiding uncertainty		
Thrill-seeking		
Self-assessment		

Answer to Research Question 2

In light of the Interpretive Structural Modeling (ISM) approach, how is the decision-making model of individual and institutional investors under conditions of capital market uncertainty—based on behavioral biases and personality traits—designed?

Step Two: Formation of the Structural Self-Interaction Matrix (SSIM)

After identifying the main components, the next step involves incorporating these components into the structural matrix of interrelationships among the variables. Accordingly, the relationships between dimensions and indicators, based on the evaluations of 17 experts, are presented in Table 5.

Table 5. Matrix Self-InteractiveStructural Dimensions Decision-making Investors True and Legal In Conditions Uncertainty Market Capital On Basis Bias Behavioral and Features Personality Investors

Investor Behavioral Components	Cultural dimensions of investors	Emotional biases	Cognitive biases	Demographic characteristics of investors	Individual characteristics of investors	Personality types	i / j
V	A	V	X	V	X		Personality types
O	O	V	A	V			Individual characteristics of investors
V	V	V	A				Demographic characteristics of investors
V	O	V					Cognitive biases
V	V						Emotional biases
V							Cultural dimensions of investors
							Investor Behavioral Components -

Step Three: Formation of the Initial Reachability Matrix (IRM)

At this stage, the Structural Self-Interaction Matrix (SSIM) is converted into a binary (0–1) matrix. In this matrix, only the numbers 0 and 1 are included. To derive the Initial Reachability Matrix, in each row of the SSIM, the symbols are replaced as follows: the symbols V and X are substituted with the value 1, while the symbols O and A are substituted with the value 0. After converting all rows, the resulting output constitutes the Initial Reachability Matrix.

Accordingly, the transformation rules are as follows:

- If the entry (i, j) is denoted by V, then cell (i, j) takes the value 1 and its reciprocal (j, i) is assigned 0.
- If the entry (i, j) is denoted by A, then cell (i, j) takes the value 0 and its reciprocal (j, i) is assigned 1.
- If the entry (i, j) is denoted by X, then both cell (i, j) and its reciprocal (j, i) are assigned the value 1.
- If the entry (i, j) is denoted by O, then both cell (i, j) and its reciprocal (j, i) are assigned the value 0.

The Structural Self-Interaction Matrix (SSIM) is thereby transformed into a binary (0–1) matrix, resulting in the Initial Reachability Matrix, which is presented in Table 6.

Step Four: Formation of the Final Reachability Matrix

After forming the initial reachability matrix, its internal consistency must be established. For example, if variable (1) leads to variable (2), and variable (2) leads to variable (3), then variable (1) must also lead to variable (3). If such a condition is not satisfied in the reachability matrix, the matrix should be revised and the omitted relationships replaced, which are shown as *1.

Various methods have been proposed to make the matrix consistent. In this research, consistency in the reachability matrix was achieved by applying mathematical rules, in such a way that the reachability matrix is raised to the power of k+1k+1k+1, where k≥1k \geq 1k≥1. The exponentiation of the matrix must, of course, be performed according to Boolean rules. According to this rule: 1=1×11 = 1 \times 11=1×1 and 1=1+11 = 1 + 11=1+1 (Azar et al., 2009).

Therefore, after adjusting the initial reachability matrix, which had been developed based on experts' opinions, the Final Reachability Matrix (FRM) of the dimensions affecting investors' decision-making is presented in Table 7, and the final reachability matrix

of the indicators affecting investors' decision-making is also presented in Table 7.

Table 6. Matrix Availability Primary Dimensions Effectiveon Decision-making Investors True and Legal inConditions Uncertainty Market CapitalonBasis Bias Behavioral and Features Personality Investors

Investor Behavioral Components	Cultural dimensions of investors	Emotional biases	Cognitive biases	Demographic characteristics of investors	Individual characteristics of investors	Personality types	i / j
1	0	1	1	1	1	1	Personality types
0	0	1	0	1	1	1	Individual characteristics of investors
1	1	1	0	1	0	0	Demographic characteristics of investors
1	0	1	1	1	1	1	Cognitive biases
1	1	1	0	0	0	0	Emotional biases
1	1	0	0	0	0	1	Cultural dimensions of investors
1	0	0	0	0	0	0	Investor Behavioral Components

Table 7. :Availability Matrix Final dimensions of decision-makingfor investors

Power of influence	Investor Behavioral Components	Cultural dimensions of investors	Emotional biases	Cognitive biases	Demographic characteristics of investors	Individual characteristics of investors	Personality types	i / j
7	1	*1	1	1	1	1	1	Personality types
6	*1	*1	1	0	1	1	1	Individual characteristics of investors
4	1	1	1	0	1	0	0	Demographic characteristics of investors
7	1	*1	1	1	1	1	1	Cognitive biases
3	1	1	1	0	0	0	0	Emotional biases
3	1	1	0	0	0	0	1	Cultural dimensions of investors
1	1	0	0	0	0	0	0	Investor Behavioral Components
	7	5	5	2	4	3	4	The power of dependency

Step Five: Determining the Relationships and Leveling among Dimensions

To determine the level and priority of variables, the reachability set and the antecedent set for each variable are identified. The reachability set of a variable includes the variables that can be reached through that variable, while the antecedent set includes the variables through which the given variable can be reached. Thus, we have:

- Reachability set (influencing or outputs): Includes the criterion itself and the criteria that are influenced by it.
- Antecedent set (influenced or inputs): Includes the criterion itself and the criteria that influence it.

This process is conducted using the reachability matrix. After determining the reachability and

antecedent sets for each variable, the common elements between the two sets are identified. Based on this, the leveling of variables is carried out, and this continues until the levels of all variables are determined.

In such a way that the factors whose input set and intersection set are aligned, and which have the least driving power (influence), are placed at the highest level of the Interpretive Structural Modeling (ISM) hierarchy. Accordingly, in this study, the levels of dimensions and indicators influencing investors' decision-making were obtained. For the sake of brevity, the final results of these stages are presented in Table 8.

Table 8.Determination Level Dimensions Decision-making model Investors

Level	Collection Common	Input set	Output set	Dimensions
First	7	7 , 6 , 5 , 4 , 3 , 2 , 1	7	Investor Behavioral Components
Second	6, 1	1 , 2 , 3 , 4 , 5 , 6	6, 1	Cultural dimensions of investors
Third	5	1 ,2 ,3 ,4 ,5	5	Emotional biases
Fourth	3	1 ,2 ,3 ,4	3	Demographic characteristics of investors
Fifth	4, 2, 1	6, 4, 2, 1	1 ,2 ,4	Personality types
Fifth	1 ,2	4, 2, 1	1 ,2	Individual characteristics of investors
Sixth	4	4	4	Cognitive biases

Step Six: Drawing the Final Model

After determining the relationships and levels of the variables, they can be illustrated in the form of a model. For this purpose, the variables are first arranged from top to bottom according to their levels. Based on the established hierarchy, a diagram entitled "The Decision-Making Model of Individual and Institutional Investors under Capital Market Uncertainty, Considering Behavioral Biases and Investors' Personality Traits" is drawn.

In this way, the seventh dimension (investors' behavioral components), which has been identified as the first level, is placed at the top level of the diagram, and accordingly, other dimensions are positioned at their respective levels. These diagrams are presented in Figure 1.

Step Seven: Analyzing Driving Power and Dependence (MICMAC Analysis)

Answer to Research Question Three:

- What is the level of influence and dependence of the dimensions affecting the decision-making of individual and institutional investors under capital market uncertainty, based on behavioral biases and investors' personality traits?

Based on the obtained values of driving power and dependence for each dimension, they are categorized into four clusters: autonomous, dependent, linkage, and independent. Accordingly, the driving–dependence matrix for mental accounting is plotted as shown in Figure 2.

According to Figure 2, it can be observed that the first cluster includes criteria with weak driving power and low dependence; these variables are almost disconnected from the system due to their weak links with other components. In the present study, no dimensions were assigned to this first cluster, i.e., the autonomous cluster.

Dependent variables are placed in the second cluster, which have low driving power but high dependence. In this study, the dimensions of emotional biases, cultural dimensions of investors, and behavioral components of investors were categorized as dependent. This indicates that changes in other decision-making indicators of individual and

institutional investors under market uncertainty will lead to changes in these indicators.

The third cluster consists of linkage variables, which have both high driving power and high dependence. These indicators are non-static, as any change in them can have a significant impact on the system. In this study, none of the decision-making indicators of investors fell into this cluster based on the calculated driving power and dependence.

The fourth cluster includes independent variables, characterized by high driving power and low dependence. Cognitive biases, individual characteristics of investors, personality types, and demographic features of investors belong to this cluster, serving as fundamental dimensions with a significant effect on other indicators. Among the seven dimensions determining investor decision-making under market uncertainty, cognitive biases, individual characteristics, personality types, and demographic features were identified as the most influential and, consequently, the most fundamental.

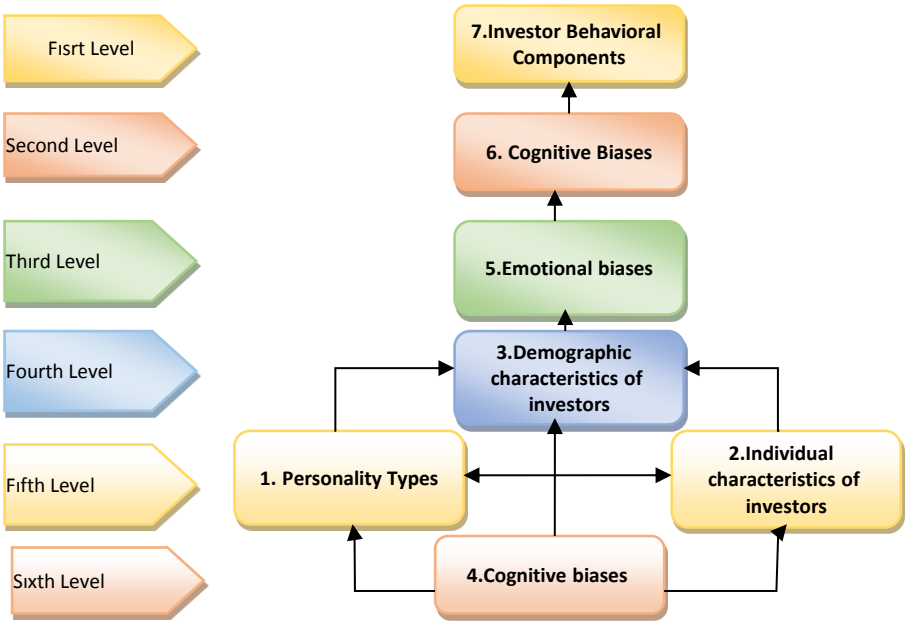

Figure 1. Final Model of Dimensions Affecting Decision-Making of Individual and Institutional Investors under Capital Market Uncertainty Based on Behavioral Biases and Investor Personality Traits

Table 9. Driving Power–Dependence of the Dimensions of Decision-Making for Individual and Institutional Investors

Investor Behavioral Components	Cultural dimensions of investors	Emotional biases	Cognitive biases	Demographic characteristics of investors	Individual characteristics of investors	Personality types	Dimensions
1	3	3	7	4	6	7	Influence
7	5	5	2	4	3	4	Dependency

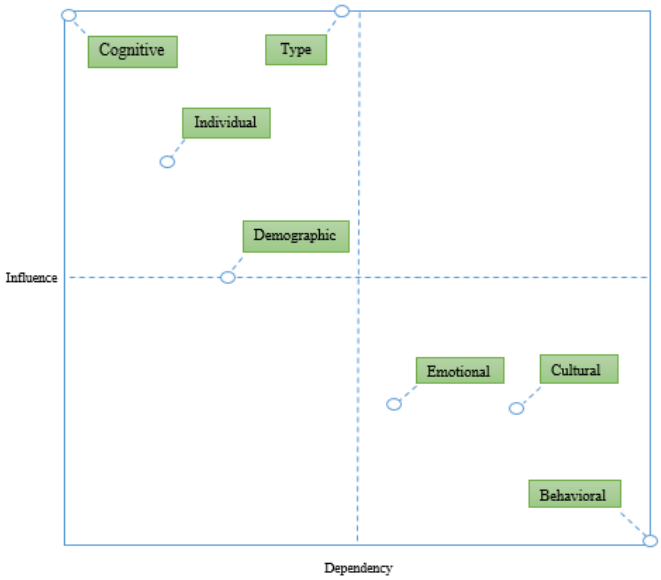

Figure 2. Power and Degree of Influence–Dependence Matrix

Structural Equation Modeling (SEM) Analysis of the Exploratory Research Model

Response to Research Question Four: To what extent is the proposed research model valid from the users' perspective?

In this study, Structural Equation Modeling (SEM) was employed to quantitatively examine the derived model. SEM is a statistical technique that combines methods such as multivariate regression, factor analysis, and path analysis, focusing on latent variables defined by observed indicators. This approach allows for the inference of causal relationships among unobservable variables while accounting for measurement errors and assessing both the correlation and the strength of influence among variables. SEM, also known as latent variable analysis or causal modeling, quantifies the relationships between independent and dependent variables, and unlike regression, which only indicates empirical correlation, SEM explains causal correlations.

Within SEM, variables are evaluated using significance coefficients (t-statistics outside the ±1.96 range) and structural coefficients (reflecting the effect of independent variables on dependent variables), and hypotheses are accepted or rejected based on these coefficients.

Before fitting the structural model, it is necessary to examine whether the 13 observed variables (including questionnaire items) adequately represent the three latent constructs: behavioral biases of individual and institutional investors, personality traits of individual and institutional investors, and decision-making of individual and institutional investors. The overall fit of the measurement model is assessed using Confirmatory Factor Analysis (CFA).

The figure below presents the measurement model for this research, in which both observed and latent variables are labeled according to their respective constructs.

Figure 3. Factor Analysis Model

After running the above model, the software suggested several modifications that improved the model's fit. These recommended adjustments involved freeing the covariances between certain error terms. The measurement model, along with these modifications, is presented in the following diagram.

In the above figure, the numbers displayed on the paths represent standardized coefficients. Standardized coefficients are the model's weights, allowing for comparison across different variables. The following table presents the factor analysis of the items and variables.

Factor loadings are calculated by assessing the correlation of each indicator with its respective construct. Loadings above 0.3 indicate that the factor loading is at an acceptable level and the model is considered valid. Table 10 presents the factor loadings of the model. These results demonstrate the significance of all variables included in the model and confirm the meaningful impact of behavioral biases and personality traits of individual and institutional investors in the exploratory model. At this stage, the structural model of the research is fitted to address the seventh research question, as illustrated in the figure below.

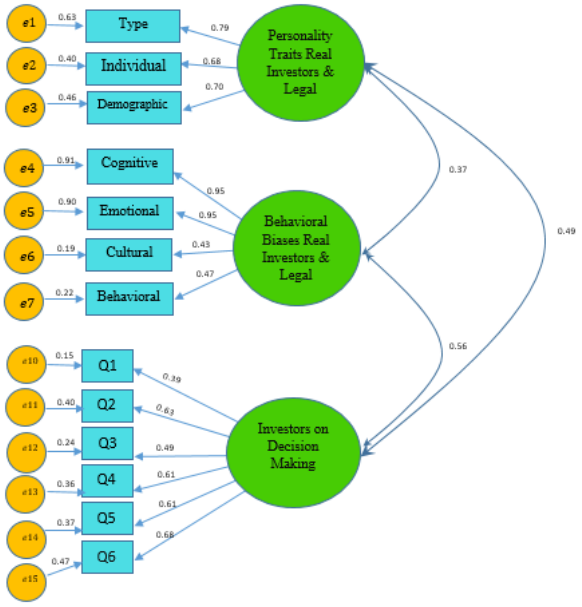

Figure 4. Factor Analysis Model with Standardized Coefficients

Table 10.Results Analysis Factor

Capital Decision Making Makers	Personality traits Capital Makers	Behavioral biases Capital Makers	Component
		0.95	Cognitive biases
		0.95	Emotional biases
		0.43	Cultural dimensions of investors
		0.47	Investor Behavioral Components
	0.79		Personality types
	0.68		Individual characteristics of investors
	0.70		Demographic characteristics of investors
0.39			(Q1) Decision to buy in conditions of uncertainty caused by an uptrend with no resistance ahead
0.63			(Q2)Deciding to sell in the face of uncertainty caused by an .uptrend with no resistance ahead
0.49			(Q3)Holding the share and waiting for a new signal in conditions .of uncertainty caused by an uptrend with no resistance ahead
0.61			(Q4)Deciding to buy in conditions of uncertainty caused by a .downtrend with no resistance ahead
0.61			(Q5)Deciding to sell in the face of uncertainty caused by a .downtrend with no resistance ahead
0.68			Q6) (Holding the share and waiting for a new signal in conditions (of uncertainty caused by a downtrend with no resistance ahead

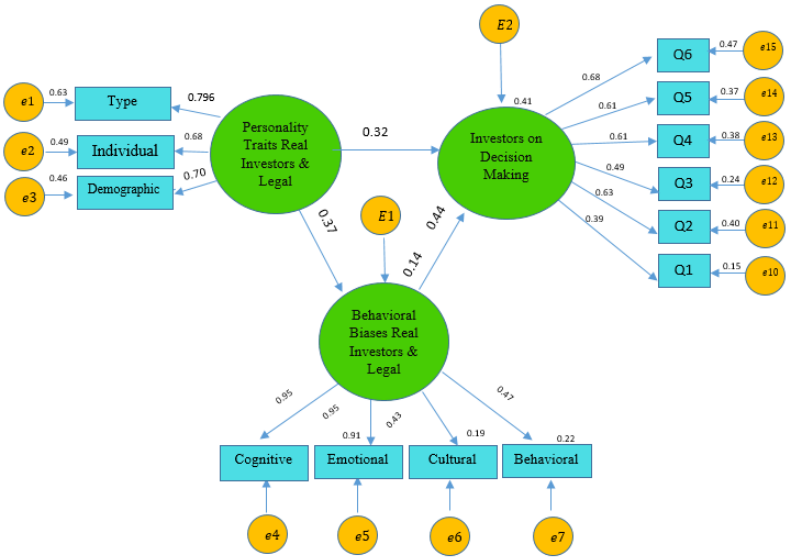

Figure 5. Structural Model of the Study

Table 11 presents the fit indices of the above model. If the values of the fit indices fall within the acceptable range, it indicates that the model is suitable for the collected data.

As observed from the above table, all indices fall within the acceptable range. Therefore, the suitability of the structural analysis model for the collected data is confirmed. Based on the results of the research's structural model, the findings of the path analysis for the research questions are presented.

To examine the ninth research question, the significance of the simultaneous relationships between variables must be assessed. For a mediating role of a variable in the relationship between two other variables to be significant, the relationships among the variables must be simultaneously significant. In other words, if the mediating role of variable YYY in the relationship between ZZZ and XXX is considered, the simultaneous significance of the relationship between YYY and XXX as well as between ZZZ and YYY must be confirmed.

Table 11.Model fit indices

RMSEA	NFI	CFI	TLI	IFI	GFI	CMIN /df	Indicators Fitness Pattern
0.044	964.0	979.0	975.0	979.0	933.0	401.2	Pattern Original
Smaller From 0. 05	More From 0/9	More From 0/9	More From 0/9	More From 0/9	More From 9/0	1 to 5	Acceptable level

Table 11 presents the path coefficients among the research variables. The analysis indicates a significant relationship between investors' personality traits and their behavioral biases under conditions of market uncertainty.

There is a significant relationship between investors' personality traits and their behavioral biases under conditions of market uncertainty.

There is a significant relationship between investors' personality traits and their decision-making under conditions of market uncertainty.

There is a significant relationship between investors' behavioral biases and their decision-making under conditions of market uncertainty.

Based on the results of Table 12, it can be stated that the effect of investors' personality traits on their behavioral biases is 0.371 (positive), with a significance level of 0.000, which is less than 0.05. Therefore, at a 95% confidence level, investors' personality traits have a significant positive impact on their behavioral biases. This implies that as investors' personality traits increase, their behavioral biases also increase.

Furthermore, the effect of investors' personality traits on their decision-making is 0.323 (positive) with a significance of 0.000, which is less than 0.05. Thus, at a 95% confidence level, investors' personality traits have a significant positive effect on their decision-making, meaning that as investors' personality traits increase, their decision-making also improves.

Additionally, the effect of investors' behavioral biases on their decision-making is 0.443 (positive) with a significance of 0.000, which is less than 0.05. Hence, at a 95% confidence level, investors' behavioral biases have a significant positive effect on decision-making, indicating that as behavioral biases increase, investors' decision-making also increases.

Table 12.Analysis Route Between Variables Model

p-value	Statisticst	Deviation Criteria	Coefficient Standard Done	Route
0.000	5.23	0.056	371.0	Behavioral biases , Capital Makers ⟵ ,Personality traits , Investors
0.000	701.4	0.064	323.0	Capital Decision Makers ⟵ ,Personality traits , Investors
0.000	685.5	0.091	443.0	Behavioral**Biases**Capital Decision Making Makers ⟵ Investors

6. Conclusion

This study aimed to identify and analyze the factors influencing the decision-making of individual and institutional investors under capital market uncertainty, based on behavioral biases and personality traits. The findings reveal a complex, multidimensional set of psychological, cognitive, emotional, demographic, cultural, and behavioral factors that hierarchically influence investor behavior. Theoretically, by employing Delphi techniques, Interpretive Structural Modeling (ISM), and Structural Equation Modeling (SEM), this research provides a comprehensive framework to understand the dynamics of decision-making in volatile markets.

The results confirmed that cognitive biases, such as mental accounting and the disposition effect, play a fundamental role in shaping investment decisions due to their profound impact on judgment and risk assessment processes. This aligns with previous studies in behavioral finance emphasizing the significance of cognitive biases in deviations from rational decision-making. Similarly, personality traits, including resistance to change and independence, were identified as key factors that can influence investors' tendencies to maintain the status quo or take on new risks. These findings underscore the pivotal role of

individual psychology in financial behavior, indicating that personality traits influence decision-making not only directly but also indirectly by amplifying behavioral biases.

The fuzzy analysis of dimensions indicated that cognitive biases and personality traits, as fundamental factors, exert their influence through intermediary dimensions such as emotional biases and cultural factors, ultimately affecting final investment behaviors. This hierarchical structure illustrates that decision-making under uncertainty results from dynamic interactions between internal factors (e.g., mental biases and psychological traits) and external factors (e.g., culture and demographic characteristics). Notably, emotional biases, such as loss aversion and overconfidence, were identified as dependent factors, influenced by fundamental dimensions and playing a crucial role in amplifying or moderating investment behaviors. These findings highlight the importance of integrating behavioral finance and psychology in analyzing investor behavior, showing that purely economic approaches are insufficient for understanding decision-making in financial markets.

Practically, the results have important implications for policymakers, capital market managers, and financial advisors. Considering the prominent roles of education and age in ranking influential factors, targeted training programs to increase investor awareness of behavioral biases and enhance financial management skills can improve rational decision-making. Additionally, designing advisory strategies that account for investors' personality traits and demographics can enhance the effectiveness of interventions. For instance, investors resistant to change may require more guidance to overcome reluctance toward new decisions, while highly educated individuals may benefit from more advanced analyses. Attention to cultural factors, such as uncertainty avoidance, in culturally diverse markets can also lead to the development of more inclusive financial policies.

The validity of the proposed model, confirmed through SEM analysis, demonstrates the methodological robustness of this study. Good model fit and significant relationships among personality traits, behavioral biases, and investor decision-making enhance the generalizability of the findings. However, limitations, such as focusing on a specific sample of experts and investors, may challenge the applicability of results to other markets. Future research is recommended to employ broader sampling and consider environmental variables, such as economic policies and technological developments. Exploring the effects of behavioral interventions, such as bias-reduction training programs, could also provide practical solutions for improving investor decision-making.

In summary, this study contributes to the literature on behavioral finance by providing a comprehensive, hierarchical framework of factors affecting investor decision-making, offering practical guidance for enhancing investment behavior under uncertainty. The emphasis on the central role of cognitive biases and personality traits, alongside cultural and emotional factors, indicates the need for a multidisciplinary approach to analyzing and managing financial behaviors. These findings can serve as a basis for financial policymaking and the design of educational interventions to promote more sustainable and rational decision-making in capital markets.

The results align with previous studies by Salehi (2024), Zeinivand et al. (2023), Yazdaniyan & Saeedi (2022), Shonmugasundaram et al. (2024), Dingra et al. (2024), and Samal & Mahapatra (2022) regarding the first research question, confirming behavioral biases (e.g., herding, overconfidence, regret aversion) and personality traits as key determinants of investment decisions. However, Salehi (2024) focused only on four biases, which may limit comprehensiveness. Khatabi & Gharghi (2024) emphasized economic indicators, financial literacy, and regulatory risk, giving less attention to behavioral biases, thus partially aligning with the research questions. Darabi & Zahrabi (2024) introduced risk management as an indirect factor influencing investment decisions, complementary but distinct from the focus on

behavioral biases. Regarding the second research question (ISM modeling), Zeinivand et al. (2023) presented predictive models for decision-making, directly aligning with this question, whereas other studies did not employ ISM, highlighting a gap. For the third question (influence and dependency of dimensions), Khatabi & Gharghi (2024) ranked factors using DEMATEL, directly aligned with this study, while others investigated influences sporadically without analyzing interrelationships. For the fourth question (model validity), none of the prior studies explicitly evaluated the model from the users' perspective, revealing a gap or inconsistency. Overall, prior studies align with this research in identifying components and effects but provide limited coverage in ISM modeling and model validation.

Based on these results, it is recommended that capital market researchers examine the effects of each identified component individually using rigorous methods, confirming their validity for policymakers. This can help design policies to reduce the impact of behavioral biases and strengthen rational decision-making, ultimately contributing to market stability and reduced volatility.

For investors, it is advised to focus on current market conditions and stock prices rather than predictions based on unreliable information. Even with access to valid data, investors should consider their psychological state, risk tolerance, and avoid overly risky positions. Adhering to capital management principles, setting stop-loss and take-profit levels, and following trading systems, even after consecutive successes, is crucial to prevent overconfidence, cultural bias, or undue pride. Investors should also rely on historical stock trends, accurate benchmarking, and expert opinions when making buy and sell decisions.

To enhance investor knowledge and awareness, regulatory authorities are encouraged to set entry requirements, such as short, practical training courses covering both fundamental and technical analysis, as well as behavioral finance topics, enabling investors to recognize and manage their biases. Investment advisory firms can provide targeted services by assessing clients' behavioral biases and risk tolerance, improving capital allocation efficiency, and investment performance.

Finally, given the impact of irrational factors such as value systems, beliefs, and cultural assumptions on decision-making, market participants should periodically review their decisions, analyze historical transaction data, and identify cognitive and emotional errors to improve decision quality. This self-assessment, combined with updated information and supplementary research, can reduce behavioral biases and promote more rational decision-making. Implementing these recommendations requires collaboration among researchers, policymakers, and market participants to integrate behavioral finance knowledge with educational tools, creating a more stable investment environment.

For future research, it is suggested to:

- Develop a framework for factors affecting individual and institutional investor decision-making using meta-analysis.
- Rank the factors influencing investor decision-making using the Analytic Hierarchy Process (AHP) and Grey System Theory.
- Investigate additional financial and non-financial drivers affecting investor decision-making.
- Examine the level of interaction among components to assess their influence and dependency using DEMATEL.
- Predict investor decision-making using other data mining algorithms, such as Genetic Algorithm, K-Means Clustering, Bagging, AdaBoost, and Naive Bayes.
- Explore the causes of each behavioral bias and factors that mitigate their impact on investor decision-making.

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Financial Reporting to Global Sustainability: The Path to Integration into Social and Environmental Accounting

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Abstract

Objectives: Sustainability accounting involves evaluating, measuring, and reporting the environmental, social, and economic impacts of organizational activities. In this context, the present study aims to investigate the integration of sustainability principles within the accounting methods of small and medium-sized enterprises (SMEs), with particular attention to the challenges faced in emerging markets and the requirements of multinational companies.

Methodology/Design/Approach: This study adopts a review-based research design and presents its analysis through a systematic examination of theoretical foundations and prior empirical studies related to sustainability accounting and reporting practices.

Findings: The study indicates that small firms in emerging markets encounter substantial challenges in implementing sustainability performance practices due to economic instability, limited resources, and insufficient legal protection. Additionally, multinational companies face difficulties arising from the lack of harmonized global sustainability reporting standards, which undermines the consistency and comparability of sustainability disclosures across borders. The findings underscore the necessity of tailored support mechanisms for SMEs and highlight the importance of advancing global standardization in sustainability reporting.

Innovation: This study contributes to the literature by addressing relatively underexplored areas of sustainability performance research, particularly in the context of SMEs and emerging economies. Moreover, it offers practical insights for policymakers and business leaders aimed at enhancing the adoption of sustainability accounting practices and emphasizes the need for coherent sustainability reporting frameworks to strengthen transparency and accountability in global business activities.

Keywords: Sustainability Performance, Social Accounting, Environmental Accounting.

1. Introduction

The introduction of the concept of sustainability in the last century as one of the most important and interesting discussions about the activities of companies, includes the commitments of the business unit to carry out fundamental reforms to build a just world, with prosperity and comfort for all, in which the surrounding environment as well as the main culture of the people are preserved and the share of these resources remains for generations to come. Bozorgar and Ghaffari (2008) believe that the issue of sustainability is an issue that society is still struggling with in its full conceptual definition. However, due to the diversity and breadth of companies' activities, attention to sustainability reporting has also increased. Although there is not yet a reporting model with reliable measurement and measurement criteria for sustainability, accountants are expected to provide more information than ever before for management reports. The accounting literature for sustainability is not yet complete, and there are different and diverse reporting methods and indicators for sustainability. Also, it is necessary to effectively integrate these indicators into the conclusion process; therefore, the role of accountants in this process increases for the transparency of business activities, especially in the field of social and environmental impacts. Of course, it is possible that despite the reporting requirements, more participation will be created by organizations for this issue (Samiei & Jamei, 2018).

The integration of sustainability into business practices has become one of the central issues in the contemporary corporate landscape. As companies strive to strike a balance between economic growth, environmental protection, and social responsibility, traditional accounting methods that focus primarily on financial results need to be revised. These traditional methods often do not pay sufficient attention to the broader social and environmental impacts of the company's activities. This has led to a growing gap between financial performance and sustainability goals (Ashrafi et al., 2019). This gap has led to the development of a concept called social and environmental accounting, which aims to provide a more comprehensive view of the overall impact of the company. However, the transition to this developed accounting framework comes with great challenges, especially in accurately measuring and reporting non-financial indicators (Epstein, 2018). Companies face significant barriers, including the need for standardized guidelines and the complexity of integrating these indicators into existing accounting systems (Crist & Burritt, 2015). Global inconsistency in sustainability reporting standards. This exacerbates the challenges and makes a difference in how companies report and manage their sustainability efforts. Despite these obstacles, the demand for more comprehensive sustainability reporting is increasing, driven by increasing pressures from stakeholders who expect companies to be accountable not only financially, but also in their social and environmental impacts (Goodington & Enerman, 2020). Addressing these challenges is of paramount importance for the future of sustainability in accounting.

Studies have shown that firms that have adopted comprehensive sustainability reporting frameworks, such as those developed by the Global Reporting Initiative (GRI) and the Sustainability Accounting Standards Board (SASB), perform better in terms of reputation, operational efficiency, and stakeholder engagement (Hermans et al., 2016). In addition, environmental accounting has become a major component of financial reporting, with a dramatic shift from a marginal practice to a major component of financial reporting, reflecting its growing position in corporate governance (Ainella et al., 2024). This transformation reflects an increasing awareness among investors, consumers, and regulatory bodies of the need for more accurate and detailed reporting on non-financial indicators, which are essential for assessing the long-term sustainability and overall impact of the company (Gil-Marin et al., 2022). Many studies have focused mainly on the theoretical aspects of social and environmental accounting (SEA), but have not yet fully explored the practical challenges that firms face in implementing these practices. One of the key

challenges is the complexity of integrating environmental costs into accounting systems and the ongoing need for standardized reporting frameworks that can be applied globally (Ainla et al., 2024). Moreover, although extensive research has been conducted in the field of social accounting in developing countries, environmental issues have not been addressed as intensely, despite the fact that these regions are particularly vulnerable to the impacts of climate change (Kian et al., 2020). Another significant limitation is the lack of uniform terminology in sustainability accounting, which makes it difficult to disclose companies' activities in achieving the SDGs (Gil-Marin et al., 2022). Additionally, empirical data on the long-term impact of sustainability accounting on corporate performance are very limited, especially in emerging markets and industries that have traditionally been less involved in sustainability-related efforts. Filling these gaps in the scientific literature is essential to advancing this field and ensuring that sustainability accounting practices are practical and widely accepted in various fields.

While recent studies have made significant advances in the development of social and environmental accounting, there are still gaps between the proposed theoretical frameworks and their practical application in various fields. One important gap lies in the difference between the emphasis on sustainability reporting in developed and developing countries. Research has focused mainly on large multinational corporations in developed economies. They often have more resources and stronger legal protections to implement comprehensive sustainability accounting practices (Kian et al., 2020). This leaves a significant gap in understanding how sustainability can be integrated into the accounting practices of smaller firms, especially in emerging markets. These firms often face unique challenges, such as limited access to capital and weaker legal environments that can hinder the adoption of practices. While theoretical models of social and environmental accounting emphasize the importance of transparency and accountability, there is a need for more empirical evidence that demonstrates the long-term impact of these practices on firms' performance, especially in sectors that have traditionally been less involved in sustainability-related efforts (Ainella et al., 2024). Inconsistencies in reporting standards in different jurisdictions also complicate the ability to compare and analyze the effectiveness of social and environmental accounting practices globally. This gap highlights the need for further research to address these empirical challenges and improve theoretical frameworks so that they can better account for the diversity of the fields in which firms operate. Addressing these gaps is essential to ensure the effective implementation of social and environmental accounting across various industries and regions.

Despite advances in social and environmental accounting, there are still significant research gaps. One of these important gaps is the lack of empirical research on the implementation of social and environmental accounting in different sectors and regions, as most studies focus on large firms in developed countries. This situation has led to the practice of social and environmental accounting in developing countries and among small and medium-sized enterprises (SMEs) being less studied. (Kian et al., 2020). Small and medium-sized enterprises in these regions face specific challenges such as limited resources and inadequate regulatory support, which make it difficult for them to adopt sustainability (Epstein, 2018). High implementation costs and resistance to change also hinder the integration of sustainability into business practices (Crist & Burritt, 2015). Social and environmental accounting has a positive impact on corporate performance, including increasing credibility, strengthening stakeholder relationships, and increasing operational efficiency (Epstein, 2018). However, more research is needed to understand these effects across sectors, especially in industries that are less active in sustainability. Such studies are needed to provide strong empirical evidence of the effectiveness of social and environmental accounting in diversified business platforms, which are essential and ultimately

demonstrate that social and environmental accounting not only responds to legal and ethical obligations, but also creates strategic value for companies.

2. Theoretical Foundations and Research Background

Accounting has traditionally emphasized financial reporting and a focus on monetary transactions. However, increasing global awareness of the negative social and environmental consequences of business activities has revealed the need for a broader approach. Social and environmental accounting has been developed to meet this demand and provides more comprehensive information on the overall impact of firms beyond financial performance (Fatemavati, 2017). Initially, social and environmental accounting was a specialized concept that was adopted by only a small number of socially responsible companies and aimed at increasing credibility and meeting stakeholder expectations through a combination of social and environmental elements. It was in the reports. The evolution of social and environmental accounting is based on critical theories, such as stakeholder theory, which argues that firms are responsible not only to shareholders, but also to a wider range of stakeholders, including employees, consumers, and the environment (Freeman et al., 2018). Social and environmental accounting has undergone a dramatic transformation since its inception, moving from a narrow focus on financial reporting to a broader approach that also encompasses social and environmental dimensions (Sumarto et al., 2024). Initially, traditional accounting mainly focused on recording and reporting monetary transactions, providing a financial picture for stakeholders (Tandino et al., 2023). However, as awareness of the social and environmental impacts of business activities increased, the demand for accounting practices that reflected these broader concerns increased. The emergence of social and environmental accounting dates back to the social and environmental movements of the 1970s and 1980s. Understood the importance of reporting non-financial effects. This change led to the beginning of the inclusion of social and environmental issues in accounting procedures, and early sustainability and corporate social responsibility reports were formed in the form of voluntary disclosures. These companies found that in addition to financial reporting, they also had a responsibility to inform the social and environmental impacts of their activities to a wider audience (Epstein, 2018;

Social and environmental accounting is based on several foundational theories that provide a conceptual framework for its implementation. Stakeholder theory, proposed byFriedman, extends the traditional perspective of corporate responsibilities beyond shareholders to include a broader group of stakeholders such as employees, customers, suppliers, local communities, and the environment. This theory states that companies should consider the interests and impacts of their activities on these groups in their decision-making process. By doing so, in addition to focusing on maximizing profits, companies also consider the needs and concerns of the groups affected by their activities. For this reason, social and environmental reporting becomes a key tool for demonstrating the company's commitment to stakeholders. This type of reporting enables companies to transparently articulate their approach to managing social and environmental impacts, build trust, and establish stronger relationships with their stakeholders (Freeman et al., 2018). Karimi et al. (2023) acknowledged that the changes and development created in accounting represent two independent intellectual attitudes. In the first approach, it proposes a philosophical attitude about the process and role of accountability of organizations and how they relate to sustainable development, and it is stated that these factors are among the factors that are effective in the movement of organizations towards sustainability. The second approach is to pay attention to the management perspective in relation to various and effective conditions and tools for the sustainability of the organization. At present, the causal, intervening, and contextual conditions, strategies, and consequences of sustainability accounting have not been investigated.

The results of the research showed that the most important causal conditions that strengthen sustainability accounting are, respectively, environmental factors and requirements, accounting ethics, compliance with policies, methods, and laws, transparency of accounting activities, disclosure of organizational information, disclosure of social responsibility, environmental incentives, environmental pressures, and political characteristics. Also, according to the experts' opinion, the characteristics of corporate governance, Firm structural characteristics, managers' behavioral characteristics, and motivational commitments are also considered as intervening factors for the sustainability accounting model.

Among them, stakeholder theory and legitimacy theory are among the most influential theories. Legitimacy theory states that companies must maintain their social legitimacy by aligning their operations with the values and expectations of society. Therefore, social and environmental reporting serves as a tool for companies to demonstrate their compliance with social norms and ethical standards, and to strengthen their commitment to broader responsibilities beyond mere financial results (Vahyuni et al., 2024).

Complementing this view, the theory of legitimacy argues that for a company to survive and succeed, the company's operations must be aligned with the norms, values, and expectations of the society in which it operates. This theory proposes that firms gain and maintain social legitimacy by ensuring that their activities are publicly considered valid. This social legitimacy is an essential part of their "license to operate" in society. In this context, social and environmental reporting serves as a tool through which companies can demonstrate that they are acting in accordance with societal expectations, thereby increasing their legitimacy and ensuring their continued activity (Sachman, 1995). Together, these two theories highlight the importance of transparency and accountability in modern corporate governance and show that social and environmental accounting has become an integral part of companies' strategic approach to sustainability.

Signaling theory is very important for understanding social and environmental accounting, especially in terms of how companies use social and environmental reporting to signal their commitment to social responsibility to the market and stakeholders. This theory states that companies can use these reports to demonstrate their commitment to sustainability and thus influence the perspective of the theory of accountability, which emphasizes the responsibility of companies to disclose and report their social and environmental impacts to stakeholders. This theory highlights the importance of transparency and accountability in social and environmental accounting procedures. Companies should provide honest and accurate information about the impacts of their operations on society and the environment. Participation in procedures, Transparent and responsible social and environmental accounting allows companies to demonstrate their commitment to sustainability and take steps toward positive progress in society (Epstein, 2018).

The high costs associated with implementing ESG practices pose a significant barrier, especially for small and medium-sized enterprises. The costs associated with developing proper reporting systems, training employees, and using the necessary technologies are often seen as an additional burden that not all companies are able to afford. These costs can be very high for small and medium-sized companies, which typically operate with limited resources, and can cause them to implement social and environmental accounting practices. They should reject it or reject it completely. Despite the long-term importance of social and environmental accounting, this reluctance to invest in this area reflects the financial challenges that many companies face in pursuing sustainability initiatives. Internal resistance to change within organizations is also another obstacle to the adoption of social and environmental accounting. This resistance can manifest at different levels, from senior management to operational staff. Lack of understanding of the

benefits of social and environmental accounting, fear of disrupting established procedures, and conflicts of interest between different parts of the organization can all lead to strong resistance to the implementation of social and environmental accounting (Cohen & Hahn, 2018). In some cases, senior management may view social and environmental accounting as an additional burden that does not directly generate financial benefits. Meanwhile, operational departments may perceive additional reporting requirements as unnecessarily complicating their work. Overcoming this resistance requires educating all levels of the organization about the importance of social and environmental accounting and its role in the long-term success of the company (Vahyuni et al., 2024). Najm al-Din et al. (2022) stated in a study that an important part of the development of accounting knowledge, beyond financial functions, today is focused on sustainability, which, under the existence of human resource functions, can provide the ground for increasing information transparency for stakeholders. Therefore, the purpose of this study is to evaluate the effectiveness of sustainability accounting based on green human resource functions. The results of the research showed, Firstly, the most important parameter of the research themes (functions of green human resource management) is the green professional identity, which has the highest rate of importance compared to other research themes according to the fuzzy weights obtained, and secondly, disclosure of human capital based on the index value equal to 0.051 is the most important criterion of sustainability accounting under the themes of green human resource functions, especially the theme of green professional identity. The results of the present study show that disclosure of human capital information as an important dimension of sustainability accounting derived from green professional identity is an important component in the company's potential future decision-making and is in the interest of companies that seek to satisfy all investors seeking information to increase the market value.

In many developing countries, laws often need to be revised or harmonized, making it difficult for SMEs to align with higher standards, such as those adopted by large firms in developed economies. This legal gap presents SMEs with challenges in adapting to social and environmental accounting practices. They are usually seen as an additional burden, rather than an integral part of business operations (Crist & Barrett, 2015). In addition, limited access to financial and technical resources exacerbates these challenges, forcing companies to choose between prioritizing sustainability and ensuring the short-term survival of their business. This dilemma often leads to a lower priority for social and environmental accounting, making it difficult for companies to fully adopt these practices. Economic challenges also differentiate the experiences of SMEs in developing countries from those of large firms in developed countries. SMEs often operate in unstable economic environments that make them more vulnerable to market fluctuations and unpredictable government policies (Bingington & Unnerman, 2020). As a result, many of these firms prefer not to invest in social and environmental accounting because they see these practices as having limited short-term financial benefits. This reluctance is in sharp contrast to large corporations in developed countries, which typically have the financial capacity and legal protections necessary to integrate social and environmental accounting into their business strategies (Epstein, 2018). Javadipour (2018) stated that companies in the societies where they operate should be accountable for the activities and actions they take and have external effects due to the use of scarce resources. One of the issues raised in the field of corporate social responsibility is accountability towards the social environment around the company and the protection of the environment. Using the analysis of the topics of the articles published in the field of social and environmental accounting, we concluded that the topics that are most focused on are in the field of topics such as creating a new image of social and environmental accounting, By providing useful insights for the use of opposing approaches, it is

to conceal and present arguments that reflect different perspectives. In this research, it is emphasized that researchers in their research in the field of social accounting need fundamental and fundamental studies in their work. Another important issue is the interactive role of researchers in this field with each other (both in terms of how the research is conducted and where it is published). To challenge the existing practice, it has also been discussed to expand transparency and create a balance in education.

The results highlight significant differences in social and environmental reporting practices across different industrial sectors. Sectors that have traditionally been less engaged in sustainability efforts, such as heavy industry and extractive industries, tend to have lower acceptance rates of social and environmental reporting than consumption-oriented sectors such as services and retail. Several factors influence the adoption of social and environmental reporting in these sectors, including stakeholder pressure, legal requirements, and the company's internal awareness of the importance of sustainability. In sectors that are less involved in sustainability, there is often a perception that such efforts are only important for industries that are more visible to consumers or industries that are directly related to environmental issues. For this reason, companies operating in these sectors may only be motivated to embrace social and environmental accounting when they are under significant external pressures. However, despite these challenges, research shows that implementing social and environmental accounting can have a positive impact on the long-term performance of companies. Companies that actively report their social and environmental performance typically enjoy better credibility among stakeholders and build stronger relationships with investors, consumers, and local communities. Greater transparency through social and environmental accounting also leads to increased operational efficiency, as companies become more aware of the impacts of their activities and work to reduce inefficiencies and wastes (Ashrafi et al., 2019). Even in sectors where sustainability has traditionally not been a priority, the adoption of social and environmental accounting can lead to significant behavioral changes and ultimately increase the company's competitiveness over time (Bingington & Unnerman, 2020). Pourmojtaba et al. (2015) stated in a study entitled "Environmental Accounting and the Challenges Facing It in Iran" as follows: The purpose of this article is to investigate the historical trend and causes of the emergence of environmental accounting to identify the strategies facing business owners and the public to achieve the concept of sustainable development. The objectives, advantages, and applications of environmental accounting explain the necessity of conducting the present study, especially in Iran. Conclusion: The results of the research indicate that paying attention to the philosophy of tax exemptions and the steps of implementing environmental accounting can lead any organization to advance the goals of sustainable development. Also, the study of the results of the application of tax exemptions and the steps of implementing environmental accounting shows that companies can have a longer lifespan by using environmental accounting from an economic, social, and environmental point of view, and take a positive step to protect the environment and the health of the community.

The global implementation of social and environmental reporting continues to face significant challenges, mainly due to the lack of uniform standards in sustainability reporting in different countries. This lack of coordination creates significant problems for multinational corporations that must adapt their reporting to the diverse requirements of each local jurisdiction in which they operate (Chryst & Burritt, 2015). The lack of standardized guidelines not only complicates the reporting process but also undermines the ability of stakeholders to compare and evaluate the social and environmental performance of companies on a global scale. This fragmentation in reporting standards can lead to a lack of transparency, making it difficult for investors, regulators, and the

general public to hold companies accountable for their environmental and social impacts It's more difficult. These inequalities can create competitive advantages for companies that commit to stricter sustainability practices, and even lead to negative perceptions in markets with lower reporting standards. Research emphasizes the urgent need to harmonize global reporting standards to address these challenges. Developing and adopting integrated sustainability reporting frameworks can improve the comparability, reliability, and effectiveness of social and environmental practices (Ashrafi et al., 2019). This harmonization is critical to promoting transparency and accountability, allowing companies around the world to contribute more effectively to global sustainability goals. In the case of SMEs, these best practices can be seen in companies that have successfully overcome these challenges and integrated sustainability into their accounting practices. Case studies of successful SMEs show that effective implementationof social and environmental reporting is often Dependent on strong leadership, a commitment to education and development, and collaboration with external organizations that can provide technical and financial support, SMEs that have successfully adopted social and environmental reporting are often innovative in reducing implementation costs, such as the use of digital technologies and efficient data management systems. Through these approaches, SMEs can overcome existing barriers and succeed in social and environmental reporting, while strengthening their position in an increasingly transparent and accountable market. Ultimately, despite the numerous challenges and limitations of social and environmental reporting implementation practices, its adoption remains essential to support the long-term sustainability of the business. By understanding and resolving these barriers, companies of all sizes and sectors can use social and environmental reporting implementation practices as a strategic tool to improve performance, strengthen stakeholder relationships, and build a reputation as socially and environmentally responsible businesses (Vahyuni et al., 2024).

Comparative Table: Literature, Theories, and Challenges of Sustainability Accounting

Comparison Axis	Small and Medium Enterprises (SMEs) in Emerging Markets	Multinational Corporations (MNCs)	Existing Literature and Theories
The main focus of the research	Investigating the Challenges of Integrating Sustainability Principles Due to Resource Constraints.	The need for uniformized global standards for reporting across geographic boundaries.	Transition from traditional (financial) accounting to social and environmental accounting (SEA).
Main challenges	1. Economic instability and risk aversion. 2. Limited financial and technical resources. 3. Inadequate legal protection and legal gap. 4. Internal resistance to change.	1. Lack of harmonized global standards (lack of integration). 2. The complexity of adapting to diverse local requirements in different countries. 3. Difficulty in comparability of reports.	1. High Cost of Implementation. 2. The complexity of measuring non-financial indicators. 3. Lack of sufficient empirical literature in less active industries.
Fundamental Theories	Legitimacy Theory: The need to maintain social legitimacy despite its limitations. Stakeholder Theory: Responding to a wide range of stakeholders with limited resources.	Theory of Legitimacy: Aligning operations with global and local norms. Signaling Theory: The use of reporting to demonstrate a commitment to sustainability in the global market.	Stakeholder Theory: Extending Responsibility Beyond Shareholders. Accountability Theory: Emphasis on transparency and accurate disclosure of social and environmental impacts.
Practical and managerial implications	The need for tailored support mechanisms (such as financial or educational incentives) to overcome cost barriers and resistance.	Support and develop integrated global reporting frameworks (such as GRI and SASB) to increase transparency.	The necessity of training accountants to integrate non-financial indicators in decision-making and reporting processes.

Comparison Axis	Small and Medium Enterprises (SMEs) in Emerging Markets	Multinational Corporations (MNCs)	Existing Literature and Theories
Situation in previous literature	Less studied; previous research has focused more on large firms in developed countries.	have been considered, but face the challenge of not harmonizing standards at the global level.	The theoretical literature is rich, but there is a gap in practical aspects, especially in the field of implementation in various industries and developing countries.
Innovation of the present research	Focusing on the role of "economic instability" as a key deterrent that was less emphasized in previous research.	Emphasizing the need for greater coordination of standards to solve the problem of the comparability of the reports of these companies.	Bridging the gap between theoretical frameworks and practical realities in emerging markets and traditional industries.

2. Conclusion

The present study examines the challenges and opportunities associated with the implementation of social and environmental accounting in small and medium-sized enterprises. Research shows that economic instability, resource constraints, and legal gaps significantly impede the adoption of social and environmental accounting practices. At the same time, multinational corporations need to manage the diverse local needs that arise from the lack of harmonized standards. It is global, they should try. These findings highlight the complexity of integrating sustainability into accounting practices across different economic contexts. This research has significant practical and managerial implications. Policymakers and business leaders need to understand the need to create appropriate support mechanisms to help small firms overcome these barriers. Multinational corporations should strive to support the development and participation of global integrated sustainability reporting frameworks. Such measures will increase the effectiveness of social and environmental accounting and ensure that sustainability is placed as a central component in business strategies around the world. The novelty of this research lies in its focus on the unique challenges faced by small and medium-sized enterprises in emerging markets, challenges that have not been explored in the previous literature. A comprehensive understanding of how economic conditions and regulatory environments affect the adoption of social and environmental accounting contributes to this scientific field. This research has significant practical and managerial implications. Policymakers and business leaders need to understand the need to establish appropriate support mechanisms to help companies overcome these barriers. Multinational corporations should strive to develop and advocate for the development and participation of global integrated sustainability reporting frameworks. Such actions will increase the effectiveness of social and environmental accounting and ensure that sustainability is a central component of business strategies to be placed all over the world. This study shows that economic instability in emerging markets adds another complexity to the implementation of social and environmental reporting for SMEs. Unstable economic conditions in these regions have made the implementation of social and environmental accounting risky for SMEs, as the potential short-term costs are perceived as more than the long-term benefits. The finding is consistent with the economic theory of risk aversion, which states that in uncertain environments, businesses are more likely to avoid actions that may increase their financial vulnerability. When comparing the results of this study with previous research, the findings of this study, like previous research, point to significant challenges faced by SMEs in implementing social and environmental reporting. These challenges are mainly due to resource constraints and regulatory barriers. For example, Adams and Whelan's (2009) research also showed that most SMEs struggle to adopt sustainable practices, citing a lack of internal capabilities and a lack of adequate external support as major barriers. Previous research has repeatedly shown that SMEs lack financial constraints and a lack of comprehensive

regulatory frameworks to help them keep up with social and environmental accounting standards. The study builds on the existing literature by providing a more detailed analysis of how SMEs face these challenges in emerging markets, where economic instability makes it particularly difficult to accept social and environmental accounting. Unlike previous research that focused mainly on resource constraints and regulatory barriers in developed economies, this study plays a key role in economic instability as a significant factor in discouraging SMEs from implementing social and environmental accounting. Emphasizing economic instability as a barrier to the adoption of social and environmental accounting is a new contribution in this area, as it highlights the complexity of sustainability efforts in areas where market volatility and uncertain government policies are common. By highlighting these specific challenges, this study provides a deeper understanding of the environmental factors that influence social and environmental accounting practices in different economic environments, thereby expanding the scope of the existing literature in the field of sustainability accounting. The study's findings on the impact of inconsistent global reporting standards add to a growing body of scientific literature calling for greater harmonization of sustainability reporting frameworks.

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Auditor Skepticism and Professional Ethical Commitment: An Empirical Investigation of Their Relationship

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Abstract

Recent corporate scandals have underscored the importance of maintaining both professional skepticism (PS) and professional ethical commitment (PEC) to ensure audit quality and public trust. The purpose of this paper is to empirically investigate the relationship between PS and PEC among Iranian auditors. To achieve this, the study integrates Hurtt's six-dimensional model of skepticism with Herawaty and Susanto's five-dimensional ethics framework. A structured questionnaire was administered to 169 technical managers and partners of audit firms accredited by the Securities and Exchange Organization. The data were analyzed using structural equation modeling, with rigorous validity and reliability checks. Findings revealed a strong, positive, and statistically significant association between PS and PEC ($\beta = 0.485$, $p < 0.001$), indicating that auditors exhibiting higher ethical commitment also demonstrated greater skeptical inquiry. The high inter-construct correlation reflects the conceptual interconnectedness between PS and PEC within the ethical–professional domain. The study concludes that integrating ethics and skepticism training into professional development, embedding related metrics in performance appraisals, cultivating organizational cultures that reward inquiry and integrity, and refining ethical codes to address real-world dilemmas can enhance audit quality. This contribution advances both theory and practice by clarifying the mutual reinforcement of skepticism and ethics, filling a gap in Iranian auditing research, and offering a validated conceptual model with actionable insights for audit firms, regulators, and professional bodies.

Keywords: professional skepticism, professional ethical commitment, audit quality.

1. Introduction

Recent financial scandals have underscored the need to uphold ethical standards and a critical mindset in the auditing profession. These scandals have eroded investors' trust in auditors' services and financial reports (Seyedzadeh Koh Kamar et al., 2025). Nevertheless, auditing plays a vital role in assuring the quality of financial reporting and serves as a foundation for corporate financial transparency. When conducting financial audits, auditors must consider all relevant events to provide accurate and appropriate evaluations. Accordingly, auditors should maintain professional skepticism (PS) throughout the audit process, which significantly affects audit quality (Thuy & Toan, 2024). When skepticism is insufficient, the risk of overlooking misstatements due to error or fraud increases, calling into question the credibility of financial statements. PS does not arise spontaneously; it is shaped by the auditor's individual characteristics, organizational culture, and ethical foundations. Indeed, it is a complex and ambiguous construct (Xu et al., 2023), and the auditor's principal responsibility often centers on reducing potential operational risks during the audit and sustaining appropriate PS to assure engagement through the audit process (Chen et al., 2023).

Professional ethical commitment (PEC) refers to an auditor's adherence to ethical principles and professional responsibilities under varying circumstances. Such commitment ensures consistent compliance with the code of ethics and independence in ethical decision-making. The rise in audit failures has underscored the importance of auditors attending to ethics and conduct by identifying key ethical issues during the audit process. Auditors routinely confront ethical dilemmas in their audit procedures; in such contexts, professional judgment is guided by individual values and beliefs, and ethical awareness plays a crucial role in moral judgment. Therefore, auditors with a strong commitment to their profession should maintain independence in decisions based on their professional judgment (Syahdan et al., 2025).

This study aims to examine the relationship between PS and PEC. As a first investigation in Iran's auditing literature, the current study integrates Hurtt's (2010) six-dimensional model of PS with Herawaty and Susanto's (2009) five-dimensional model of PEC within a unified theoretical framework. It simultaneously and causally tests the interrelationships among the variables within an empirical study using structural equation modeling (SEM). Ensuring convergent and discriminant validity, as well as the reliability of the measurement instrument, the study develops a practical conceptual model that precisely depicts the causal links among the variables. Moreover, it offers actionable recommendations—such as professional ethics training and organizational incentives—to enhance PS and audit quality, thereby addressing the research gap on the effect of ethical commitment on auditors' PS.

2. Literature Review

PS refers to possessing a questioning mind and engaging persistently in the pursuit of knowledge. Auditors with PS are consistently seeking new information and innovative methods for examining data. It represents a critical mindset in evaluating the reliability of claims or obtained evidence. Accordingly, the auditor both maintains sufficient confidence in the claims or evidence gathered and considers their adequacy and appropriateness when conducting an audit. Through PS, auditors can perform better in detecting fraud, as they are less likely to accept management's assertions without valid supporting evidence. The combination of PS and an auditor's experience enhances the auditor's competence in fraud detection, thereby improving the resulting audit quality (Hurtt, 2010). Auditors remain trusted by the public and clients so long as they preserve their PS and detect fraud throughout the audit process.

This study adopts Hurtt's (2010) model, which conceptualizes PS within two domains: the philosophy of skepticism and the auditing literature. The model comprises the following indicators:

Questioning mind: Independent auditors with a questioning mindset strive persistently to detect irregularities and are not satisfied until sufficient data are collected. This approach enables them to follow up more precisely on inconsistencies in financial statements and accounting methods. A questioning mind reduces the influence of presentation format on audit judgment quality (Seyedzadeh Koh Kamar et al., 2025).

Suspension of judgment: The suspension of judgment entails that the auditor avoids hasty decisions and refrains from concluding until sufficient, appropriate, and reliable evidence has been gathered. It reflects a deliberate pace in making judgments regarding a suspicious matter, as it requires further reflection and evidence (Herawaty & Susanto, 2009).

Search for knowledge: This trait manifests when the auditor faces unfavorable conditions and clarifies the situation by collecting evidence, assessing key fraud components, and expanding knowledge. The search for knowledge can be viewed as curiosity driven by motivation and stimulation, especially regarding understanding evidence providers and their sources (Hadian et al., 2024).

Interpersonal understanding: Hurtt (2010) noted that different individuals possess varying perceptions of skepticism, which can lead to diverse interpretations of similar events. These differing perceptions may result in misleading, biased, or inaccurate information. Recognizing that PS is key to fraud detection highlights the importance of studying its role in enhancing auditors' ability to detect fraud (Rezaei et al., 2024).

Autonomy: Autonomy indicates that auditors do not accept others' statements without reflection and investigation, maintain decisiveness regarding their professional opinions, and are not unduly influenced by others. They do not trust appearances or formalities unless substantiated through inquiry. Autonomy reflects the auditor's courageous decision-making in evaluating, presenting, and upholding audit opinions (Seyedzadeh Koh Kamar et al., 2025).

Self-esteem: Self-esteem refers to the auditor's full confidence in their abilities, qualifications, and technical competence. Consequently, when PS leads them to gather additional evidence or information, they trust themselves and act on their skepticism. Self-esteem shapes auditors' honesty and trust, which in turn influences the formation of their attitudes and behaviors (Seyedzadeh Koh Kamar et al., 2025).

PEC functions as a communicative and interactive norm in societies and in each profession. Its meaning varies across professions because individuals differ in how they perceive and enact their professional roles (Hejazi Farahmand &Jahanshad, 2025). In auditing, ethical objectives can be coherently framed as the alignment between auditors' perceptual orientations and their auditing skills and capabilities (Barzegar et al., 2024). Auditors' professional ethics are central to preserving public trust and enhancing the quality of financial reports. Adherence to these principles enables auditors to deliver high-quality services, protect public interest, and uphold the credibility of the profession (Masoudi Moghaddam & Talebnia, 2025). Professional ethics emphasizes a fair resolution of conflicts while grounding decisions in principles and standards. When clients attempt to influence audit outcomes, auditors can resist such pressures by invoking ethical codes (Che et al., 2023). The national accounting community needs clearly defined ethical attributes—such as work attachment, a spirit of participation and trust, and constructive interaction—and a sustained culture-building effort to realize them (Karimabadi et al., 2024). This study adopts the indicators proposed by Herawaty and Susanto (2009). The indicators are as follows:

Personality: In psychology, personality typologies address enduring, fundamental human traits. Corporate collapses, such as those of Enron, Lehman Brothers, and WorldCom, remind us that global organizational leaders may exhibit personality deficiencies (Alizadegan et al., 2022).

Professional competence: Generally Accepted Auditing Standards (GAAS) require auditors to possess appropriate professional training and expertise

to perform audits (Rezaei, 2022). Information provided by auditors must be efficient, reliable, factual, and unbiased; accordingly, auditors must be duly qualified and professionally competent (Kiani et al., 2024).

Responsibility: Social responsibility—by fostering a sense of belonging and loyalty to society and shared values—strengthens adherence to professional codes of conduct and enhances positive professional identity. Professional ethics is a hallmark of auditing, and the profession's acceptance depends on the level of responsibility it assumes in society. Public trust can be sustained only if certified auditors deliver services at a level worthy of societal confidence (Rahimi et al., 2024).

Adherence to the code of ethics: Fraud in auditing constitutes a major research area with both theoretical and practical dimensions. To prevent such frauds, a robust ethical code and strong moral values are essential, and the auditors' code of ethics significantly shapes ethical judgment. Commitment to the code yields desirable outcomes for audit firms and professional bodies, which continually strive to enhance understanding and compliance, as well as cultivate a strong ethical culture (Le & Vo, 2022).

Interpretation and refinement of the code of ethics: A deeper understanding of the code of ethics materially influences how accounting and auditing principles are applied. Implementing the code ensures that financial information is reliable, transparent, and free from error, fraud, and bias; it prevents audit delays and supports timely, high-quality reporting. Individuals with a higher professional commitment tend to comprehend the code and its nuances better. Adhering to the code's guidelines can reduce fraud and corruption, lessen external pressure to tailor reports to specific demands, mitigate bias toward a single practice, lower conflicts of interest, enhance the credibility of financial statements, and reinforce respect for confidentiality (Karamshahi et al., 2023).

Hejazi Farahmand and Jahanshad (2025) examined the influence of dimensions from Kohlberg's and Rest's ethical decision-making models on auditors' professional judgment. The findings indicated that social responsibility, thinking styles, moral sensitivity, moral judgment, moral action, and moral motivation have a positive and significant impact on professional judgment. Conversely, dimensions related to social conformity pressures and organizational suspicion had a significant negative effect on auditors' professional judgment.

Masoudi Moghaddam and Talebnia (2025) investigated the impact of auditors' professional ethics on engagement strategies with clients, including preliminary discussions and final negotiations. Results suggested that professional ethics significantly influences these interaction strategies, serving as a key factor guiding auditor–client engagements. Implementing the study's recommendations could enhance mutual trust and cooperation while improving audit quality and financial reporting.

Barzegar et al. (2024) explored the effect of ethical orientation components on independent auditors' fraud risk assessments. The target population consisted of auditors from both the Audit Organization and private-sector audit firms, selected randomly over six months. The findings revealed a significant positive correlation between ethical orientation and perceived fraud risk. Positive expectations in the societal and professional environment appear to energize auditors' independence-driven functions, motivating them to maintain a professional philosophy and render judgments free from undue influence.

Ardestani Rostami et al. (2024) developed an internal audit quality model based on organizational culture and professional ethics using Interpretive Structural Modeling (ISM). The model was subsequently validated with Structural Equation Modeling (SEM). The ISM analysis revealed that professional ethics—encompassing adherence to professional standards, professional conduct, competence, independence, objectivity, confidentiality, and integrity—enhances internal audit quality. Similarly, organizational culture—defined by compliance with organizational rules, acceptance of organizational values, adaptability, and commitment to participation—was shown to improve audit quality.

The MICMAC matrix indicated that adherence to standards, professional conduct, competence, and independence/objectivity have the highest driving power. In contrast, compliance with organizational rules, acceptance of values, adaptability, and participation exhibited the highest dependence on the quality of internal audits. SEM results confirmed that professional ethics and organizational culture positively influence internal audit quality, with culture mediating the relationship between ethics and quality.

Yousefzadeh and Masoumi Bilondi (2024) conducted a phenomenological study that conceptualized auditors' lived experiences of PS. Analysis of the interview data yielded five descriptive categories: skepticism as a mental attitude; skepticism as a process of knowledge acquisition over time; skepticism as the absence of exoneration; skepticism as situational doubt; and skepticism as a general culture of inquiry.

Safajo and Pourzamani (2024) examined relationships between PS, individual creativity dimensions, and auditors' judgment. Findings revealed that PS has a positive and significant effect on creativity (fluency, flexibility, originality, and elaboration), which in turn influences auditors' judgment and decision-making.

Taghizadeh and Safari (2024) analyzed the factors contributing to the strengthening of the hegemony of professional ethics culture in auditing through a comprehensive interpretive-structural model (IMS). Using a meta-synthesis and Delphi analysis, they reduced 21 propositions to 17 key items for IMS modeling. Results suggested that approving programs, budgets, and incentives for auditors was the most influential factor, whereas enhancing learning via open information sharing was the least influential. The model narrows the theory–practice gap in auditing and reduces the audit expectations gap between auditors and stakeholders by aligning social and professional values.

Kiani et al. (2024) studied the impact of personality traits on auditing ethics within a population of 29,973 auditors at Iran's National Tax Administration. Results showed positive effects from religiosity ($\beta = 0.65$), critical thinking ($\beta = 0.44$), employee attitudes ($\beta = 0.40$), responsibility ($\beta = 0.70$), respectfulness ($\beta = 0.31$), confidentiality ($\beta = 0.27$), organizational citizenship behavior ($\beta = 0.86$), and trust ($\beta = 0.49$). Organizational citizenship behavior exerted the greatest effect, while confidentiality had the least.

Hadian et al. (2024) assessed the role of Theory of Mind in auditors' skepticism and its moderating effect on the relationship between skepticism and audit quality within Iran's Supreme Audit Court. Using SEM analysis of responses from 330 auditors (collected between 2022 and 2023), they found a significant positive association between Theory of Mind and skepticism. Moreover, they noted that Theory of Mind strengthens the link between skepticism and quality.

Madineh and Zare (2023) examined the impact of religious beliefs on auditors' skepticism and fraud-risk assessments, adopting a religiosity hierarchy framework from an Islamic perspective. Findings indicated that religiosity positively influences the link between skepticism and risk assessment.

Rahimi et al. (2024) examined how auditors' personality traits and intelligence affect their compliance with professional ethics. Using data from 243 certified public accountants out of a total population of 2,710, the study found no significant link between neuroticism and ethical compliance. In contrast, extraversion, openness to experience, agreeableness, and conscientiousness were each significantly and positively associated with adherence to professional ethics.

Bekhradi Nasab et al. (2024) examined the enhancement of the control environment by focusing on the personal ethics of internal auditors relative to corporate strategic quality. Data from internal audit reports (2009–2019) suggested that human capital quality—except for internal audit head tenure—along with internal auditor reporting level, independence, and presence of financial experts positively influenced the control environment; however, tenure, internal–external auditor interaction, non-executive board

composition, and separation of CEO and chair roles showed no significant effect.

Alizadegan et al. (2022) assessed the effects of personality type and professional ethics on auditors' fraud-detection ability within the Theory of Planned Behavior, considering skepticism as a mediator. Results indicated that various personality types, combined with professional ethics and skepticism, positively and significantly affected fraud detection. Personality type and ethics also indirectly influenced detection via skepticism. Overall, higher skepticism increased auditors' inclination to seek potential fraud indicators, thereby enhancing detection capability.

Napitupulu and Djaddang (2025) examined auditor professional ethics within a postmodern paradigm for sustainable financial reporting audits. Their findings offered both insights into the importance of ethics as a foundation for addressing sustainability challenges and a basis for further research aimed at enhancing audit quality in the evolving digital era.

Syahdan et al. (2025) investigated the effect of ethical ideology and professional commitment on moral judgment. The results indicated that ethical idealism had a positive impact on moral judgment, whereas ethical relativism exhibited a negative effect. Professional commitment also exerted a positive influence on the moral judgment of auditors within the Financial Affairs Oversight and Development Agency in North Maluku Province.

Lannai et al. (2025) proposed an audit-quality model with PS as a moderating variable, focusing on determinants such as professional ethics and auditor experience. The results demonstrated that experience and professional ethics significantly improve audit quality. Moreover, PS positively mediates this relationship, underscoring the value of a questioning mindset in achieving high-quality audits. These findings clarify how experience, ethics, and skepticism interact to enhance audit outcomes.

Hardies et al. (2025) used field evidence to understand the antecedents of skeptical actions by auditors. Key antecedents included the overall professional orientation of the audit firm, auditors' personal sense of responsibility, innate skepticism, motivation, and intent to act skeptically. Auditors' goals were found to be most strongly influenced by social norms and less affected by attitudes and self-efficacy regarding skeptical behavior. Other important antecedents included the audit firm's quality control systems, certain personality traits, industry-specific expertise, and audit knowledge.

Fathurohmah and Wasfini (2025) analyzed the impact of auditor experience and audit fees on fraud detection, with PS serving as a moderating variable. Results indicated that auditor experience had a negative but insignificant effect on fraud detection, while audit fees had a positive and significant effect. PS strengthened the relationship between experience and fraud detection but did not enhance the effect of audit fees on fraud detection.

Elta and Yusfa Milani (2025) examined auditor experience and PS in fraud detection, with workload acting as a moderator. Auditor experience exhibited a positive but insignificant effect, whereas PS had a positive and significant effect on fraud detection. Workload did not strengthen the relationship between experience and fraud detection, but did amplify the impact of PS.

Grohnert et al. (2025) explored the effect of a supportive learning culture and rank on PS in information search. They found that a supportive learning culture was associated with increased skeptical information-seeking. Still, this effect was evident only among audit managers and partners, not among lower-level staff, such as associates and senior auditors.

Suhartini and Binsar Tamado (2024) studied remote auditing and PS in sustaining audit quality in public accounting firms in Surabaya. Their results indicated that the more appropriate the technology used for remote auditing and the greater the auditor's inquiries into suspicious matters, the higher the resulting audit quality.

Rininda (2024) assessed the role of auditor experience and PS in fraud detection, with PEC as a moderating variable. Findings revealed that experience

and skepticism each positively affected auditors' fraud-detection ability, but PEC did not moderate the effects of these independent variables. This research is considered relevant for enhancing auditor accountability in detecting fraud within local government organizations.

Given the findings above, the research hypothesis in the current study is as follows:

H1: There is a positive and significant relationship between auditor skepticism and professional ethics commitment.

Conceptual research model:

Based on the proposed hypothesis and the causal relationships among the variables, the study's conceptual model is depicted in Figure 1.

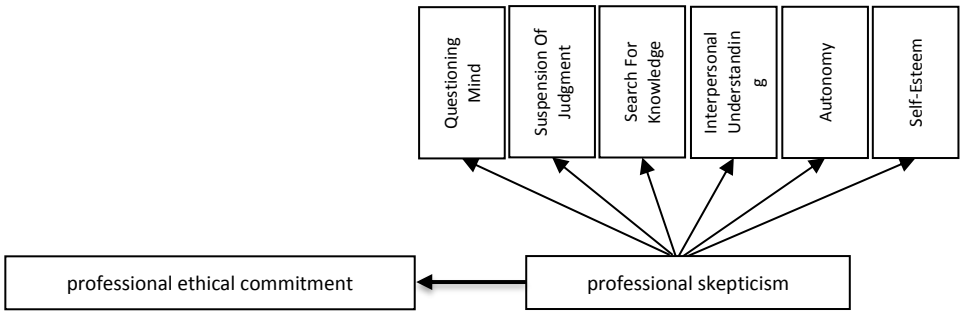

Figure 1. Conceptual model of the study

3. Methodology

In terms of purpose, this research is applied in nature. It adopts a qualitative approach and empirically examines the effect of auditors' PS level on their ability to detect fraud, employing a comparative perspective between Hurtt's model and that of Fozia and Yanti. The study uses a survey method, distributing questionnaires to collect primary data from respondents. The gathered data were organized in Microsoft Excel, and the final dataset was analyzed using Smart PLS (version 2) and SPSS (version 25).

The statistical population comprised all technical managers and partners of audit firms accredited by the Securities and Exchange Organization in 2025. Based on the official list obtained from the Audit Organization, 188 individuals were identified as the study population. Of the returned questionnaires, 19 were excluded due to incomplete information. Consequently, 169 valid questionnaires were retained for statistical analysis.

4. Results

The research hypothesis was tested after confirming the goodness of fit of the conceptual research model.

Descriptive statistics

Table 1 presents the descriptive socio-demographic findings derived from the questionnaires. In light of the information reported in Table 1, the overall qualifications of the respondents are confirmed.

Table 1 summarizes the demographic profile of the 169 respondents. The majority were male (76.3%), with the largest age group being 40–49 years (37.3%). Most participants held a degree in accounting (89.35%) and a master's qualification (52.1%). In terms of organizational role, 71% were technical managers in audit firms, while 29% were partners. The most common range of professional experience was 20–29 years (40.8%), indicating a highly experienced respondent pool.

Table 1. Frequency and percentage distribution of respondents' demographic characteristics

Variable	Category	Frequency (n)	Percentage (%)
Gender	Female	40	23.7
	Male	129	76.3
Age	Under 30 years	17	10.1
	30–39 years	41	24.3
	40–49 years	63	37.3
	50–59 years	37	21.8
	60 years and above	11	6.5
Field of Study	Accounting	151	89.35
	Auditing	2	1.18
	Financial Management	2	1.18
	Other Management Fields	14	8.29
Educational Degree	Bachelor's	48	28.4
	Master's	88	52.1
	Doctorate	33	19.5
Organizational Position	Technical Manager (Audit Firm)	120	71.0
	Partner (Audit Firm)	49	29.0
Work Experience	Less than 10 years	23	13.6
	10–19 years	46	27.2
	20–29 years	69	40.8
	30 years and above	31	18.4
Total	—	169	100

Source: Research findings

Table 2. Measurement diagnostics for the study constructs

Construct	KMO	Bartlett's test (p)	Mean factor loading	AVE	√AVE	Cronbach's α	CR	HTMT with other constructs	Fornell–Larcker: correlation with other constructs	Shared validity index (1 – SSE/SSO)
PS	0.930	< .001	0.742	0.610	0.781	0.948	0.949	0.978 (→ PEC)	0.978	0.757
PEC	0.935	< .001	0.884	0.674	0.821	0.951	0.954	0.978 (→ PS)	0.978	0.694

Source: research findings

Hypothesis Testing

The measurement model demonstrated outstanding psychometric properties across all assessed criteria (Table 2). Sampling adequacy was confirmed with Kaiser–Meyer–Olkin values of 0.930 for PS (Hurtt scale) and 0.935 for PEC, both well above the recommended 0.90 threshold, indicating "marvelous" adequacy for factor analysis. Bartlett's tests of sphericity were highly significant ($p<0.001$) for both constructs, confirming the factorability of their correlation matrices.

Convergent validity was substantiated by high mean standardized factor loadings (0.742 and 0.884, respectively) and Average Variance Extracted (AVE) values of 0.610 and 0.674, each exceeding the 0.50 benchmark. The square roots of AVE (0.781 and

0.821) were greater than the respective construct–construct correlations, aligning with the Fornell–Larcker criterion, albeit only marginally given the very high correlation observed (0.978).

Internal consistency reliability was exemplary: Cronbach's α coefficients were 0.948 and 0.951, and composite reliability values were 0.949 and 0.954 for PS and PEC, respectively, far surpassing the 0.70 threshold and comfortably within the range considered "excellent" (>0.90).

Discriminant validity results warrant careful interpretation. While the Fornell–Larcker criterion was technically met, the heterotrait–monotrait ratio between the two constructs was 0.978, exceeding both the conservative (0.85) and liberal (0.90) thresholds, signalling substantial empirical overlap. This high inter-construct association may be theoretically defensible given their shared ethical–professional domain. Nevertheless, it should be acknowledged as a potential limitation when interpreting structural relationships.

The shared validity indices (1 – SSE/SSO) of 0.757 for PS and 0.694 for PEC indicate that each construct demonstrates substantial predictive relevance and quality in explaining variance in its own indicators. Taken together, these diagnostics provide strong evidence for the robustness of the measurement model in terms of sampling adequacy, convergence, reliability, and predictive relevance, while also ensuring transparency regarding the high conceptual relatedness between the two constructs.

The hypothesised positive effect of PEC on PS was statistically supported. The unstandardised standard error was 0.103, the t-statistic was 4.485, and the p-value fell well below the .001 threshold, indicating a highly significant result. This suggests that, within the sample, higher levels of ethical commitment are reliably associated with greater tendencies toward professional scepticism. The strength and precision of this estimate lend credence to the theoretical proposition that an ethical orientation fosters a more questioning and critical professional mindset.

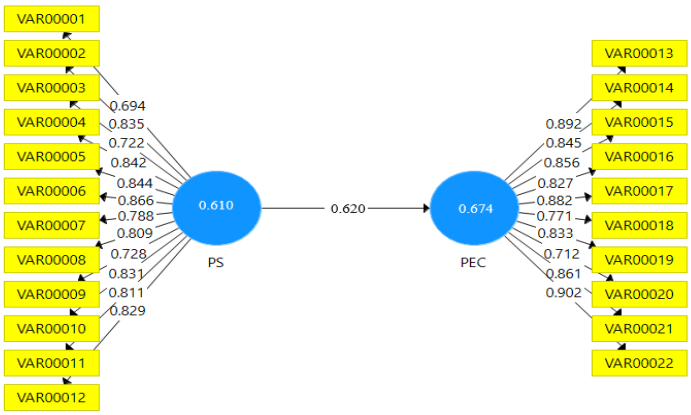

Figure 2. Factor Loadings and Path Coefficient of the Research Model

Path	Standard Error (SE)	t-value	p-value	Outcome
PS → PEC	0.103	4.485	< 0.001	Hypothesis Supported

Table 3. Findings from Hypothesis Testing
Source: Research findings

5. Discussion and Conclusions

This study confirms a significant, positive relationship between auditors' PS and commitment to professional ethics (β=0.485, p<0.001\beta=0.485,\ p<0.001). A questioning mindset not only enhances audit quality but also directly strengthens ethical adherence. By establishing skepticism as a direct driver of ethics—rather than solely its outcome—these results extend prior models (Hardiz et al., 2025; Siyahdan et al., 2025) and complement mediation-based findings (Lanai et al., 2025).

The findings of the present study are consistent with those of Hardiz et al. (2025), who identified antecedents of skeptical behavior—such as a sense of personal responsibility and professional ethical orientation—as influential factors in audit quality. Siyahdan et al. (2025) reported a positive effect of professional commitment on ethical judgment. In contrast, by examining the reverse relationship, the study demonstrates that a skeptical attitude can also strengthen ethical commitment in itself. Lannai et al. (2025) highlighted the mediating role of PS between professional ethics and audit quality; here, we explicate the direct effect of skepticism on commitment, thereby extending the theoretical framework.

Practical Recommendations

Design of integrated training programmes: Audit firms can incorporate workshops combining principles of professional ethics with PS techniques (inquisitive mindset, suspension of judgment, and knowledge seeking) into professional development programmes, thereby simultaneously enhancing auditors' technical skills and critical thinking.

Performance evaluation based on skepticism and ethics indicators: Annual auditor evaluations may encompass metrics such as the number of probing questions identified during audit procedures, the volume of additional evidence requested, and compliance with the code of ethics, ensuring that PS and ethical commitment are concrete elements of reward and promotion systems.

Strengthening organisational culture: Oversight bodies and professional associations can issue guidelines that encourage raising concerns and reporting suspicious matters. Moreover, by publicising auditors' success stories, they can foster ethical skepticism and intrinsic motivation to uphold the code of ethics.

Updating ethical guidelines: Given the finding that interpretation and refinement of the code of ethics is a key dimension of commitment, ethical guidelines should be periodically reviewed to incorporate practical examples of ambiguous situations (ethical dilemmas) to facilitate understanding and application in real-world contexts.

Further research: Future studies are encouraged to examine potential mediating or moderating variables such as organizational pressures, a supportive learning culture, or auditors' professional experience, to develop a more comprehensive framework for the interaction between PS and ethical commitment.

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Tax Avoidance and Corporate Commercial Credit

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Abstract

Objectives: This study aims to investigate the relationship between tax avoidance and firms' commercial credit among firms listed on the Tehran Stock Exchange.

Methodology/Design/Approach: The research is applied in nature and employs a causal (post-event) correlational design. The statistical population includes all firms listed on the Tehran Stock Exchange. Using the systematic elimination method, 142 firms were selected as the research sample and examined over five years from 2019 to 2023, resulting in 710 firm-year observations.

Findings: The results indicate that tax avoidance has a direct and significant effect on firms' commercial credit.

Innovation: This study contributes to the literature by providing empirical evidence on the link between tax behavior and commercial credit in an emerging market context. The findings offer useful implications for managers, creditors, and policymakers in assessing the credit-related consequences of corporate tax avoidance practices.

Keywords: Tax avoidance, trade credit, Tehran Stock Exchange.

1. Introduction

Trade credit, a bilateral agreement between the seller (supplier) and the buyer (demander) that provides an interest-free loan (Martinez-Solenno et al., 2012), serves as a short-term financing source for small and medium-sized enterprises (Seifert et al., 2013). Accordingly, deciding on its use is considered a critical managerial task, as effective management of trade credit can maximize firm value and shareholder wealth. When firms face difficulties in obtaining capital from external sources, trade credit becomes a viable alternative to bank financing (Law et al., 2012; Petersen & Rajan, 1997).

By extending credit to customers, suppliers are exposed to risk because buyers may misuse resources or engage in opportunistic behavior. In other words, resources may be inefficiently allocated as costs of goods sold or administrative and selling expenses (e.g., cost stickiness), increasing the risk of default for the supplier. Such risks can lead not only to financial losses but also potentially to the bankruptcy of the supplier. Consequently, suppliers are naturally motivated to actively monitor their customers' use of resources by acquiring and maintaining relevant information.

Tax avoidance reflects a firm's ability to preserve cash for working capital needs, including credit payments and investments. This signal may enhance suppliers' confidence in the creditworthiness of tax-avoiding firms, making them more willing to extend trade credit. However, there are also reasons to expect a negative relationship between tax avoidance and trade credit. Prior studies suggest that tax avoidance may become easier under financing constraints and limited access to external capital (Edwards et al., 2016). Moreover, high levels of tax avoidance increase organizational complexity and reduce the transparency of financial reporting (Balakrishnan et al., 2019). Suppliers may therefore perceive firms with lower accounting quality as riskier and may be less inclined to grant them trade credit (Raman & Shahror, 2008). Chen et al. (2017) further argued that poor-quality financial reporting can hinder a firm's access to trade credit.

Considering the above, the present study seeks to answer the following question:

Does tax avoidance affect the commercial reputation of firms?

Given the lack of definitive findings regarding the effect of tax avoidance on commercial reputation, this study aims to examine the relationship between tax avoidance and commercial reputation using data from 142 firms listed on the Tehran Stock Exchange during 2019–2023. The research will be conducted using EViews software.

The structure of the study is as follows: First, the theoretical foundations and background of the research will be presented; next, the statistical population and research methodology will be described; then, the data will be analyzed; and finally, the results, suggestions, and limitations of the study will be discussed.

2. Theoretical foundations and research background

Tax, as one of the most efficient sources of financing, has been utilized in various ways since the formation of societies and governments. Moreover, taxation plays a sensitive political and financial role, including improving income redistribution, allocating resources, and stabilizing economic fluctuations, which further underscores its importance. These factors have elevated the significance of the tax system, particularly in developing countries that finance their expenditures largely through the sale of natural resources and raw materials (Aria & Delkhah, 2018).

On one hand, firms and taxpayers often seek to minimize taxation, using tax incentives as a strategic tool. On the other hand, both theoretical foundations and empirical evidence indicate that firms strive to reduce and defer taxes on their income (Darabi & Nateghi Rostami, 2018). Tax avoidance is defined as legally minimizing tax obligations without violating laws. Furthermore, firms that engage in tax avoidance to maximize value often increase their use of debt rather than equity in the capital structure (Firmansyah

et al., 2020). While debt can enhance firm leverage, it also increases default risk and can lower the firm's credit rating, subsequently raising the cost of debt.

Trade credit, as a key component of product market transactions, serves as a fundamental source of short-term financing. Research indicates that, after external financing such as bank loans, trade credit is the second most important source of external financing (Norden et al., 2020). Trade credit reflects the level of trust suppliers and creditors place in a firm. Firms with strong trade credit can obtain goods and services without immediate cash payment, and banks and other lenders often extend credit based on the firm's trade creditworthiness (Izadinia & Taheri, 2016).

Since tax belongs to shareholders as a form of savings, tax avoidance may not align with the interests of bank debt holders. Banks often perceive tax avoidance as a source of lending risk. Consequently, firms may rely more on trade credit as an alternative to bank debt. Despite its high implicit cost, trade credit allows firms to acquire goods without immediate cash outflows, ensuring operational continuity and growth (Hassan & Habib, 2023). In one U.S. sample, the average ratio of accounts payable to sales (total liabilities) was 21%, highlighting the importance of trade credit as a financing source.

Given the widespread use of trade credit and the prevalence of tax avoidance, examining the relationship between these two factors is highly important.

A review of the research background reveals that domestic studies on corporate trade credit have predominantly focused on financial reporting characteristics and their effect on the level of trade credit received. In other words, prior research has emphasized the quality of accounting information—such as net income accuracy, absence of earnings management, fraud-free financial statements, and quality of accruals—as determinants of trade credit. However, the present study, adapted from Habib and Hassan (2023) and implemented domestically, aims to explore beyond these factors by examining the impact of corporate tax avoidance on trade credit—an area not yet addressed in the country.

Researcher(s)	Research Summary
Hutchens et al. (2024)	In a study examining tax avoidance and corporate risk in the United States, they stated that there is a positive and significant relationship between tax avoidance and risk.
Amri et al. (2023)	In a study titled "The interactive effect of tax avoidance and tax risk on firm value" in a sample of 52 firms in Tunisia over the period 2003 to 2016, they stated that ownership structure and the supervisory role of tax authorities are the determining factors explaining tax aggression. While board characteristics do not seem to explain the likelihood of engaging in tax aggression strategies. The results of additional regressions showed that the effect of these characteristics is enhanced in cases where there is no controlling shareholder.
Hassan and Habib (۲۰۲۳)	In a study titled "Tax Avoidance and Trade Credit" in a Sample of Listed Firms in the United States from 1987 to 2017, they found that tax-avoidant firms are more likely to rely on supplier-provided trade credit as a source of financing. The relationship between tax avoidance and trade credit is also more pronounced for subsamples of firms with: (1) greater information asymmetry and (2) greater financial constraints. These findings are robust to a wide range of sensitivity analyses and endogeneity concerns. In an additional analysis, we find that corporate tax avoidance increases firms' reliance on trade credit because it reduces their access to bank loans.
Hasan & Alam (2022)	Examined the relationship between asset redeployability and firms' use of trade credit using a large sample of US firms over the period 1985–2015. The results showed that firms with more redeployable assets used less trade credit. Their cross-sectional analyses showed that the negative relationship between asset redeployability and trade credit was more pronounced for firms with greater financing constraints, higher levels of information asymmetry, and lower corporate liquidity.
Asif and Nisar ((۲۰۲۲	In a study examining the impact of trade credit on firm performance, they stated that the statistical results of the model used support the strong impact of trade credit in determining the financial performance of Pakistani firms. The results also showed that profitable firms with high participation in trade credit can increase their performance by optimally utilizing trade credit resources. However,

Researcher(s)	Research Summary
	obtaining bank loans for firms that do not have operational needs can disrupt their financial health and ultimately threaten their performance, and this relationship is more evident for large firms.
Hassan et al. (۲۰۲۱)	Examined the relationship between the firm life cycle and trade credit in a sample of Egyptian firms. They found evidence that firms in the introduction, growth, and decline stages used significantly more trade credit, while firms in the maturity stage used significantly less trade credit. The firm life cycle operates as a distinct channel to influence trade credit independent of other channels proposed in the literature. These results are robust to alternative regression specifications, alternative measures of life cycle and trade credit, and endogeneity concerns. Firms in the introduction and decline stages adjust trade credit to the target level more quickly than others.
Piri et al. (2023)	In a study titled "Investigating the Moderating Effect of Financial Risk on the Relationship between Corporate Governance and Tax Avoidance," they stated that the results of the study indicate that there is a significant and inverse relationship between corporate governance and tax avoidance, and that financial risk also has a significant and inverse effect on the relationship between corporate governance and tax avoidance.
Setayesh and Ebrahimi (2021)	In a study titled "Substitution Relationship of Leverage in Capital Structure and Tax Avoidance", using a sample of 1026 firms, they showed that there is a negative and significant relationship between leverage and tax avoidance, which indicates the substitution effect of leverage. The results of testing the second hypothesis showed that the effect of the adjusting variable of the cost of leverage on the relationship between the use of leverage and tax avoidance is significant. Examining the effect of control variables also indicates a positive and significant effect of firm size and growth opportunities, and a negative and significant effect of profitability, dividends, and collateral capacity on the use of leverage.
Pourfakharan et .al (2021)	In their study, they examined the effect of government monetary policy on the relationship between financial statement auditing and corporate credit using data from 172 listed firms. The results showed that the quality of the independent auditor and the quality of financial statement auditing improve the corporate credit, and this relationship is moderated and reduced by the government's contractionary monetary policy. Further findings showed that an unqualified audit opinion does not affect corporate credit.
Khajavi et al. (2021)	They examined the effect of trade credit on cost stickiness of firms using a sample of 185 firms listed on the Tehran Stock Exchange in 2011-2019. The findings showed that trade credit has a significant effect on reducing the stickiness of general, administrative, and selling costs, and in years when sales decline, trade credit can accelerate cost reduction and prevent cost stickiness.
Aflatooni and Noroozi (2020)	They investigated the effect of some corporate financial factors on the supply and demand of trade credit using data from 147 firms active in the Tehran Stock Exchange during the period 2007-2017. The results of their research showed that the supply and demand of trade credit increase with the size and age of the firm. Also, the findings indicate a negative effect of firm liquidity on the supply and demand of trade credit.

Based on the theoretical framework, research background, and the presented materials, a general hypothesis was formulated to investigate the impact of tax avoidance on the trade credit of firms listed on the Tehran Stock Exchange, as follows:

Research Hypothesis: Tax avoidance affects a firm's trade credit.

3. Research methodology

The present study is applied in terms of its purpose. Since it describes existing conditions without any intervention, it is a descriptive-causal study in terms of methodology and falls within the field of positivist accounting research. The data used in this study were gathered from audited financial statements and were analyzed using information obtained from the Tehran Stock Exchange website and the Rahavard Novin database for the period 2018 to 2022. Excel and EViews 10 software were used to process and analyze the data.

The conceptual model of the research aligns with the theoretical relationships among the variables and is illustrated in Figure 1:

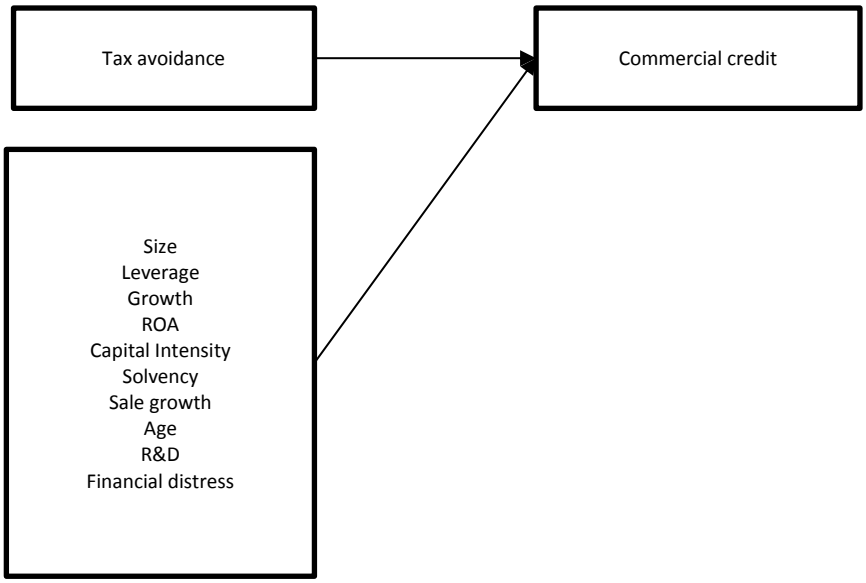

Figure1:

After developing the conceptual model, the research sample was selected using a screening approach from all firms listed on the Tehran Stock Exchange during the period 2018–2022 to collect the required data. To ensure the homogeneity of observations, the following criteria were applied: firms had to be listed before 2018 and remain listed on the Tehran Stock Exchange through 2022; their fiscal year-end had to be Esfand, with no changes in fiscal year or business activity during the study period. Firms operating in investment and financial intermediation sectors—including leasing and insurance firms, holding firms, banks, and other financial institutions—were excluded due to their distinct reporting structures. Additionally, financial information for the study period had to be available, firms could not experience trading halts exceeding six months, and data for all research variables had to be accessible. As illustrated in Figure 2, after applying these criteria, a total of 142 firms were selected as the final sample for the period 2018–2022.

Figure2. How to select a research sample

Total population in 2022		577
Less: Inactive firms	-193	
Less: Firms with trading suspensions	-33	
Less: Firms that changed their fiscal year	-70	
Less: Firms listed during the study period	-90	
Less: Investment firms, banks, and holding firms	-49	
Final research sample		142

3. Research variables

Based on the theoretical foundations of the study and in line with Hasan and Habib (2023), a model comprising the identified variables was developed to test the research hypotheses, as presented below.

$$TC_{it} = \beta_0 + \beta_1 \text{Tax Avoid}_{it} + \beta_2 SIZE_{it} + \beta_3 MTB_{it} + \beta_4 LEV_{it} + \beta_5 ROA_{it} + \beta_7 CAP\ INT_{it} + \beta_8\ \text{Growth Sale}_{it} + \beta_9 CASH_{it} + \beta_{10} AGE_{it} + \beta_{11} R\&D_{it} + \beta_{12}\ T - score_{it} + \varepsilon_{it}$$

The dependent variable in this study is **trade credit (TC)**. Following Hasan and Habib (2023), trade credit is measured as the ratio of end-of-period accounts payable and other payables (AP) to sales. This measure reflects the proportion of total purchases financed through trade credit and has been widely used in prior literature (Garcia-Appendini & Montoriol-Garriga, 2013; Love et al., 2007; Molina & Preve, 2012).

Tax avoidance (Tax Avoid) is considered the independent variable. Consistent with Hasan and Habib (2023) and Arab Salehi and Hashemi (2015), tax avoidance is measured using the cash effective tax rate. The cash effective tax rate is calculated as cash taxes paid divided by pre-tax income and multiplied by negative one to obtain a direct measure of tax avoidance (Arab Salehi & Hashemi, 2015).

Additionally, the following variables are included as **control variables** in the analysis:

- **Firm size (SIZE):** Measured as the natural logarithm of operating revenues.
- **Firm growth (MTB):** Measured as the market-to-book ratio of shareholders' equity.
- **Financial leverage (LEV):** Defined as the ratio of total debt to total assets.
- **Return on assets (ROA):** Calculated as net income divided by total assets.
- **Capital intensity (CAPINT):** Measured as the ratio of fixed assets to total assets.
- **Sales growth (Growth Sale):** Calculated as the change in sales relative to sales in the previous period.
- **Liquidity (Cash):** Measured as the ratio of end-of-period cash holdings to total assets.
- **Firm age (Age):** Measured as the natural logarithm of the difference between the year of firm establishment and the year under consideration.
- **Research and development intensity (R&D):** Defined as the ratio of research and development expenditures to sales.
- **Financial distress risk (T-score):** Measured using the modified Altman model proposed by Kurdistani et al. (2014). To adapt financial distress models to the institutional environment of Iran, the modified model developed by Kurdistani et al. (2014) is employed, consistent with Aflatooni et al. (2022) and Alavi & Memarian (2020).

The final model is specified as follows:

T-score_it = 0.291(x1) + 2.458(x2) - 0.301(x3) - 0.079(x4) - 0.05(x5)

In this model, T-score represents the firm's financial strength, where lower values indicate a weaker financial condition. Specifically, when T <- -0.14, the probability of financial distress is considered to be very high. The components of the model are defined as follows:

x1 is the ratio of working capital to total assets.

x2 is the ratio of retained earnings to total assets.

x3 is the ratio of operating profit (loss) to total assets.

x4 is the ratio of the book value of equity to total liabilities.

x5 is the ratio of revenue to total assets.

4. Research Findings

4.1. Descriptive Statistics

To examine the general characteristics of the variables and to provide a detailed analysis, it is necessary to present the descriptive statistics of the variables. Figure 3 reports the descriptive statistics of the variables used in the study after identifying and replacing outliers. The reported descriptive statistics are based on a sample of 142 firms over five years from 2018 to 2022, resulting in a total of 710 firm-year observations.

Variable name	Symbol	Mean	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis
Trade credit	TC	0.25	0.78	0.041	0.20	1.48	4.32
Tax avoidance	Tax Avoid	-0.16	0.0000	-0.78	0.15	-1.73	7.10
Firm size	SIZE	15.42	19.80	11.70	1.75	0.42	3.27
Firm growth	MTB	6.58	15.90	1.11	4.78	0.88	2.48
Financial leverage	LEV	0.50	0.98	0.094	0.20	0.16	2.44
Return on assets	ROA	0.19	0.56	-0.10	0.15	0.37	2.60
Capital intensity	CAPINT	0.26	0.79	0.030	0.19	0.87	2.90
Sales growth	Growth Sale	0.53	1.12	-0.24	0.37	-0.09	2.24
Liquidity	CASH	0.05	0.20	0.005	0.047	1.45	4.58
Firm age	AGE	3.74	4.15	2.94	0.30	-0.56	2.25
R&D intensity	R&D	0.006	0.025	0.0000	0.003	6.38	43.70
Financial distress	T-SCORE	Binary variable (0,1), reported in the following section					

The most important measure of central tendency is the mean, which represents the balance point or center of gravity of a distribution and serves as an appropriate indicator of data centrality. For instance, the mean value of financial leverage is 0.50, indicating that most observations are concentrated around this point.

In general, measures of dispersion indicate the extent to which observations are spread out from one another or deviate from the mean. One of the most widely used measures of dispersion is the standard deviation. For example, the standard deviation is 4.78 for firm growth and 0.003 for research and development intensity, indicating that these variables exhibit the highest and lowest dispersion, respectively.

Additionally, the minimum and maximum values represent the smallest and largest observations for each variable, providing further insight into the data range.

Table 4. Frequency distribution of financial distress

Description	Code	Frequency	Percentage
Financial distress	1	86	12.11
No financial distress	0	624	87.89
Total	–	710	100.00

As reported in Table 4, the total number of firm-year observations is 710. Among these, 86 firm-year observations, representing 12.11 percent of the sample, experienced financial distress, while 624 firm-year observations, accounting for 87.89 percent of the sample, did not experience financial distress.

4.2. Inferential Statistics

4.2.1. Test for Heteroskedasticity

When the error terms are heteroskedastic, the standard error of the intercept becomes inflated. The standard errors of the slope coefficients also depend on the form of heteroskedasticity. For example, if the variance of the error terms is positively related to the square of an explanatory variable, the standard error of the coefficient associated with that variable will be substantially larger (Aflatooni, 2016). Accordingly, the statistical hypotheses of the test are defined as follows:

Null hypothesis (H0): The variance of the error terms is constant.
Alternative hypothesis (H1): The variance of the error terms is not constant.

Table 5. Results of the heteroskedasticity test

Test model	Test statistic	p-value	Test result
Research model	261.36	0.0000	Presence of heteroskedasticity

Source: Research findings

The results reported in Table 5 indicate that the p-value of the heteroskedasticity test for the research model is less than 5 percent, confirming the presence of heteroskedasticity in the error terms. This issue was addressed in the final estimation of the models by applying the GLS procedure and using robust standard errors in EViews 10.

4.2.2. Autocorrelation Test

One of the fundamental assumptions of OLS regression is the absence of autocorrelation (or serial correlation) among the error terms. Since the values of the explanatory variables in the model are random, the error terms should also be random; in other words, there should be no systematic correlation or ordered pattern among them over time. If such a correlation exists, the error terms would no longer be random and would instead depend on the values of the explanatory variables. Autocorrelation can occur across different time periods or across cross-sectional units (Aflatooni, 2018).

Accordingly, the statistical hypotheses of the autocorrelation test are as follows:

Null hypothesis (H0): No autocorrelation exists.

Alternative hypothesis (H1): Autocorrelation exists.

Table 6. Results of the serial autocorrelation test

Test model	Test statistic	p-value	Test result
Research model	229.68	0.0000	Presence of serial autocorrelation

Source: Research findings

As shown in Table 6, the p-value of the serial autocorrelation test for the research model is below the 5 percent significance level, indicating the presence of serial autocorrelation. This problem was resolved in the final estimation by employing robust standard errors in EViews (Aflatooni, 2018).

5. Hypotheses Testing

In this section, the data are analyzed using inferential statistics, employing panel data techniques. First, the stationarity of the variables was examined. Since the study period spans five years, the variables are stationary over this time horizon; therefore, stationarity test results are not reported (Aflatooni, 2018).

Next, the Chow (F-Limer) test was applied to determine the appropriate data structure. Finally, after estimating the model using the selected specification, the regression assumptions were examined using the GLS procedure with robust standard errors, and the final model was estimated accordingly. Robust standard errors, which are widely used in accounting and finance research, are resistant to heteroskedasticity and serial autocorrelation and also provide the likelihood ratio statistic (Aflatooni, 2018).

5.1. Results of Hypotheses Testing

The hypotheses for the Chow (F-Limer) test are defined as follows:

- Null hypothesis (H0): All intercepts in the model are equal.
- Alternative hypothesis (H1): At least one intercept differs from the others.

Acceptance of the null hypothesis indicates that intercepts are homogeneous across firms and time periods, suggesting that a pooled regression model is appropriate. Rejection of the null hypothesis implies heterogeneity of intercepts across firms or time periods, in which case a panel data model with either fixed or random effects is more suitable.

Table 7. Results of the Chow (F-Limer) test

Test model	Test statistic	p-value	Test result
Research hypothesis	1.930	0.103	Panel data model accepted

Source: Research findings

The research hypothesis states that tax avoidance affects corporate trade credit. Accordingly, the hypothesis is formulated as follows:

Null hypothesis (H0): Tax avoidance does not affect corporate trade credit.

Alternative hypothesis (H1): Tax avoidance has a significant effect on corporate trade credit.

Table 8. Results of hypothesis testing

Model specification: TC_it = β0 + β1 TaxAvoid_it + β2 SIZE_it + β3 MTB_it + β4 LEV_it + β5 ROA_it + β6 CAPINT_it + β7 GrowthSale_it + β8 CASH_it + β9 AGE_it + β10 R&D_it + β11 TScore_it + ε_it						
Dependent variable: Trade credit (TC)						
Variable	**Symbol**	**Coefficient**	**Std. Error**	**t-statistic**	**p-value**	**VIF**
Tax avoidance	Tax Avoid	0.086	0.034	2.52	0.011	1.17
Firm size	SIZE	-0.030	0.003	-9.39	0.0000	1.34
Firm growth	MTB	-0.001	0.001	-1.22	0.220	1.26
Financial leverage	LEV	0.290	0.031	9.40	0.0000	2.07
Return on assets	ROA	-0.230	0.045	-5.17	0.0000	2.45
Capital intensity	CAPINT	0.067	0.027	2.41	0.016	1.50
Sales growth	Growth Sale	-0.071	0.013	-5.35	0.0000	1.11
Liquidity	CASH	-0.170	0.100	-1.70	0.088	1.08
Firm age	AGE	-0.091	0.015	-5.93	0.0000	1.01
R&D intensity	R&D	1.170	1.170	0.99	0.310	1.02
Financial distress	T-Score	0.045	0.017	2.60	0.009	1.47
Constant	—	1.027	0.081	12.60	0.0000	—
R-squared:			0.71			
Durbin–Watson statistic:			2.11			
F-statistic:			118.488			
Prob(F-statistic):			0.0000			

Source: Research findings

5.2. Interpretation of results

The results reported in Table 8 indicate that tax avoidance has a positive and statistically significant effect on trade credit, with a coefficient of 0.086 and a p-value of 0.011. Therefore, the research hypothesis is supported at the 5% significance level.

Among the control variables, firm size, financial leverage, return on assets, capital intensity, sales growth, firm age, and financial distress also exhibit statistically significant relationships with trade credit.

The model's R-squared value of 0.71 indicates that the independent and control variables collectively explain 71% of the variation in trade credit. The Durbin–Watson statistic of 2.11, which falls within the acceptable range of 1.5 to 2.5, suggests that there is no severe autocorrelation in the residuals. Furthermore, all variance inflation factor (VIF) values are below 5, indicating the absence of serious multicollinearity among the explanatory variables. Finally, the F-statistic is statistically significant at the 5% level, confirming that the overall model has a good fit.

Table 9. Summary of research findings

Hypothesis title	Relationship	Result
Tax avoidance affects corporate trade credit.	Positive	Supported

6. Top of Form Bottom of Form Discussion and Conclusion

Trade credit represents a crucial source of short-term financing, particularly for small and medium-sized enterprises. Decisions regarding the extent of trade credit utilization are among the most critical managerial responsibilities. Trade credit is defined as a bilateral agreement between the seller (supplier) and the buyer (customer); consequently, effective management of trade credit can have a substantial impact on firm value and shareholder wealth. Due to its advantages, firms in many economies often rely more on trade credit than on short-term bank loans.

Prior studies have documented considerable cross-sectional variation in trade credit usage and suggest that it can serve as a substitute for bank financing when firms face constraints in accessing external capital.

Firms may also use trade credit as a channel for tax avoidance. Tax planning activities reflect a firm's strategic efforts to reduce tax liabilities efficiently. However, tax avoidance is inherently risky, as it may lead to future tax disputes and adversely affect firms' after-tax cash flows. From an agency theory perspective, tax avoidance may provide managers with opportunistic incentives, allowing them to exploit information asymmetry to pursue private benefits through aggressive tax strategies. Accordingly, the main objective of this study is to examine the relationship between tax avoidance and corporate trade credit among 142 firms listed on the Tehran Stock Exchange over the period 2018–2022.

The empirical results indicate a positive and statistically significant relationship between tax avoidance and trade credit. Specifically, firms engaging in higher levels of tax avoidance tend to rely more heavily on trade credit. Tax avoidance appears to encourage firms to substitute trade credit for bank debt, as trade credit enables the purchase of goods without immediate cash payment despite its relatively high implicit cost. This non-cash financing mechanism supports firms' operational continuity and growth. The findings are consistent with Hasan and Habib (2023) but contradict the results reported by Edwards et al. (2016). These differences may be attributed to variations in economic development, economic uncertainty, and regulatory oversight between Iran and the United States. Given the structural and institutional differences between these markets, direct comparisons should be interpreted with caution, as contextual factors may influence firms' financing behavior and tax strategies.

7. Practical Implications

Firms that engage in tax avoidance tend to exhibit higher levels of trade credit. Consequently, tax auditors and investors may use trade credit ratios as an indicator to evaluate the extent of tax avoidance, enabling them to make more informed decisions. Moreover, internal auditors can monitor managers' financing decisions related to trade credit to detect potential tax avoidance motives and implement appropriate control mechanisms.

8. Suggestions for Future Research

Future studies could build on this research by examining the relationship between risk management practices and the use of trade credit. Another promising direction is to investigate the association between trade credit and firms' financial risk. Additionally, future research may explore the role of government ownership in shaping firms' trade credit policies.

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The Impact of Risk Management Process Effectiveness on Risk-based Internal Audit Practice

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Abstract

Objectives: The purpose of this study is to examine the impact of risk management process effectiveness on risk-based internal audit practice.

Methodology: This research is quantitative and survey-based. Data were collected through a Likert-scale questionnaire localized to the Iranian context. Out of 436 distributed questionnaires, 408 were deemed valid for analysis. The data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS software. The reliability and validity of the constructs were confirmed, and the relationships among variables were tested based on path coefficients and t-statistics.

Findings: The results revealed significant relationships between the internal auditors' responsibilities, risk management training, and management support with risk management effectiveness. Furthermore, a significant association was observed between risk management and risk-based internal auditing. In addition, risk management, as a mediating variable, influences the relationship between the internal auditors' role, management support, and risk-based internal auditing, while it has no significant mediating effect on the relationship between risk management training and risk-based internal auditing.

Innovation: Focusing on Iran's economic environment, this study fills an existing research gap in domestic literature and highlights the evolving role of internal auditors over time. Internal auditors now go beyond their traditional responsibilities by monitoring, assessing, and evaluating risks that threaten organizational objectives. Moreover, they increasingly serve as advisors to management, as managers are responsible for implementing and executing risk mitigation strategies within business entities.

Keywords: Management support in business entities; Risk management; Risk-based internal auditing; Traditional role of internal auditors.

1. Introduction

The importance of risk management and risk-based internal auditing has significantly increased in developed countries from economic, social, and environmental perspectives. Organizational alignment with dynamic environmental changes leads to financial stability, market confidence, and enhanced reputation (Jiménez *et al*., 2024). All business entities face various types of risks throughout their operations, including credit, operational, and market risks. Almgrashi and Mujalli (2024) emphasized that since business entities encounter numerous ambiguities in every period, it is recommended that they adopt a sustainable risk management strategy. Such a strategy is not only beneficial but also essential for overcoming future challenges. Risk management plays a vital role in minimizing potential losses and assisting organizations in achieving long-term market sustainability (Mwangi and Njoroge, 2024). A risk management strategy refers to the process of identifying, assessing, and mitigating potential threats faced by business entities. While risk management is crucial for financial stability, effective communication of its outcomes to stakeholders and investors is equally important (Adepoju *et al*., 2025).

According to Turetken *et al*. (2020), internal auditors provide management with an independent and objective perspective on the effectiveness of risk management within business entities. Historically, internal auditors assumed a traditional and control-centered role; however, over time, their responsibilities have evolved toward a more proactive and dynamic approach aimed at managing risks and strengthening organizational control mechanisms. Many researchers, such as Yousif and Mohamed (2022) and Baharom (2025), have clearly noted that the internal auditors' role has significantly changed in areas such as risk-based decision-making and strategic planning.

No prior research in Iran has examined the effectiveness of the risk management process on risk-based internal audit practices. The present study aims to fill this research gap by analyzing perceptual data gathered from academic and professional experts actively engaged in internal audit practices. Unlike most previous studies that rely on mathematical models or financial statement data, this research employs a Likert-scale questionnaire to collect data from respondents.

The core problem addressed in this study concerns how the risk management process affects internal auditors' activities within business entities. The role of internal auditors has evolved; in the past, their work primarily focused on processing financial transactions and verifying compliance with organizational policies. However, as business environments have become more complex, internal auditors have expanded their responsibilities beyond traditional control functions to include strategic advisory roles, offering insights and recommendations on how to analyze and respond to risks. This transformation in internal auditing has led to the adoption of a risk-based approach, which serves as a modern and effective framework integrating the concept of risk management. Such integration enhances the efficiency, effectiveness, and capabilities of internal auditors, thereby increasing the overall value of business entities (Fekir *et al*., 2025).

According to Attaf and Bensbahou (2025), all organizations face extensive risks and challenges. Therefore, to survive and remain competitive, they must continuously adapt their operations and implement effective risk management systems. In essence, risk management functions as an internal mechanism essential for the success and sustainability of all business entities.

Therefore, the main research question and objective of this study are to examine the impact of risk management process effectiveness on risk-based internal audit practice. Achieving this objective will enable the development of more effective and preventive actions in the field of risk management, which serves as a critical factor for all business entities. The outcomes of such measures are expected to enhance both the value and performance of organizations. Furthermore, this approach allows business entities to operate within a secure competitive environment, focusing not merely on mitigating

potential threats but on fostering innovation in risk management practices. Ultimately, these efforts will be reflected in the financial statements of the entities, demonstrating improved organizational resilience and performance.

2. Literature Review

The literature on internal auditing has evolved, shifting from a traditional audit approach to a risk-based review framework. The extent of implementing risk-based internal auditing varies across industries and depends on the size and structure of each business entity (Coetzee and Lubbe, 2021). According to the Institute of Internal Auditors (IIA) statement issued in 2009, the implementation of a risk-based internal audit involves several critical stages and is structured as a systematic and cyclical process (Babiker and Elseed, 2025). Figure 1 illustrates a unified framework for risk-based internal audit planning (Wang *et al*., 2025).

Having an appropriate risk-based internal audit (RBIA) plan provides business entities with a comprehensive perspective on how to allocate resources effectively to areas where auditors can have the greatest impact. Consequently, audit activities become more meaningful and value-adding for the organization (ibid). The implementation of systematic procedures through risk-based internal auditing constitutes an integral part of internal auditors' responsibilities within business entities. Such practices enable auditors to identify and mitigate threats related to the entity's operations. Moreover, risk-based internal auditors also provide a form of assurance regarding management's behavior toward all stakeholders (Almgrashi and Mujalli, 2024). In fact, risk is an inseparable element of every decision. It should not be viewed solely as an undesirable event but rather as a potential opportunity. The growing interconnections within dynamic markets and the instability of economic environments have made risk an inherent component of both business activities and social life. Researchers argue that risk itself should not be considered inherently negative; rather, the failure to manage risk effectively, the lack of proper understanding of its nature, and the inaccurate pricing of risk in volatile economic environments are the factors that make risk appear undesirable. Most organizations attempt to manage risks, yet many fail due to fragmented or inconsistent risk management practices, a phenomenon often described as silo thinking. Effective risk management, therefore, requires a comprehensive, integrated, forward-looking, and process-oriented approach, enabling business entities to not only control risks but also transform them into opportunities. In essence, a risk management strategy entails identifying, assessing, and mitigating risks that threaten the operations and objectives of the organization (Adepoju *et al*., 2025).

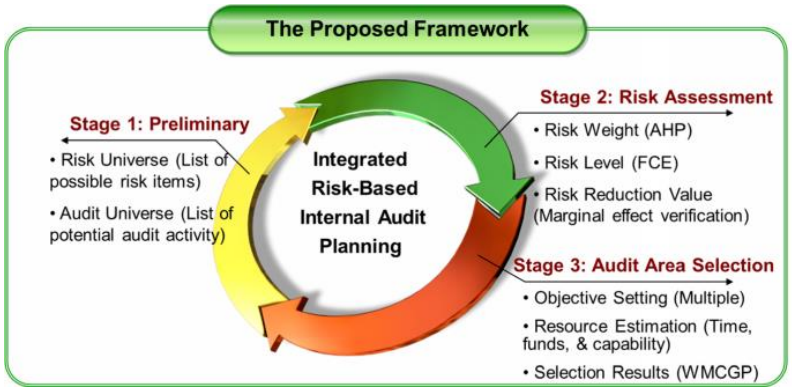

Figure (1) Framework of Risk-Based Internal Audit Planning

Setayesh *et al*. (2025) stated that the adoption of emerging technologies has a significant impact on the independence and objectivity of auditing, the efficiency and professional care of the audit process, the quality assurance and improvement programs of internal auditing, as well as management support for internal audit functions. Sajjadi and Hooshmand Kashani (2024) found that data analytics and the importance of the audit committee have a positive and significant effect on the utilization of continuous audit information in risk-based internal audit planning. Nasredin Maroof *et al*. (2024) demonstrated that risk-based internal controls have a significant effect on the transparency of financial reporting. Furthermore, Barkhordar *et al*. (2021) reported that internal audit independence, auditor competence, management support, internal audit size, and the relationship between internal and external auditors all have positive and significant effects on internal audit effectiveness. However, while effective internal auditing improves internal control systems in banks, it does not have a significant impact on bank risk management.

Fekir *et al*. (2025) stated that adopting a risk-based internal audit (RBIA) approach through a focus on organizational risks enhances the efficiency of internal auditors and helps business entities achieve their objectives. Moreover, compliance with international auditing standards increases audit accuracy and promotes effective resource allocation. Additionally, the alignment of internal auditing with risk management strategies is essential for organizations to accomplish their goals. Zahra (2025) found that internal auditors play a vital role in evaluating and strengthening internal controls, adopting a risk-based perspective, and improving the organization's ability to prevent and detect fraud. Similarly, Babiker and Elseed (2025) demonstrated that risk identification, assessment, and audit planning indicators are significantly associated with the quality of integrated reporting in organizations. Furthermore, conducting risk-based auditing and risk-based reporting has a positive effect on reporting quality. Jaber *et al*. (2024) reported that internal auditors have shown relatively strong participation in the risk management processes of business entities. Moreover, both the role of internal auditors in risk management and their independence have a significant impact on organizational risk management. However, the independence of internal auditors, as a moderating variable, does not significantly influence the relationship between the auditors' role in risk management and overall organizational management. Dmyshko (2024) emphasized that audit planning should be based on a comprehensive risk assessment. Developing a precise audit plan grounded in an in-depth evaluation of the organization's risks is crucial, and continuous monitoring allows internal auditors to promptly adjust their audit programs in response to emerging threats and opportunities. Alabdullah (2023) found that consistency in assurance and internal controls is significantly related to audit procedures, whereas no significant relationship was found between auditor failure and audit practices. Lois *et al*. (2021) revealed a significant association between the implementation of risk-based internal auditing, competence in risk management, active participation of audit committee members, and the establishment of a formal risk management system. Finally, Erlina *et al*. (2020) concluded that managerial commitment, professional competence, and policy frameworks influence the implementation of effective risk management. Additionally, the role and communication of internal auditors significantly affect the adoption of risk-based internal auditing, which in turn positively influences internal audit quality.

The present study examines the impact of risk management process effectiveness on risk-based internal audit practices. Accordingly, based on the reviewed literature and theoretical foundations, the following hypotheses have been developed:

- **H1:** There is a significant relationship between the role of internal auditor in risk management (IAR) and risk management (RME).

- **H2:** There is a significant relationship between training in risk management (TRM) and risk management (RME).
- **H3:** There is a significant relationship between management support (MS) and risk management (RME).
- **H4:** There is a significant relationship between risk management (RME) and risk-based internal audit (RBIA).
- **H5:** Risk management (RME) has a mediating effect on the relationship between the role of internal auditor in risk management (IAR) and risk-based internal audit (RBIA).
- **H6:** Risk management (RME) has a mediating effect on the relationship between training in risk management (TRM) and risk-based internal audit (RBIA).
- **H7:** Risk management (RME) has a mediating effect on the relationship between management support (MS) and risk-based internal audit (RBIA).

3. Methodology

The research strategy of the present study is built upon examining the impact of risk management process effectiveness on risk-based internal audit (RBIA), serving as the main path toward testing the proposed hypotheses. Data and information were collected through a survey method using a Likert-scale questionnaire. In terms of implementation outcome, this research is applied, and from a methodological perspective, it is quantitative in nature. Moreover, based on its purpose, the study is descriptive (survey-based), follows an inductive logic, and is cross-sectional in terms of its time horizon.

The questionnaire used in this research was adapted from previous studies, particularly Almgrashi and Mujalli (2024), and was localized and redesigned to fit the environmental and institutional conditions of Iran. According to Sekaran and Bougie (2016), a questionnaire is a highly effective and practical tool for collecting data. One of its main advantages is that it allows respondents to reflect on their answers, providing thoughtful responses while requiring less time compared to other methods, such as interviews. Conducting a questionnaire-based survey also enables researchers to obtain a substantial amount of specific and homogeneous data from the target sample (Saunders *et al*., 2009).

Table (1) Measurement Components by Construct

Risk-Based Internal Audit (RBIA)	Evaluation of internal audit unit guidelines
	Risks related to receivables and shareholders' claims
	Deeper understanding of the internal audit process
	More efficient allocation of financial resources
The Role of Internal Auditor in Risk Management (IAR)	Operational and strategic objectives within organizations
	Estimating the business unit's risk levels in annual reports and their outcomes
	Inherent risks associated with organizational performance
	Assessing and providing timely information about risks that may affect organizational sustainability
	Efficiency of the internal audit system
	Effectiveness of risk management practices
Training in Risk Management (TRM)	Establishment of a risk-based audit system
	Documentation and assessment of risks associated with the business unit
	Enhancing the quality of internal audit and risk management procedures

Management Support (MS)	Evaluation of risks and risk-based internal auditing
	Duties, accountability, and responsibilities of the internal audit unit
	Allocating an appropriate budget to the internal audit department
Risk Management (RME)	Clarity of accountability mechanisms and risk management procedures
	Existence of a separate and identifiable risk management function
	Embedding risk management practices within organizational processes

4. Findings

The statistical population of this study consists of internal auditors operating within Iran. Given the extensive and uncountable number of practitioners across various organizations, the population was considered infinite. Accordingly, the minimum required sample size was determined to be 384 respondents, based on Cochran's formula for an infinite population at a 95% confidence level and a 5% margin of error.

To ensure sufficient representation and account for potential non-responses or incomplete data, a total of 436 questionnaires were distributed among internal auditors in different regions and sectors. Ultimately, 408 fully completed questionnaires were collected and deemed valid for analysis, representing a response rate of approximately 93.6%, which is considered highly satisfactory for social science research.

The collected data were subsequently coded, cleaned, and analyzed using appropriate statistical techniques to test the research hypotheses and evaluate the relationships among the study variables. Descriptive statistics were first employed to summarize the demographic and key characteristics of the respondents, followed by inferential analyses using advanced statistical models consistent with the research objectives.

Table (2) Descriptive Statistics of Respondents

Variable	Category	Frequency	Percentage (%)
Gender	Male	301	73.8
	Female	107	26.2
Educational Level	Bachelor's	29	7.10
	Master's	132	32.4
	Ph.D.	173	42.4
	DBA	57	14.0
	Post-Doctorate	17	4.2
Field of Study	Financial Management	189	46.3
	Financial Engineering	45	11.0
	Accounting	147	36.0
	Other Finance-related Fields	27	6.6
Work Experience (Years)	5–10	66	16.2
	10–15	87	21.3
	15–20	177	43.4
	20–25	49	12.0
	25 and above	29	7.1

The descriptive analysis of the 408 respondents indicates that the majority were male (73.8%) and held advanced academic qualifications, with Ph.D. (42.4%) and Master's degrees (32.4%) predominating. Most

participants specialized in Financial Management (46.3%) and Accounting (36%), reflecting a strong finance-oriented expertise among internal auditors. Regarding professional experience, the largest group had 15–20 years of work experience (43.4%), followed by 10–15 years (21.3%) and 5–10 years (16.2%), demonstrating a seasoned and diverse workforce. Overall, the sample represents a highly qualified, experienced, and finance-focused population, providing a solid basis for subsequent analyses of the relationships between internal auditing practices and risk-based auditing in the Iranian context.

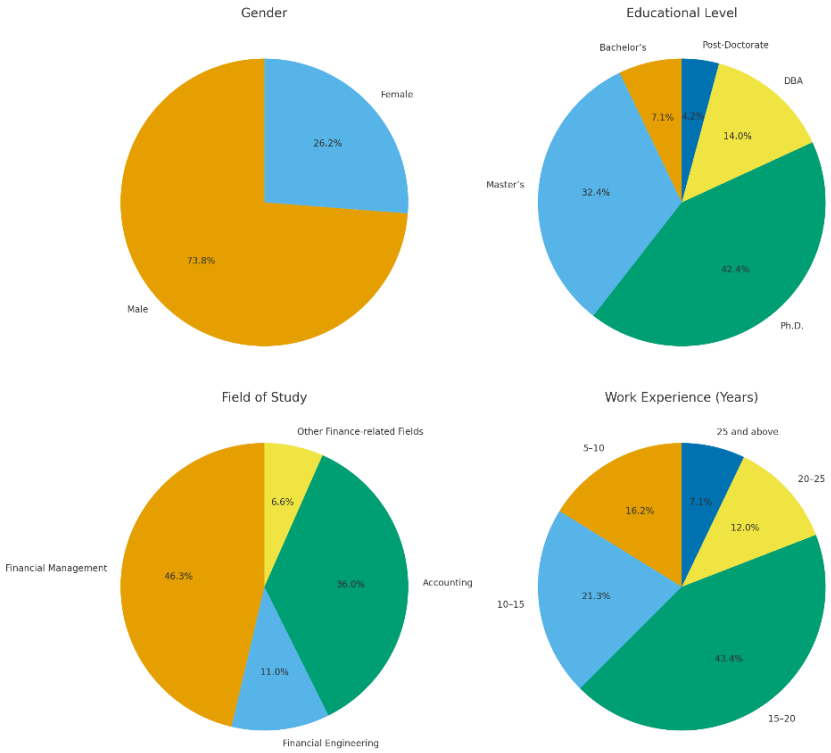

Figure 2: Descriptive Statistics of Respondents

Before structural analysis, the reliability of the measurement instruments was assessed. Internal consistency was evaluated using Cronbach's Alpha (α) and Composite Reliability (CR). Table 3 presents the reliability values for the dependent variable (Risk-based internal audit (RBIA)), independent variables (The role of internal auditor in risk management (IAR), Training in risk management (TRM), Management support (MS)), and the mediating variable (Risk management (RME)).

Table 3 shows the reliability of all constructs, assessed using Cronbach's Alpha and Composite Reliability. All constructs demonstrate strong internal consistency, with α values ranging from 0.862 to 0.949 and CR values from 0.916 to 0.959, exceeding the recommended threshold of 0.70. The independent variables (IA, TRM, and MS), as well as the mediating

variable RME and the dependent variable RBIA, all exhibit satisfactory reliability, indicating that the measurement instruments are consistent and suitable for further structural analysis.

Table (3) Reliability of constructs

Constructs	Cronbach's Alpha	Composite Reliability
IAR	0.949	0.959
TRM	0.889	0.931
MS	0.887	0.930
RME	0.862	0.916
RBIA	0.924	0.946

Following the assessment of reliability, the convergent validity of the measurement model was examined to ensure that the indicators effectively represent their respective constructs. Convergent validity evaluates the degree to which multiple indicators of the same construct share a high proportion of variance. In this study, it is assessed using Factor Loadings and the Average Variance Extracted (AVE). Factor loadings indicate the strength of the relationship between each indicator and its underlying construct, with values above 0.70 considered acceptable. Table 4 presents the AVE values for all constructs in the study.

Table (4) Convergent Validity of Constructs

Constructs	AVE
IAR	0.795
TRM	0.819
MS	0.815
RME	0.783
RBIA	0.815

Table 4 shows the AVE values for all constructs, ranging from 0.783 to 0.815, exceeding the recommended threshold of 0.50. This indicates that the indicators of each construct, including IAR, TRM, MS, RME, and RBIA, share a high proportion of variance, confirming strong convergent validity and suitability for further structural analysis.

After assessing reliability and convergent validity, the discriminant validity of the measurement model was examined to ensure that each construct is distinct from the others. Discriminant validity evaluates the extent to which a construct differs from other constructs in the model, confirming that indicators measure their intended construct rather than overlapping with others. In this study, discriminant validity is assessed using the Fornell-Larcker criterion, which requires that the square root of the Average Variance Extracted for each construct is greater than its correlations with all other constructs. Table 5 presents the Fornell-Larcker results for all constructs in the study.

Table (5) Convergent Validity of Constructs

Constructs	√AVE	IAR	TRM	MS	RME	RBIA
IAR	0.891	1	0.713	0.687	0.815	0.899
TRM	0.904	0.713	1	0.745	0.952	0.668
MS	0.902	0.687	0.745	1	0.841	0.715
RME	0.884	0.815	0.652	0.841	1	0.617
RBIA	0.902	0.899	0.668	0.715	0.617	1

Table 5 presents the discriminant validity of the constructs using the Fornell-Larcker criterion. For all constructs, the square root of the AVE (diagonal values) ranges from 0.884 to 0.904, which is higher than their respective correlations with other constructs (off-diagonal values). This indicates that each construct is distinct from the others, confirming adequate discriminant validity. These results support that the indicators reliably capture their intended constructs without significant overlap, ensuring the robustness of the measurement model for subsequent structural analysis.

Following the evaluation of reliability and validity, the measurement model was examined to assess the relationships among constructs. Figure 3 illustrates the measurement model with the path coefficients, showing the strength of the relationships among constructs. Figure 4 displays the model with t-values, indicating the statistical significance of the paths. These visual representations provide a clear overview of both the magnitude and significance of the relationships in the proposed model.

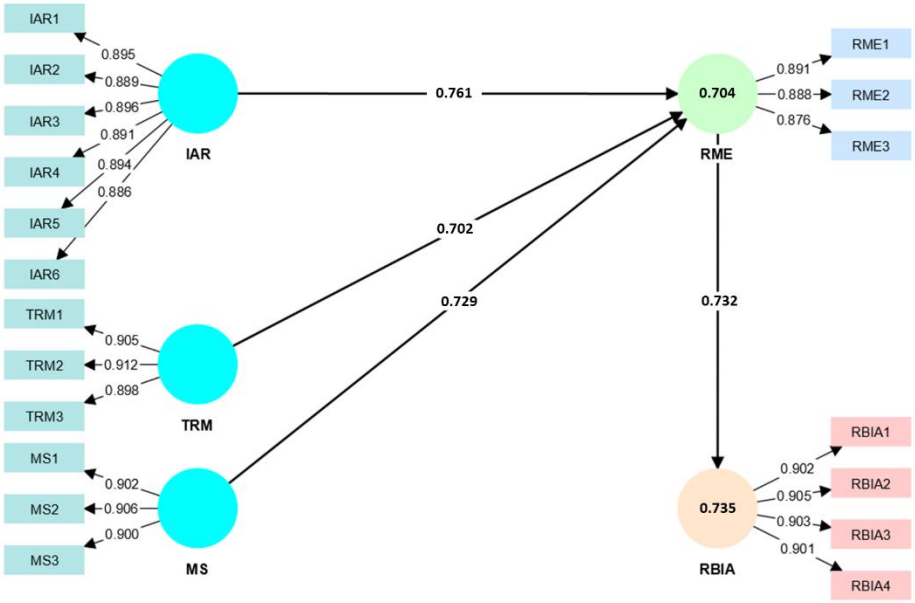

Figure (3) Measurement Model with Path Coefficients

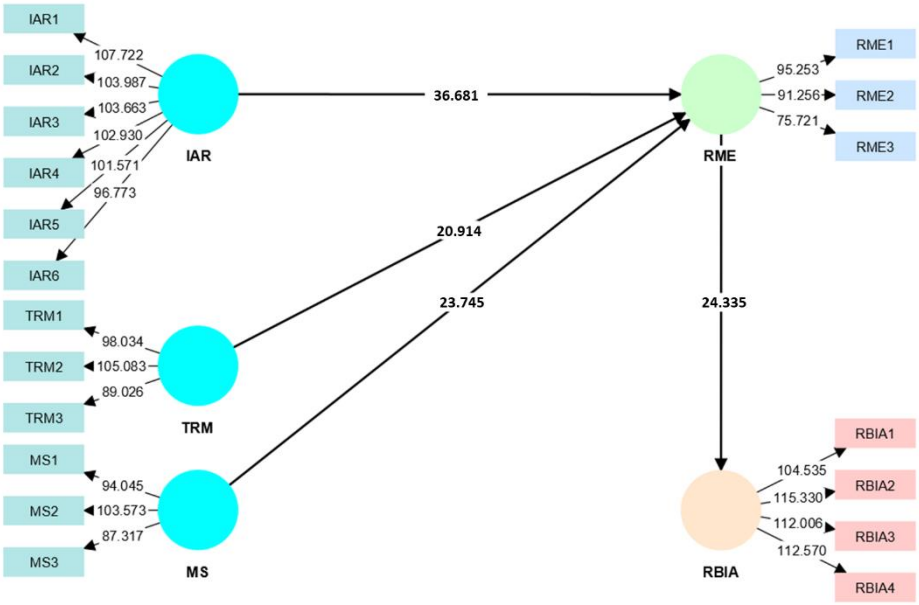

Figure (4) Measurement Model with t-values (Significance of Paths)

After validating the measurement model, the structural model was evaluated to test the proposed hypotheses. The significance and strength of the relationships between constructs were examined using path coefficients and t-values obtained through Smart PLS. Table 6 summarizes the results of the hypothesis testing, indicating whether each hypothesized relationship is supported based on the significance level and direction of the path coefficients.

Table (6) Results of the Hypotheses Testing

No	Hypothesis	Path Coefficient	t-values	p-values	Result
1	IAR → RME	0.761	36.681	0.000	Hypothesis confirmation
2	TRM → RME	0.702	20.914	0.000	Hypothesis confirmation
3	MS → RME	0.729	23.745	0.003	Hypothesis confirmation
4	RME → RBIA	0.732	24.335	0.000	Hypothesis confirmation
5	IAR → RME → RBIA	0.746	30.508	0.014	Hypothesis confirmation
6	TRM → RME → RBIA	0.717	22.624	0.219	Hypothesis Rejection
7	MS → RME → RBIA	0.731	24.040	0.001	Hypothesis confirmation

Table 6 presents the results of the hypotheses testing based on path coefficients, t-values, and p-values. All direct relationships between the independent variables and the mediating variable IAR → RME ($\beta = 0.761$, $t = 36.681$, $p < 0.001$), TRM → RME ($\beta = 0.702$, $t = 20.914$, $p < 0.001$) and MS → RME ($\beta = 0.729$, $t = 23.745$, $p < 0.01$) are statistically significant, confirming hypotheses 1-3. The mediating effect of RME on RBIA is also significant for most paths: RME → RBIA ($\beta = 0.732$, $t = 24.335$, $p < 0.001$), IAR → RME → RBIA ($\beta = 0.746$, $t = 30.508$, $p < 0.05$), and MS → RME → RBIA ($\beta = 0.731$, $t = 24.040$, $p < 0.01$), confirming hypotheses 4, 5, and 7. However, the indirect effect of TRM → RME → RBIA ($\beta = 0.717$, $t = 22.624$, $p = 0.219$) is not statistically significant, leading to the rejection of hypothesis 6. Overall, these results indicate that while most proposed relationships are supported, the mediating role of RME in the case of TRM on RBIA is not confirmed.

The coefficient of determination (R^2) was calculated to assess the explanatory power of the structural model. R^2 represents the proportion of variance in the dependent or mediating variables explained by the independent variables. Higher R^2 values indicate a stronger predictive ability of the model. Table 7 presents the R^2 values for the mediating variable RME and the dependent variable RBIA, providing an overview of the model's explanatory strength.

Table (7) Coefficient of Determination (R^2)

Constructs	R^2	R^2 adjusted
RME	0.510	0.506
RBIA	0.474	0.472

Table 7 presents the coefficient of determination (R^2) for the mediating variable RME and the dependent variable RBIA. The R^2 value for RME is 0.510 (adjusted $R^2 = 0.506$), indicating that 51% of the variance in risk management is explained by the independent variables IAR, TRM and MS. For RBIA, the R^2 value is 0.474 (adjusted $R^2 = 0.472$), suggesting that approximately 47% of the variance in risk-based internal audit is explained by the model, including the mediating effect of RME. These values reflect a moderate to substantial explanatory power, demonstrating that the structural model effectively captures the key determinants of the constructs.

To evaluate the overall fit of the structural model, the Goodness-of-Fit (GoF) index was calculated. The GoF provides a global measure of how well the model reproduces the observed data by combining the quality of both the measurement and structural models. Higher GoF values indicate a better fit, with recommended thresholds suggesting small, medium, and large effect

sizes. Table 8 presents the GoF values for the model, reflecting the adequacy of the proposed framework in capturing the relationships among constructs.

Table (8) GoF Index for the Structural Model

Indicator	Value
GoF	0.626

Table 8 presents the GoF index for the structural model, which is calculated as 0.626. According to conventional thresholds for PLS-SEM, a GoF value above 0.36 is considered large, indicating that the model has a strong overall fit. This result confirms that the proposed structural model effectively represents the relationships among the constructs and that both the measurement and structural components of the model adequately capture the underlying theoretical framework.

In summary, the measurement model demonstrated strong reliability and validity, with all constructs exhibiting satisfactory Cronbach's Alpha, Composite Reliability, AVE, and discriminant validity based on the Fornell-Larcker criterion. The structural model results indicate that most hypothesized relationships are supported, with significant path coefficients and t-values, while one indirect effect (TRM → RME → RBIA) was not confirmed. The coefficients of determination (R^2) for RME and RBIA suggest moderate to substantial explanatory power, and the Goodness-of-Fit (GoF) index of 0.626 indicates a strong overall fit of the model. Overall, these results confirm that the proposed framework is both reliable and robust for explaining the determinants of risk-based internal audit within the studied context.

5. Discussion and Conclusion

The primary objective of this study was to examine the impact of risk management process effectiveness on risk-based internal audit (RBIA) practices. Risk is one of the most critical issues faced by all business entities, regardless of their economic conditions. In essence, risk arises when the outcome of an event is uncertain; in financial terms, risk is defined as the degree of uncertainty surrounding a specific matter. This uncertainty represents the potential adverse effects that may result in loss or damage. According to the International Organization for Standardization (ISO 31000: 2018), risk is a significant factor that can affect an organization's objectives. However, over time, research has demonstrated that risk should not merely be viewed as a negative element; rather, when properly managed, it can be transformed into an opportunity.

Within business entities, the responsibility for effectively evaluating and managing risk primarily lies with internal auditors. Through their insights and recommendations, internal auditors assist managers in managing risks more efficiently. Internal auditors play a vital role in organizations, ensuring compliance with essential requirements during the supervision of managerial performance. They also assess the effectiveness of methods and procedures employed within business operations. Recently, the adoption of risk-based internal auditing has become recognized as an ideal and strategic approach for internal audit functions. Moreover, top management support enhances the effectiveness of internal auditors' responsibilities in implementing risk-based practices.

The findings of this study revealed significant relationships among the role of internal auditor in risk management (IAR), training in risk management (TRM), management support (MS), and risk management effectiveness (RME). Consistent with Lois *et al*. (2021) and Mujalli (2024), internal auditors should prioritize the adequacy and effectiveness of risk management mechanisms within business entities. Similarly, Rae and Subramaniam (2008) found that risk management training improves the quality of internal control systems. Moreover, as Mujalli (2024) noted, management support plays a crucial and influential role in the accurate and effective implementation of risk management methods.

The results also indicated a significant relationship between risk management (RME) and risk-based internal audit (RBIA). Researchers such as Zainal Abidin (2017), Goodwin-Stewart and Kent (2006), Mujalli (2024), and Coetzee and Lubbe (2014)

emphasized that aligning risk management practices with organizational structures is a managerial responsibility, requiring the establishment and implementation of appropriate frameworks and processes.

Furthermore, the results showed that risk management (RME), as a mediating variable, significantly affects the relationships among the role of internal auditor (IAR), management support (MS), and risk-based internal audit (RBIA), but does not have a mediating effect on training in risk management (TRM).

The responsibilities of internal auditors within organizations are vital and indispensable, as they are accountable for detecting, assessing, and minimizing risks and fraud that may hinder organizational objectives (Lois *et al*., 2021). In addition, Drogalas *et al*. (2014) emphasized that managerial commitment to risk management practices and techniques is of utmost importance. Establishing a risk awareness culture and allocating sufficient resources to effective and efficient risk mitigation methods are essential components of a successful risk management framework.

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The Effect of Investor Sentiment on the Relationship between Corporate Social Responsibility and Corporate Financial Performance

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Abstract

Objectives: Behavioral finance examines how psychological factors shape investor decision-making under uncertainty. Given that investor perceptions and sentiments influence investment choices, pricing, resource allocation, and returns, this study aims to investigate the effect of investor sentiment on the relationship between corporate social responsibility (CSR) performance and the financial performance of firms listed on the Tehran Stock Exchange.

Methodology/Design/Approach: The study employs a quantitative approach using data from 82 firms over the period 2012–2021. Linear regression analysis was conducted using EViews software to test the research hypotheses and evaluate how investor sentiment interacts with CSR and corporate financial performance (CFP).

Findings: The results demonstrate that investor sentiment negatively affects corporate financial performance, whereas corporate social responsibility has a positive influence on financial performance. However, investor sentiment does not play a moderating role in the relationship between CSR performance and corporate financial performance.

Innovation: By integrating behavioral finance concepts with corporate social responsibility and financial performance, this study provides new insights into the behavioral dynamics of investors in emerging markets. It highlights the independent and contrasting effects of investor sentiment and CSR on firm performance, offering implications for managers, investors, and policymakers concerned with sustainable value creation.

Keywords: Investor Sentiment, Corporate Social Responsibility, Corporate Financial Performance.

1. Introduction

The increasing pressures related to human resources and the environment have created significant concerns in the business world. Corporate social responsibility (CSR) has emerged as an overarching framework to address and mitigate these pressures. Various definitions of CSR have been presented in the literature. According to Bowen (1953), CSR can be defined as the obligations of a manager: "By following those policies, making those decisions, or adopting those courses of action which are desirable in terms of the values and goals of our society." Based on these points, this study considers CSR as the behaviors of a company aimed at positively influencing both social and non-social stakeholders, going beyond merely economic benefits (Agan, 2015).

Researchers have found that CSR can have various impacts on corporate financial performance, which can be analyzed from two perspectives. The first perspective arises from traditional management theories and neoclassical economics, which argue that companies should prioritize shareholders as the primary stakeholders, with profit maximization as a core objective. Efforts to satisfy other stakeholder groups, in this view, may negatively affect corporate performance and reduce financial success. In contrast, stakeholder theory suggests that CSR can serve as a tool for creating competitive advantage and enhancing financial performance (Vvong, 2022).

Shi and Zhang (2010) found that investor sentiment has an inverse effect on a company's future financial performance. They argued that investor optimism encourages firms to invest more, which can weaken financial performance when investments are made during optimistic market conditions. Conversely, during pessimistic market conditions, companies tend to cut back on investments and select only the most valuable projects, which can enhance corporate performance. Cheng (2019) demonstrated that trading volume, as an indicator of investor sentiment, has a positive relationship with future operating return ratios.

2. Theoretical Foundations

2.1. Corporate Social Responsibility Performance

The United Nations Conference on Trade and Development defines social responsibility as the effort to evaluate how well a company's actions align with societal goals and needs, as well as the extent to which companies can influence these societal priorities (Hasasyeganeh & Barzegar, 2013). Türker (2009) proposed a framework conceptualizing corporate social responsibility (CSR) into five dimensions:

1. Social responsibility to the environment
2. Social responsibility to the media
3. Social responsibility to employees
4. Social responsibility to customers
5. Social responsibility to stakeholders (Agan et al., 2014)

However, the literature indicates that Carroll's (1979) conceptualization of CSR is the most widely accepted. Carroll (1979) defined corporate social responsibility as "encompassing the economic, ethical, legal, and discretionary expectations that society has of organizations at a particular point in time." He identified four key elements of CSR:

1. Economic Responsibilities
2. Legal Responsibilities
3. Ethical Responsibilities
4. Discretionary/Philanthropic Responsibilities (Carroll, 1979)

Corporate economic responsibility involves the duty of a business to generate profits for its investors. The legal aspect refers to the obligation of a business to operate within the framework of established laws and regulations. Carroll (1991) argued that since society permits businesses to engage in economic activities as part of a "social contract" and sanctions the economic system, it also establishes laws and regulations that businesses are expected to follow.

Ethical responsibilities pertain to a corporation's obligation to act in ways that are right, fair, and just. These responsibilities reflect societal expectations that extend beyond mere legal compliance. In other words,

a company should strive to exceed its legal obligations in its interactions with the community.

Finally, discretionary responsibilities represent societal expectations that a business should engage in social roles that go beyond its economic, legal, and ethical duties. Such activities—like supporting social, educational, recreational, or cultural initiatives—are not legally mandated, and a firm does not violate legal or ethical norms if it chooses not to undertake them.

Carroll's categories of corporate social responsibility are not mutually exclusive but are organized based on their fundamental role and evolving significance (Amodu, 2018).

2.2. Corporate Financial Performance

Derivational performance refers to the process of evaluating the efficiency and quality of previous activities. Based on this definition, performance can be categorized into two dimensions:

1. Effectiveness: This assesses the extent to which organizational goals are achieved and typically measures how well outputs meet quality standards, customer needs, and availability requirements.
2. Efficiency: This indicates how effectively a company utilizes resources to produce goods and services.

Corporate performance is evaluated based on the achievement of both long-term and short-term goals, making it a key indicator of how well predetermined objectives are met. This evaluation reflects the degree of success that companies have in accomplishing their goals.

There are various approaches to assessing corporate performance, among which the four most significant are:

1. Accounting approaches
2. Financial management approaches
3. Economic approaches
4. Integrated approaches

One widely used indicator is Economic Value Added (EVA), which reflects the true wealth creation for shareholders and quantifies the value generated by the company. An increase in EVA corresponds to an increase in shareholder wealth.

2.3. Investor Sentiment

Investors can be categorized into two groups: rational arbitrageurs (traders), who make decisions free from emotions, and irrational arbitrageurs, who are guided primarily by emotions. In the market, irrational arbitrageurs play a significant role in determining prices and expected returns, while rational arbitrageurs face certain limitations. These limitations stem from transaction costs, short time horizons, and the risks associated with short-term trading.

The framework's key predictions are derived from its two dynamic components. First, it assumes that within companies, sentiment-driven demand shocks differ across securities, while arbitrage opportunities remain equally challenging across firms. As a result, rising investor sentiment typically increases demand for more speculative securities, leading to higher returns for these stocks simultaneously (Baker & Wurgler, 2007).

In the context of investor sentiment, an exogenous shock can trigger a series of market reactions, observable at multiple points along the chain. Limited arbitrage implies that demand pressures can generate mispricing, which may be detected through indicators such as the book-to-market ratio. Mispricing can elicit informed responses from insiders, such as managers, who may possess superior information and incentives to exploit these opportunities. Companies may adjust their equity or debt structures in response.

However, this chain of reactions can be affected by confounding factors. The gap between actual investor behavior and survey responses introduces skepticism into sentiment measurement. Sentiment is often irrational when considered relative to trading activity and shareholder positioning. Generally, market prices reflect fundamental indicators, with sentiment exerting a secondary influence. Companies may adjust their financial structures for reasons related to business fundamentals, not solely as a response to market sentiment.

Practically, these considerations suggest that sentiment must be inferred from imperfect measures. Less experienced retail investors are generally more susceptible to sentiment-driven behavior than professional investors. Research indicates that younger investors tend to buy more aggressively during price bubbles than older investors. Overall, retail investors often trade in a coordinated manner, reflecting systematic emotional patterns in the market (Baker & Wurgler, 2007).

2.4. Investor Sentiment, Corporate Social Responsibility, and Financial Performance

Cheong et al. (2017) were among the first to investigate how **investor sentiment** can influence corporate social responsibility (CSR) behavior. They found that when financial markets or investors experience a downturn in sentiment in the previous year, companies tend to increase their CSR activities in the following year to enhance their public image and reassure market participants. Similarly, Naughton et al. (2019) confirmed that investor sentiment significantly affects CSR commitments.

Their findings indicate that companies respond to investor pessimism by strengthening their CSR efforts. This response is particularly pronounced among firms with higher valuation uncertainty and diverse investor time horizons, as these firms are more motivated to react to shifts in investor sentiment. Although empirical evidence on the interplay between investor sentiment, CSR, and financial performance is limited, existing studies suggest that investor sentiment can influence the relationship between CSR and financial outcomes.

This effect likely arises from managerial decisions aimed at attracting sentiment-driven investors. As Naughton et al. (2019) note, managers face a trade-off between two conflicting objectives: (1) maximizing long-term corporate value through activities that enhance risk-adjusted future cash flows, and (2) maximizing the current stock price by engaging in activities preferred by sentiment-driven investors. Additionally, managers may exploit investor sentiment to boost the company's stock price in the short term, increasing their compensation and offsetting potential corporate losses.

Overall, managerial decisions—whether operational or CSR-related—can significantly impact CSR performance, financial outcomes, and stakeholder relationships. Accordingly, and based on both theoretical perspectives and empirical evidence, this study aims to investigate the impact of investor sentiment on the relationship between CSR performance and financial performance among firms listed on the Tehran Stock Exchange.

Research Hypotheses

H1: Investor sentiment has a significant negative impact on corporate financial performance.
H2: Corporate social responsibility (CSR) has a significant positive impact on corporate financial performance.
H3: Investor sentiment enhances the impact of CSR on corporate financial performance.

3. Research Methodology

3.1. Research Method and Data Collection

The research is characterized as a correlational study, employing an ex post facto approach, which is typical for this type of analysis. The research is applied in nature and employs a combination of deductive and inductive reasoning. Data is collected from archived sources, specifically using the official www.codal.ir website and the Rahavard Novin software for information collection.

3.2. Statistical Population and Sample

The population for this study includes all companies listed on the Tehran Stock Exchange from 2012 to 2021. A systematic screening method was used for sampling, resulting in a selection of 82 companies, accounting for 820 company-years.

3.3. Data Analysis Method

All calculations and mathematical operations were conducted using Excel to compute the research variables. For descriptive statistics, measures of central tendency, distribution, and dispersion were used to describe the findings. In the inferential statistics section, multivariate regression equations were employed using EViews software. The research hypotheses were tested based on the significance level of the student's t-statistic.

3.4. Research Regression Models

Regression model (1) for analyzing the first research hypothesis:

$$FP_{it}(Q_{it}) = \beta_0 + \beta_1 FS_{it-1} + \beta_2 SIZE_{it-1} + \beta_3 LEV_{it-1} + \beta_4 MTB_{it-1} + \beta_5 IND_{it-1} + \beta_6 GDP_{it-1} + \varepsilon_{it-1} \quad (1)$$

Regression model (2) for analyzing the second research hypothesis:

$$FP_{it}(Q_{it}) = \beta_0 + \beta_1 CSR_{it-1} + \beta_2 SIZE_{it-1} + \beta_3 LEV_{it-1} + \beta_4 MTB_{it-1} + \beta_5 IND_{it-1} + \beta_6 GDP_{it-1} + \varepsilon_{it-1} \quad (2)$$

Regression model (3) for analyzing the third research hypothesis:

$$FP_{it}(Q_{it}) = \beta_0 + \beta_1 CSR_{it-1} + \beta_2 FS_{it-1} + \beta_3 CSR_{it-1} \times FS_{it-1} + \beta_4 SIZE_{it-1} + \beta_5 LEV_{it-1} + \beta_6 MTB_{it-1} + \beta_7 IND_{it-1} + \beta_8 GDP_{it-1} + \varepsilon_{it-1} \quad (3)$$

Where:

FP(Q): Financial performance (Tobin Q index) of company i in year t.

CSR: Corporate Social Responsibility performance of company i in year t-1.

FS: Investor sentiment of company i in year t-1.

LEV: Leverage of company i in year t-1.

SIZE: Size of company i in year t-1.

MTB: market-to-book value of company i in year t-1.

IND: Board of directors' independence in the company i in year t-1.

GDP: The country's GDP growth for the year t-1.

3.5. Operational Definition of Research

Table 1 details the measurement approach for each of the independent, dependent, moderating, and control variables in the research:

Table (1): Operational definition of research variables

Row	Variable name	Symbol	The way of calculating the variable
Dependent Variable			
1	Financial Performance	FP (Q)	$\frac{total\ liabilities + total\ market\ value\ of\ equity}{total\ assets}$
Independent Variable			
2	Corporate Social Responsibility Performance	CSR	Measured using the KLD index: CSRD=COMD+ EMPD+END+ PROD CSRD: Corporate social responsibility disclosure score COMD: disclosure score of the community involvement aspect EMPD: Disclosure score of employee relations ENVD: Disclosure score of the environmental aspect PROD: Product features disclosure score To measure the score of corporate social responsibility, each of the four aspects must be calculated first, and then the total score is measured using the formula (Saboohi & Mohammadzadeh, 2017).

Moderating Variable			
3	Investor Sentiment	FS	Measured using the Arms Index. This index measures whether trading volume is higher in a bull market than in a bear market. If the index is less than one, it indicates higher trading volume in a bull market, which is a good sign; if it is greater than one, higher trading volume occurs in a bear market, which is a warning sign. The investor sentiment model is as follows: $\frac{\text{Average volume of advancing trades} * \text{number of advancing prices}}{\text{Average declining volume} * \text{number of declining prices}}$ =Investor Sentiment
Control Variables			
4	Company Size	SIZE	Natural logarithm of the company's total assets
5	Financial Leverage	LEV	$\frac{\text{total liabilities}}{\text{total asset}}$
6	Market-to-Book Value	MTB	$\frac{\text{value of stock market}}{\text{Book value of equity}}$
7	Independence of board of directors	IND	$\frac{\text{Number of non} - \text{executive board members}}{\text{total number of board members}}$
8	GDP Growth Rate	GDP	$\frac{\text{the current year's GDP} - \text{the previous year's GDP}}{\text{the previous year's GDP}}$

Source: Vvong

4. Research Results

4.1. Descriptive Statistics

Table 2 presents the central, distribution and dispersion indicators for the study variables, including the independent variable (Corporate Social Responsibility Performance), the dependent variable (Financial Performance), the moderating variable (Investor Sentiment) and control variables (Company Size, Market-to-Book Value, Financial Leverage, Independence of Board of Directors, and GDP Growth Rate).

The table above presents the maximum and minimum values, indicating the upper and lower bounds of each observation. The standard deviation effectively illustrates the dispersion of the data. According to the values shown, each variable exhibits relatively low dispersion. However, given the presence of companies from different industries on the Tehran Stock Exchange, as well as their varied policies and organizational structures, some deviations from zero can result in notable variability.

Table 2: Descriptive Statistics of Research Variables

Variables	Mean	Median	Maximum	Minimum	Standard Deviation	Skewness	kurtosis
FP (Q)	1.57	1.37	3.98	0.19	0.71	1.25	4.25
CSR	1.006	0.75	3.00	0.16	0.73	1.03	3.19
FS	1.61	1.54	2.30	1.29	0.29	1.07	3.32
SIZE	14.58	14.44	20.12	11.03	1.49	0.60	3.79
LEV	0.57	0.59	0.99	0.03	0.20	-0.37	2.54
MTB	1.70	1.61	4.90	-2.97	1.17	0.05	3.58
IND	0.64	0.60	1.00	0.20	0.17	0.14	2.98
GDP	0.26	0.25	0.57	-0.01	0.15	0.30	2.80

Source: Researcher's findings

Skewness measures the asymmetry of the data: positive skewness indicates that most observations fall below the mean, while negative skewness indicates that most observations are above the mean. Kurtosis, which also relates to the shape of the data distribution, shows that the positive kurtosis values for all variables imply a sharper peak compared to a normal distribution.

4.2. Testing the first hypothesis

Table 3 provides the test results for the first hypothesis of the study:

The significance level for the Student's t-statistic of the independent variable (investor sentiment) is 0.03. Since this value is less than 0.05, it can be stated with 95% confidence that investor sentiment has a significant impact on corporate financial performance. Given that the coefficient of investor sentiment is negative, it can be concluded that investor sentiment has a significant inverse effect on corporate financial performance, thereby confirming the first hypothesis of the study.

The adjusted coefficient of determination (R^2) is 0.10, indicating that 10% of the variation in the dependent variable (corporate financial performance) is explained by the independent and control variables, which include investor sentiment, financial leverage, company size, market-to-book ratio, board independence, and GDP growth. The significance level of the F-statistic is 0.00, which is less than 0.05, demonstrating that the model is statistically significant. Furthermore, the regression model does not exhibit autocorrelation, as the Durbin-Watson statistic falls within the acceptable range of 1.5 to 2.5.

Table 3: Testing the First Research Hypothesis

Variables	coefficient	Error	Student T-statistics	Significance level
C	2.15	0.39	5.39	0.000
FS	-0.16	0.07	-2.12	0.0339
SIZE	-0.01	0.02	-0.81	0.4134
LEV	-0.67	0.14	4.81	0.000
MTB	0.15	0.02	7.69	0.000
IND	-0.13	0.15	-0.83	0.4039
GDP	0.60	0.15	3.94	0.0001
Coefficient of Determination		0.1088	Adjusted Coefficient of Determination	0.1022
F-statistic		16.54	Significance Level of the F-Statistic	0.000
Durbin-Watson Statistic			1.5034	

Source: Researcher's findings

4.3. Testing the Second Hypothesis

Table 4 presents the results of testing the second hypothesis of the study:

The significance level of the Student's t-statistic for the independent variable, corporate social responsibility (CSR), is 0.06. Since this value exceeds 0.05, we can state with 95% confidence that CSR does not have a statistically significant impact on financial performance. Although the coefficient of CSR is positive, indicating a direct effect on financial performance, this effect is not statistically significant. Therefore, the second hypothesis of the study is not supported.

Table (4): Testing the Second Hypothesis

Variables	coefficient	Error	Student T-statistics	Significance level
C	1.85	0.36	5.13	0.000
CSR	0.07	0.04	1.84	0.0661
SIZE	-0.01	0.02	-0.78	0.4325
LEV	-0.69	0.14	-4.96	0.000
MTB	0.16	0.02	7.78	0.000
IND	-0.14	0.15	-0.90	0.3634
GDP	0.51	0.14	3.46	0.0006
Coefficient of Determination		0.1074	Adjusted Coefficient of Determination	0.1008
F-statistic		16.30	Significance Level of the F-Statistic	0.000
Durbin-Watson Statistic			1.5868	

Source: Researcher's findings

The adjusted coefficient of determination (R^2) indicates that 10% of the variation in the dependent variable, corporate financial performance, is explained by the independent and control variables, which include CSR, financial leverage, company size, market-to-book value, board independence, and GDP growth. The F-statistic has a significance level of 0.00, below 0.05, confirming that the overall model is statistically significant. Furthermore, the Durbin-Watson statistic falls between 1.5 and 2.5, indicating that there is no autocorrelation in the regression residuals.

4.4. Testing the Third Hypothesis

Table 5 presents the results of testing the third hypothesis of the study:

Table (5): Testing the Third Hypothesis

Variables	coefficient	Error	Student T-statistics	Significance level
C	2.40	0.43	5.57	0.000
CSR	0.20	0.17	1.17	0.2407
FS	-0.27	0.11	-2.33	0.0196
FS×CSR	0.16	0.10	1.54	0.1216
SIZE	-0.02	0.02	-1.1	0.2682
LEV	-0.66	0.14	-4.70	0.000
MTB	0.15	0.02	7.63	0.000
IND	-0.12	0.15	-0.80	0.4182
GDP	0.56	0.15	3.70	0.0002
Coefficient of Determination		0.1133	Adjusted Coefficient of Determination	0.1045
F-statistic		12.95	Significance Level of the F-Statistic	0.000
Durbin-Watson Statistic			1.50	

Source: Researcher's findings

The significance level of the Student's t-statistic for the moderating variable (corporate social responsibility × investor sentiment) is 0.12. Since this value is greater than 0.05, we cannot assert with 95% confidence that investor sentiment has a significant impact on the effect of corporate social responsibility on financial performance. Although the coefficient for the moderating variable is positive, suggesting that investor sentiment may enhance the effect of corporate social responsibility on financial performance, this enhancement is not statistically significant. Therefore, the third hypothesis of the study is not supported.

The adjusted coefficient of determination indicates that 10% of the variation in the dependent variable (corporate financial performance) is explained by the independent, moderating, and control variables (corporate social responsibility, investor sentiment, financial leverage, company size, market-to-book value, board independence, and GDP growth). The F-statistic has a significance level of 0.00, which is below 0.05, indicating that the model is statistically significant. Additionally, there is no autocorrelation in the regression model, as the Durbin-Watson statistic falls between 1.5 and 2.5.

5. Conclusion and Recommendations

5.1. Discussion and Conclusion

The results of testing the first hypothesis show that investor sentiment has a significantly negative impact on corporate financial performance. This suggests that when the investments of companies listed on the Tehran Stock Exchange are influenced by investor sentiment, their financial performance tends to decline. These findings are consistent with the studies conducted by Dakheli et al. (2021), Vvong (2022), Kahloul et al. (2022), and Mazhari and Pourahetsham (2023).

The results of testing the second hypothesis indicate that corporate social responsibility (CSR) does not have a significant impact on corporate financial performance. In other words, increasing CSR activities among companies listed on the Tehran Stock Exchange does not lead to any significant change in their financial performance. Although stakeholder theories emphasize the social role of companies, and CSR activities can potentially reduce conflicts of interest between firms and their shareholders—thereby enhancing financial performance and company value over time—this effect was not observed in the current study. While CSR initiatives such as improving work conditions, employee rights, business conduct, environmental protection, and aligning corporate interests with societal needs can lead to long-term benefits like increased productivity, enhanced performance, and competitive advantages, these benefits do not appear to translate into measurable financial performance for the sample companies. These findings are not consistent with Vvong's (2022) study.

The results of testing the third hypothesis indicate that investor sentiment does not moderate the impact of CSR on financial performance. This means that although increases in CSR activities may improve corporate financial performance, this relationship is not influenced by investor sentiment among companies listed on the Tehran Stock Exchange. The outcome of this hypothesis also does not align with Vvong's (2022) findings.

5.2. Research Recommendations

Considering the inverse impact of investor sentiment on corporate financial performance, it is recommended that both individual and institutional investors calculate investor sentiment—reflecting how a company perceives investing in other companies—using the ARMS Index before selecting an investment target. High levels of investor sentiment may negatively affect a company's future financial performance, potentially leading to a decline in profitability.

Further research suggestions include:

1) Examine the influence of investor sentiment on the relationship between environmental responsibility performance and financial performance.

2) Investigate the impact of investor sentiment, measured using alternative models such as questionnaires, on the relationship between corporate social responsibility (CSR) performance and financial performance.
3) Analyze how investor sentiment affects the relationship between CSR performance and financial performance, measured through indicators such as return on equity (ROE) and return on total assets (ROA).
4) Explore the effect of investor sentiment on the relationship between CSR performance and non-financial performance.
5) Study the impact of investor sentiment on the CSR–financial performance relationship using various CSR measurement models, such as content analysis or the Rezaei and Mousavi (2016) data envelopment analysis model.
6) Finally, analyze how investor sentiment influences the CSR–financial performance relationship across different industries listed on the Tehran Stock Exchange.

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