KMAN PUBLISHING INSTITUTE
Journal Website

Article history:
Received 19 October 2023
Accepted 17 December 2023
Published online 20 December 2023

International Journal of Innovation Management and Organizational Behavior

Volume 3, Issue 5 (Special Issue on Finance and Economics), pp 187-197

IJIMOB International Journal of Innovation Management and Organizational Behavior

E-ISSN: 3041-8992

Futures Research on Environmental Sustainability Reporting Model Considering Accountants' Behavioral Biases

Seyed Hamid. Ramazani Yasuj[1], Hamid Reza. Jafari Dehkordi[2*], Bahareh. Banitalebi Dehkordi[3]

[1] PhD Student Department of Accounting, Shahrekord Branch, Islamic Azad University, Shahrekord, Iran
[2] Assistant Prof, Department of Accounting, Shahrekord branch, Islamic Azad University, Shahrekord, Iran
[3] Associate Prof, Department of Accounting, Shahrekord branch, Islamic Azad University, Shahrekord, Iran

*** Corresponding author email address**: H.Jafari@iaushk.ac.ir

A r t i c l e I n f o

Article type:
Original Research

How to cite this article:
Ramazani Yasuj, S. H., Jafari Dehkordi, H. R., & Mohammadi, N. (2023). Futures Research on Environmental Sustainability Reporting Model Considering Accountants' Behavioral Biases. *International Journal of Innovation Management and Organizational Behavior*, *3*(5), 187-197.
https://doi.org/10.61838/kman.ijimob.3.5.23

A B S T R A C T

Objective: The objective of this study is to identify and evaluate the impact of behavioral biases on environmental sustainability reporting, with a specific focus on how these biases affect the quality and transparency of reporting.

Methodology: This research employs a mixed-methods approach, combining the fuzzy Delphi method and structural equation modeling (SEM). Initially, six behavioral biases influencing environmental sustainability reporting were identified using the fuzzy Delphi method. These biases were then ranked using the Copeland method. The study further validated the proposed model through confirmatory factor analysis (CFA) and structural equation modeling to assess the reliability and validity of the identified biases and their impact on environmental sustainability reporting.

Findings: The study identified six key behavioral biases—managerial inflexibility, narcissism, short-sightedness, optimism (two cases), and overconfidence—affecting environmental sustainability reporting. The Copeland ranking revealed that managerial short-sightedness has the most significant negative impact on the quality of environmental sustainability reporting. The findings also showed that these biases contribute to distortions, superficial reporting, and reduced transparency in sustainability reports. The proposed model demonstrated strong convergent validity and reliability through CFA and SEM analysis.

Conclusion: The research concludes that behavioral biases, particularly managerial short-sightedness, significantly reduce the quality and transparency of environmental sustainability reporting. The study emphasizes the need for regulatory bodies and accounting standard-setters to develop frameworks that limit the influence of managerial biases on reporting practices. It also suggests that accountants and analysts should be aware of these biases when evaluating the quality of sustainability reports.

Keywords: *Environmental Sustainability Reporting, Environmental Accounting System, Behavioral Biases.*

1 Introduction

Traditional economic perspectives have identified the primary responsibility of companies as profit-making, asserting that companies can achieve profits solely by engaging in core activities. However, over the past forty years, corporate social responsibility (CSR) has introduced a new perspective on stakeholders (Paltrinieri et al., 2020). CSR has been defined across various branches, with environmental sustainability reporting emerging as a globally significant issue, serving as a link between accounting and environmental management. Environmental sustainability reporting is a form of voluntary reporting that can significantly reduce information asymmetry and enhance the transparency of the informational environment (Ludwig & Sassen, 2022). Additionally, Lin and Wu (2023) demonstrated that environmental sustainability reporting, by improving the informational environment, reduces the risk of future stock price crashes. Theories in the field of environmental sustainability reporting can be explained through four main theories: agency theory, stakeholder theory, signaling theory, and institutional theory (Lin & Wu, 2023). The literature indicates that companies with higher environmental performance tend to disclose more information, as they seek to demonstrate credibility, reliability, and enhance their reputation among stakeholders (Lin & Wu, 2023). According to legitimacy theory, disclosing information related to environmental activities can legitimize the company in the eyes of consumers, bring competitive advantages, and consequently improve the company's performance and value (Khatri & Kjærland, 2023). Furthermore, agency theory suggests that environmental sustainability reporting reduces information asymmetry between the company and its stakeholders, thereby lowering agency costs and conflicts of interest (Guping et al., 2020; Habbash & Haddad, 2020). Disclosure of environmental performance information leads to more voluntary information disclosure in the market and reduces information asymmetry between the company and external stakeholders, thereby improving the quality of financial reporting. In this context, financial market analysts can use this information to assess the integrity, ethical commitment, and behavior of managers, making them less likely to withhold bad news (Feng et al., 2022).

Sustainability innovation involves intentional changes in a company's products, services, or processes to create long-term social and environmental benefits while generating economic profit for the company. In this regard, sustainability leadership refers to leaders who are more innovative and advanced in their work due to their ability and power of thought and influence. In fact, knowledgeable leaders support the creation and development of sustainability within organizations and companies. Additionally, these leaders and managers have the ability to provide relevant information in critical situations and can use innovative solutions to solve company and organizational problems, making appropriate decisions to create sustainability. Indeed, making innovation-based decisions that lead to sustainability within the company is essential (Khan et al., 2022).

On the other hand, environmental sustainability refers to the responsibility of each individual towards the environment in terms of preventing resource misuse and pollution (Lopez et al., 2022). The goals of sustainable development require governments and private sector organizations to focus more on environmental sustainability and protect their resources for future generations (Han, 2021).

Environmental sustainability reporting, as the disclosure of a company's performance in various areas such as social, environmental, and economic activities, explains the organization's and company's plans for preserving social and environmental values and ensuring the interests of individuals who do not directly hold a stake in the company. According to innovation theory in economics and investment, what primarily drives economic growth in the modern world is not capital, but the use of innovative capacities across various fields, which can lead to the continuous growth and profitability of companies and organizations. If a company uses sustainable and impactful innovations in its services and products, these innovations will be reflected in the company's reports. Therefore, companies that use processes in their products and services that provide sustainable and long-term social and environmental benefits, and include these aspects in their performance reports, are likely to achieve greater economic profits in the future (Khan et al., 2022).

Moreover, since environmental sustainability reporting is influenced by managers' decisions, it can be expected to be affected by their behavioral biases. In recent years, with the emergence of behavioral finance, the financial literature has witnessed new research exploring the relationship between individuals' behavioral and personality traits and financial variables. Behavioral finance theories are designed on the premise that, due to differences in personality traits, individuals do not exhibit similar behavior or make similar

IJIMOB
E-ISSN: 3041-8992

decisions under the same control conditions. Additionally, individuals perceive the same phenomenon differently, with each person interpreting it based on their own analysis. Therefore, the concept of behavioral bias has emerged in behavioral finance literature. Behavioral finance, which combines psychology and finance, posits that personality traits play a role in financial decision-making. The core of behavioral finance theory stems from studying the behavior of agents in how they allocate and arrange resources over time and space in an uncertain environment. Time and uncertainty are two key factors that influence financial behavior (Cheska et al., 2022; Feng et al., 2022; Taghavi Gudarzi & Fazilat, 2021).

Several studies have been conducted in the field of sustainability reporting models (Abdi et al., 2019; Mahmoudi et al., 2023). Most of these studies have analyzed the factors influencing all dimensions of reporting. However, there has been little focus on the behavioral biases of accountants concerning the specific dimension of sustainability reporting (the environmental dimension), which is crucial for future generations. Behavioral biases such as narcissism, overconfidence, managerial flexibility, shortsightedness, and optimism can significantly impact environmental sustainability reporting, a subject that has been largely overlooked. This research gap is specifically addressed in this study by focusing on futures research and presenting a model of environmental sustainability reporting based on accountants' behavioral biases.

2 Methods and Materials

This research is applied in nature and employs a mixed-methods approach (qualitative-quantitative). The study was conducted in two phases: qualitative and quantitative. In the qualitative phase, using grounded theory, the causal, contextual, intervening conditions, strategies, and consequences of the environmental sustainability reporting model based on accountants' behavioral biases were identified. In the quantitative phase, structural equations and confirmatory factor analysis were used to validate the relationships and correlations between behavioral biases and the environmental sustainability reporting model. The qualitative research population consisted of accounting-auditing experts familiar with the topic, managers of listed companies on the stock exchange, and accounting faculty members. A purposive sampling method (criteria of theoretical saturation and key informant selection) was employed, resulting in a sample of 11 individuals for the qualitative phase. The validity of the research tool was confirmed through content validity. Initially, in the research process, behavioral biases affecting environmental sustainability reporting were identified using a review of the research literature and the fuzzy Delphi technique. These biases were then ranked using the Copeland method and fuzzy Delphi. In the quantitative phase, a questionnaire consisting of six questions based on the categories and constructs identified in the qualitative phase was developed using a 5-point Likert scale. The questionnaire was randomly distributed electronically and in person among a broader research population, comprising all active accountants-auditors in the official Accountants Association of Iran. Using Cochran's formula, 384 individuals were selected as the research sample, and all participants responded to the questionnaires, from which the data were extracted. The questionnaire's validity was confirmed through content validity (test-retest reliability score of 0.81 and CVR=0.9), and the reliability of the research tool was confirmed through Cronbach's alpha (0.89). The questionnaire data were analyzed using SPSS and AMOS software. Data analysis was conducted through confirmatory factor analysis and structural equations to validate and confirm the relationships in the environmental sustainability reporting model based on accountants' behavioral biases. It should be noted that all statistical tests were conducted at a 5% error level.

3 Findings and Results

The implementation stages of the fuzzy Delphi method are, in fact, a combination of the Delphi method and analyses performed on the information using the definitions of fuzzy set theory.

The main differences between the fuzzy Delphi method and the traditional Delphi method are that in the fuzzy Delphi technique, experts usually express their opinions in the form of linguistic variables. Then, the average of the experts' opinions (the provided numbers) and the degree of disagreement of each expert from the average are calculated, after which this information is sent back to the experts to receive new opinions. In the next stage, each expert, based on the information from the previous stage, either provides a new opinion or revises their previous opinion. This process continues until the average of the fuzzy numbers stabilizes sufficiently. Additionally, if the study requires input from different groups of experts, the distance between triangular numbers can be calculated to identify the opinions of experts

IJIMOB
E-ISSN: 3041-8992

within similar groups based on fuzzy relations, and this information can be sent to the relevant experts.

The research questionnaire (designed and developed using a review of the research literature) aims to gather experts' opinions on the extent of their agreement with the behavioral biases affecting environmental sustainability reporting. Experts expressed their level of agreement through linguistic variables such as very low, low, moderate, high, and very high.

Table 1

Definition of Linguistic Variables

Linguistic Variables	Triangular Fuzzy Number	Defuzzified Number
Very High	(0, 0.25, 1)	0.9375
High	(0.15, 0.15, 0.75)	0.75
Moderate	(0.25, 0.25, 0.5)	0.5
Low	(0.15, 0.15, 0.25)	0.25
Very Low	(0.25, 0, 0)	0.0625

In Table 1, the defuzzified numbers were calculated using the Minkowski formula.

First Round of Survey:

In this stage, the conceptual model along with the description of the indicators (the same questionnaire from the first round) was sent to the experts, and their level of agreement with the identified factors, as well as their proposed suggestions and revisions, were summarized.

Second Round of Survey:

In this stage, after making necessary changes to the existing factors (behavioral biases affecting environmental sustainability reporting), a second questionnaire was prepared and, along with the previous opinions and the level of disagreement with other experts' views, was sent back to the expert group members.

Third Round of Survey:

In this stage, further necessary changes were made to the existing factors (behavioral biases affecting environmental sustainability reporting), a third questionnaire was prepared, and along with the previous individual opinion and the degree of disagreement with the average opinion of other experts, it was sent back to the experts.

Fourth Round of Survey:

In this stage, further necessary changes were made to the existing factors (behavioral biases affecting environmental sustainability reporting), a fourth questionnaire was prepared, and along with the previous individual opinion and the degree of disagreement with the average opinion of other experts, it was sent back to the experts.

After identifying the existing factors (behavioral biases affecting environmental sustainability reporting) by the experts using the fuzzy Delphi method, the factors were prioritized using the Copeland method, as explained below.

Table 2

Extracted Codes from Interviews: Texts and Initial Codes Related to Suggested Factors (Interviewees)

Initial Codes Extracted	Interview Texts
Conservatism (and Flexibility)	According to the interviewees, within the company environment, managers' behavioral characteristics, in general, and the CEO's behavioral traits, in particular, are crucial in determining the quantity and quality of sustainability reporting, especially environmental reporting. Conservative managers, due to their focus on maintaining the quality of reporting, tend to engage more in sustainability reporting activities compared to other managers. Flexible managers follow changes related to sustainability and show less resistance to these changes. Overconfident and optimistic managers evaluate the results of their decisions and actions positively and ultimately feel they have made the best decisions in non-financial areas, such as environmental issues, and seek to disclose this success in sustainability reporting.
Managers' Narcissism	Managers' narcissism increases social responsibility, and thus, narcissism in managers leads them to pursue sustainability development and sustainability reporting. One of the recent issues pursued by narcissistic managers is environmental issues and industrial pollutants. However, on the other hand, narcissism and superiority can cause managers to ignore sustainability and public welfare issues, including environmental issues (e.g., carbon emissions, industrial pollutants, and recycling), and they may not focus on transparency in sustainability reporting.
Managers' Short-sightedness	Short-sighted managers disregard the company's long-term goals. Environmental considerations are among the issues that the company should comply with in the long term, but short-sighted managers ignore these issues. In general, short-sighted managers do not pursue long-term goals and sustainability issues to preserve their short-term interests, leading to a reduction in the quality of sustainability reporting in environmental and social matters, which are part of the company's long-term plans. Generally, short-sightedness increases current accounting profits by reducing costs with long-term benefits (such as green expenses and revenues

IJIMOB
E-ISSN: 3041-8992

	aligned with promoting environmental culture and reducing environmental pollutants; environmental costs) and affects the quality of environmental sustainability reporting. Short-sighted managers tend to invest less in sustainability issues, such as accounting and environmental matters, which will have adverse future environmental consequences for the company.
Managers' Optimism	Optimistic managers perceive sustainability reporting and sustainability issues, such as environmental considerations, superficially. Due to the optimistic outlook of managers, there is a likelihood of errors in sustainability reporting on environmental issues (e.g., carbon emissions, industrial waste, etc.).
Managers' Overconfidence	Overconfidence in managers leads to distortions in sustainability reporting, including distortions and manipulations in the content of environmental reports and issues and risks arising from non-compliance with environmental considerations. Whether these distortions are intentional or unintentional, they reduce the quality of information presented in environmental reporting. In general, overconfidence leads to underestimation of the harmful effects of environmental pollutants and overestimation of desirable environmental outcomes in reports. This issue reduces the quality of sustainability reporting. Additionally, overconfident managers systematically overestimate the future returns from investments in environmental management projects (environmental costs) and environmental cost accounting, leading to potential additional expenses. This issue causes deviations in reporting.

In this stage, the conceptual model was presented, and the description of the indices of behavioral biases affecting environmental sustainability reporting was sent to the expert group members. The extent of their agreement with each of the behavioral biases affecting environmental sustainability reporting was obtained, and their proposed suggestions and revisions were summarized. Based on the proposed options and the linguistic variables defined in the questionnaire, the results from the analysis of the responses provided are presented in Table 3.

Table 3

Mean of Expert Opinions Based on the First Round of the Questionnaire

Bias	Lower Bound	Mean	Upper Bound	Defuzzified Number
Managers' Overconfidence	3.309152	4.892684	6.699335	4.967057
Managers' Narcissism	3.530325	6.018852	8.412726	5.987301
Managers' Short-sightedness	4.021451	6.129189	8.543858	6.231499
Managers' Optimism	3.723782	5.070801	8.051849	5.615478
Conservatism (and Flexibility)	3.448147	4.530527	7.588174	5.188949

The triangular fuzzy means were calculated using the previously described formulas and then defuzzified using the Minkowski formula. The resulting mean indicates the level of agreement among experts on each of the behavioral biases affecting environmental sustainability reporting.

In this stage, after making the necessary changes to the behavioral biases affecting environmental sustainability reporting, the second questionnaire was prepared and sent to the expert group members along with their previous opinions and the degree of disagreement with other experts' views. Based on the opinions of other group members and the changes made to the behavioral biases and criteria, the questions were answered again. The results of the analysis of the responses in the second round were similar to those in the first round, analyzed using the same formulas.

Here, the difference between the first and second rounds of the survey on behavioral biases affecting environmental sustainability reporting was calculated. Considering the opinions provided in the first round and comparing them with the results of this round, if the difference between the two rounds is less than the very low threshold of 0.15, the survey process for that variable is stopped. Based on the calculations, the experts reached consensus on all biases except for bias number 5, "Conservatism-Flexibility." Consequently, the survey on this bias was discontinued, and since bias number 5, "Conservatism-Flexibility," fell within the very low range, it was excluded.

Table 4

Mean of Expert Opinions Based on the Second Round of the Questionnaire

Bias	Lower Bound	Mean	Upper Bound	Defuzzified Number
Managers' Overconfidence	3.309152	4.892684	6.699335	4.967057
Managers' Narcissism	3.530325	6.018852	8.412726	5.987301
Managers' Short-sightedness	3.388018	4.720824	7.381073	5.163305
Managers' Optimism	3.859346	5.191652	8.051849	5.700949
Conservatism (and Flexibility)	3.999844	5.740279	8.493079	6.077734

IJIMOB
E-ISSN: 3041-8992

Table 5

Difference in Mean Expert Opinions Between the First and Second Rounds

Bias	Difference in Means
Managers' Overconfidence	0.00
Managers' Narcissism	0.00
Managers' Short-sightedness	0.03
Managers' Optimism	-0.09
Conservatism (and Flexibility)	0.15

Since the questionnaires also included open-ended questions, experts' opinions were received in open-ended form as well. After refining the suggestions provided by the expert group, the final decision was made.

In this section, the Copeland method (dominant and dominated method) was used to rank the position and role of behavioral biases affecting environmental sustainability reporting. The importance and superiority (dominance) of one bias over another were assessed. For example, in cell (15) [in the first row and fifth column], the number 1 is placed, indicating that the bias of overconfidence is superior to the bias of optimism. Similarly, in cell (14) [row 1 and column 4], the number 0 is placed, indicating that bias number 1, overconfidence, is not superior to bias number 3, short-sightedness. The column for "dominance" shows the total number of ones (superiority), and the row for "being dominated" shows the total number of ones or superiority in each column. Finally, the rank of the behavioral bias is obtained by subtracting the number of dominances from the number of times it was dominated.

Table 6

Results of the Copeland Method for Ranking Behavioral Biases

Bias	Bias 1	Bias 2	Bias 3	Bias 4	Dominance
Managers' Overconfidence	0	0	0	1	1
Managers' Narcissism	1	0	0	0	1
Managers' Short-sightedness	1	1	0	1	3
Managers' Optimism	0	1	0	0	1
Being Dominated	2	2	0	2	
Difference	-1	-1	3	-1	
Copeland Rank	2	2	1	2	

In this ranking, the bias of managers' short-sightedness holds the first rank, while the other biases hold subsequent ranks (equally important and influential) among the behavioral biases affecting environmental sustainability reporting. This means that managers' short-sightedness plays a more significant role in the environmental sustainability reporting model.

Approximately 35% of the respondents were women, and 65% were men. Over half of the respondents (55%) held a bachelor's degree in accounting, and about 42% had a master's degree in accounting. The most frequent age group was 41-50 years old (39%), while the least frequent age group was 51 years and older (13%).

Table 7

Descriptive Statistics Related to the Environmental Sustainability Reporting Model Based on Accountants' Behavioral Biases

Variable	Mean	Standard Deviation	Significance Level	Mean Rank	Chi-Square Statistic (Significance Level)
To what extent are the company's managers flexible regarding sustainability and environmental issues?	3.599**	.9563	0.001	3.28	67.54 (0.001)
To what extent does narcissism in managers cause them not to pursue environmental issues and ignore transparency in sustainability reporting?	3.747**	.9729	0.001	3.76	
To what extent does managers' short-sightedness lead to ignoring environmental issues and reduce investment in long-term goals such as environmental sustainability?	3.924**	.8440	0.001	4.02	

IJIMOB
E-ISSN: 3041-8992

To what extent does managers' optimism lead them to perceive sustainability reporting and sustainability issues, such as environmental considerations, superficially?	4.1328**	.80829	0.001	4.45
To what extent does the optimistic outlook of managers lead to potential errors in sustainability reporting on environmental issues (e.g., carbon emissions, industrial waste, etc.)?	4.0755**	.70952	0.001	3.32
To what extent does overconfidence in managers cause distortions in sustainability reporting, including distortions and manipulations in the content of environmental reports and issues and risks arising from non-compliance with environmental considerations?	4.0625**	.78248	0.001	2.89

Note: Significant at the 1% error level. This significance level indicates that the mean score of the existing behavioral biases in the environmental sustainability reporting model is significantly greater than 3 (theoretical mean: criterion of desirability). The results in the significance column indicate that all of the behavioral biases in accountants significantly impact the level of environmental sustainability reporting (P-Value < 0.05). Additionally, Table 7 shows that managers' optimism has the highest mean score (3.99) in the proposed model (environmental sustainability reporting), while managers' inflexibility has the lowest mean score (3.59). On the other hand, based on the mean rank column, it can be said that managers' optimism, with a mean rank of 4.45, plays the most significant role in the level of environmental sustainability reporting.

B) Validation of the Sustainability Reporting Model

Next, using structural equations (structural and measurement models) and fit indices, the model was validated. Researchers typically work with two models when dealing with structural equations: the measurement model and the structural model. Based on the measurement model of the studied concepts, the average variance extracted (AVE) to assess convergent validity is presented in Table 8.

Table 8

Average Variance Extracted (AVE) - Composite Reliability (CR) of Environmental Sustainability Reporting Model Constructs

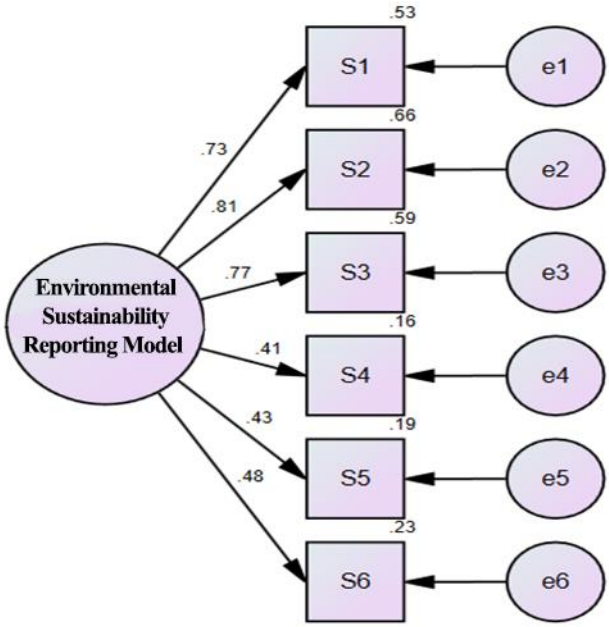
Construct	AVE	CR	Result
To what extent are the company's managers flexible regarding sustainability and environmental issues? (How inflexible are they?)	0.73	0.76	Convergent Validity
To what extent does managers' short-sightedness lead to ignoring environmental issues and reduce investment in long-term goals such as environmental sustainability?	0.81	0.86	Convergent Validity
To what extent does narcissism in managers cause them not to pursue environmental issues and ignore transparency in sustainability reporting?	0.77	0.82	Convergent Validity
To what extent does managers' optimism lead them to perceive sustainability reporting and sustainability issues, such as environmental considerations, superficially?	0.42	0.89	Convergent Validity
To what extent does the optimistic outlook of managers lead to potential errors in sustainability reporting on environmental issues (e.g., carbon emissions, industrial waste, etc.)?	0.43	0.79	Convergent Validity
To what extent does overconfidence in managers cause distortions in sustainability reporting, including distortions and manipulations in the content of environmental reports and issues and risks arising from non-compliance with environmental considerations?	0.48	0.81	Convergent Validity

Since all AVE values are greater than 0.4, it can be concluded that all behavioral biases included in the environmental sustainability reporting model exhibit convergent validity.

IJIMOB
E-ISSN: 3041-8992

Figure 1

Environmental Sustainability Reporting Model Based on Behavioral Biases [Second-Order Factor Analysis] (Standardized Coefficients)



From Figure 1, it is observed that all the behavioral biases influencing (negatively) the environmental sustainability reporting model have sufficient factor loading and convergent validity. After confirmatory factor analysis and before starting the structural model, the fit indices of the measurement model were evaluated. The next step is the model fit, as presented in the table below:

Table 9

Goodness-of-Fit Indices for the Model

Index	Symbol	Permissible Range	Obtained Value	Result
Absolute Indices	X^2/df Ratio	< 3	10.29	Not Confirmed
	RMSEA	< 0.08	0.03	Confirmed
	GFI	> 0.80	0.89	Confirmed
	AGFI	> 0.80	0.91	Confirmed
Relative Indices	NFI	> 0.90	0.93	Confirmed
	NNFI	> 0.90	0.95	Confirmed
	IFI	> 0.90	0.91	Confirmed
	CFI	> 0.90	0.92	Confirmed
Adjusted Indices	PGFI	> 0.50	0.73	Confirmed
	PNFI	> 0.50	0.69	Confirmed

Given the obtained values for the goodness-of-fit indices, it is observed that our measurement model has achieved an acceptable fit in most cases. The nature of the statistical population is one of the main reasons for the adequacy of some model fit indices. Table 10 presents the standardized coefficients and significance of the paths between the variables using the structural model.

IJIMOB
E-ISSN: 3041-8992

Table 10

Path Coefficients of Environmental Sustainability Reporting Model Constructs

Path	t-Statistic (C.R)	Beta Coefficient	Result
Inflexibility -- Environmental Sustainability Reporting (Non-ideal)	111.56	0.731	Significant
Managers' Short-sightedness -- Lack of Long-term Sustainability Reporting	12.242	0.811	Significant
Managers' Narcissism -- Non-transparent Reporting	11.924	0.769	Significant
Optimism -- Superficial Reporting	6.599	0.405	
Optimistic Attitude -- Errors in Reporting	6.990	0.431	
Overconfidence -- Reporting Distortions	7.931	0.480	Significant

From Table 10, it is observed that all six behavioral biases of accountants have a significantly positive impact on undesirable forms of environmental sustainability reporting (as the t-statistic does not fall within the critical region of -1.96 to 1.96, and the estimated beta coefficient is positive). It is also noted that managers' short-sightedness, with a standardized coefficient of 0.811, has the most significant impact, while managers' optimism, with a standardized coefficient of 0.405, has the least impact on reducing (and creating undesirable forms of) environmental sustainability reporting. This result is consistent with the result obtained using the Copeland method.

4 Discussion and Conclusion

In this study, six behavioral biases influencing environmental sustainability reporting were identified using the fuzzy Delphi method. These biases include inflexibility in reporting, narcissism in reporting, short-sightedness in reporting, optimism in reporting (two cases), and overconfidence in reporting. Additionally, the Copeland ranking results indicated that managers' short-sightedness holds a higher rank compared to other biases in environmental sustainability reporting.

The findings on behavioral biases influencing environmental sustainability reporting align with the prior results (Bafundi et al., 2022; Mashayekhi et al., 2021; Morovat et al., 2020; Schrand & Zechman, 2012). The impact of optimism, short-sightedness, and overconfidence on environmental sustainability reporting is consistent with the prior findings (Abdi et al., 2019; Mahmoudi et al., 2023). demonstrated that managers' behaviors significantly affect the quality level of sustainability reporting. The general behavioral characteristics of managers, particularly the behavioral traits of CEOs, are crucial in determining the quantity and quality of sustainability reporting. Flexible managers are more likely to follow changes related to sustainability and show less resistance to these changes. Overconfident and optimistic managers tend to positively evaluate the outcomes of their decisions and actions and ultimately feel that they have made the best decisions, seeking to disclose this success in sustainability reporting. Conservative managers, in their efforts to maintain the quality of reporting, are more likely than other managers to engage in sustainability reporting activities (Abdi et al., 2019). This explanation is in contrast with the findings of the present study. However, studies by Deshmukh et al. (2013) and Cronqvist et al. (2012) provided evidence that managers' optimism (whether intentional or unintentional) leads to biased distortions in reporting, which negatively affects the transparency of information presented in reports (Deshmukh et al., 2013). Optimistic managers, due to their beliefs and opinions about future issues (with environmental and sustainability issues being the most significant), may pay less attention to information transparency. Additionally, the prior research (Schrand & Zechman, 2012; Shafayat, 2019) showed that overconfidence in managers has a significant impact on sustainability reporting. Short-sighted managerial behavior also leads to the use of an optimistic tone in financial reporting to achieve short-term goals and to manage the perceptions of the users of explanatory accounting reports, which results in long-term goals and sustainability (especially environmental issues) being overlooked in reporting.

Confirmatory factor analysis and structural equations demonstrated that each proposed model and its constructs possess convergent validity and sufficient reliability. The results of confirmatory factor analysis in structural equations also showed that the impact of behavioral biases on the level of environmental sustainability reporting in companies indicated that managers' short-sightedness plays the most significant negative role in environmental sustainability reporting. In other words, the greater the short-sightedness of managers concerning the company's environmental issues, the more significantly the quality level of reporting in this area declines.

IJIMOB
E-ISSN: 3041-8992

There have been few studies on the quantification of these models (environmental sustainability reporting), making this part of the research one of its innovative aspects. Only the study by Mahmoudi et al. (2023), which continues and complements the results of Abdi et al. (2019), referred to several behavioral characteristics influencing the level of sustainability reporting (Abdi et al., 2019; Mahmoudi et al., 2023). However, this study used structural equations to evaluate and validate the environmental sustainability reporting model based on accountants' behavioral biases. The most significant distinction of this research from similar previous studies is that while earlier studies addressed sustainability reporting models across all topics (economic, social, and environmental), this research specifically explores sustainability reporting models in environmental issues, considering innovation and behavioral biases from a futures research perspective. Based on the findings of this study, the following recommendations can be made:

It is recommended that lawmakers and accounting standard-setters draft new standards and regulations in the field of sustainability reporting, providing a standardized framework that limits and prohibits the freedom of action and discretion of individuals, especially managers, in decision-making and reporting, including environmental reporting, so that managers cannot easily be influenced by their personal and psychological behaviors, leading to deviations in reporting.

Accountants and reporting analysts are advised to analyze the tone and nature of reporting on environmental issues in company decision-making and reporting. They should also consider the behavioral biases of both themselves and the managers, as there is a possibility that the managers of the company in question might be optimistic or overconfident, which could lead to errors in reporting or superficial reporting of environmental issues.

The limitations of this research include the limitation and dispersion of the statistical population, which makes the results not generalizable to other populations and spatial domains. Additionally, only six behavioral biases were considered and studied, which is one of the most significant limitations of the research. Future research could explore other behavioral biases and psychological behaviors such as over-reliance, regret aversion, and so on, which impact decision-making and reporting.

Authors' Contributions

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

Declaration

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

Transparency Statement

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

Acknowledgments

We would like to express our gratitude to all individuals helped us to do the project.

Declaration of Interest

The authors report no conflict of interest.

Funding

According to the authors, this article has no financial support.

Ethical Considerations

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

References

Abdi, M., Kordestani, G., & Rezazade, J. (2019). Designing of Corporates' Coherent Sustainability Reporting Model. *Financial Accounting Research*, *11*(4), 23-44. https://doi.org/10.22108/far.2019.118585.1498

Bafundi, A., Garcia Osma, B., Grande-Herrera, C., & Guillamon Saorin, E. (2022). CEO Career Concerns, Optimism and Accuracy in Disclosure Tone. *Available at SSRN 3160100*. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4059198

Cheska, D. P., Ronniell, M., & James, S. E. (2022). Impact of environment accounting disclosures on profitability and firm value of petrochemical industry in The philippines. Proceedings of International Interdisciplinary Conference on Sustainable Development Goals (IICSDGs),

Deshmukh, S., Goel, A. M., & Howe, K. M. (2013). CEO overconfidence and dividend policy. *Journal of Financial Intermediation*, *22*(3), 440-463. https://doi.org/10.1016/j.jfi.2013.02.003

Feng, J., Goodell, J. W., & Shen, D. (2022). ESG rating and stock price crash risk: Evidence from China. *Finance Research Letters*, *46*, 102476. https://doi.org/10.1016/j.frl.2021.102476

E-ISSN: 3041-8992

Guping, C., Safdar Sial, M., Wan, P., Badulescu, A., Badulescu, D., & Vianna Brugni, T. (2020). Do Board Gender Diversity and Non-Executive Directors Affect CSR Reporting? Insight from Agency Theory Perspective. *Sustainability*, *12*(20), 8597. https://www.mdpi.com/2071-1050/12/20/8597

Habbash, M., & Haddad, L. (2020). The impact of corporate social responsibility on earnings management practices: evidence from Saudi Arabia. *Social Responsibility Journal*, *16*(8), 1073-1085. https://doi.org/10.1108/SRJ-09-2018-0232

Han, H. (2021). Consumer behavior and environmental sustainability in tourism and hospitality: a review of theories, concepts, and latest research. *Journal of Sustainable Tourism*, *29*(7), 1021-1042. https://doi.org/10.1080/09669582.2021.1903019

Khan, M. K., Babar, S. F., Oryani, B., Dagar, V., Rehman, A., Zakari, A., & Khan, M. O. (2022). Role of financial development, environmental-related technologies, research and development, energy intensity, natural resource depletion, and temperature in sustainable environment in Canada. *Environmental Science and Pollution Research*, *29*(1), 622-638. https://doi.org/10.1007/s11356-021-15421-0

Khatri, I., & Kjærland, F. (2023). Sustainability reporting practices and environmental performance amongst nordic listed firms. *Journal of Cleaner Production*, *418*, 138172. https://doi.org/10.1016/j.jclepro.2023.138172

Lin, B., & Wu, N. (2023). Climate risk disclosure and stock price crash risk: The case of China. *International Review of Economics & Finance*, *83*, 21-34. https://doi.org/10.1016/j.iref.2022.08.007

Lopez, B. E., Allen, J. M., Dukes, J. S., Lenoir, J., Vilà, M., Blumenthal, D. M., Beaury, E. M., Fusco, E. J., Laginhas, B. B., Morelli, T. L., O'Neill, M. W., Sorte, C. J. B., Maceda-Veiga, A., Whitlock, R., & Bradley, B. A. (2022). Global environmental changes more frequently offset than intensify detrimental effects of biological invasions. *Proceedings of the National Academy of Sciences*, *119*(22), e2117389119. https://doi.org/10.1073/pnas.2117389119

Ludwig, P., & Sassen, R. (2022). Which internal corporate governance mechanisms drive corporate sustainability? *Journal of Environmental Management*, *301*, 113780. https://doi.org/10.1016/j.jenvman.2021.113780

Mahmoudi, R., Talebnia, G. A., Vakilifard, H., Ahmadi, F., & Moradi Shahdadi, K. (2023). Providing a model of sustainability reporting with the foundation data theory approach in companies listed on the Tehran Stock Exchange. *Financial Economics*, *64*(17), 207-222. https://doi.org/10.30495/fed.2023.705598

Mashayekhi, B., Mashayekhi, B., & Zare, S. (2021). Corporate Sustainability Reporting in the Petrochemical Industry: A Case Study of Morvarid Petrochemical Company. *Journal of Management Accounting and Auditing Knowledge*, *10*(39), 115-135. https://www.jmaak.ir/article_17996.html

https://www.jmaak.ir/article_17996_9aee65a9f1a2b8c5a187efb2e1c31cf2.pdf

Morovat, H., Sharif, M., & Nezakat, P. (2020). Investigating the Effect of Cognitive biases (hot-hand effect and Hyperbolic discount Rate) on Environmental Attitudes and Behaviors in Iran. *Quarterly Journal of Applied Theories of Economics*, *6*(4), 163-190. https://ecoj.tabrizu.ac.ir/article_10014_6a51bc25ec471c4f5ccc6f1df692d5cd.pdf

Paltrinieri, A., Dreassi, A., Migliavacca, M., & Piserà, S. (2020). Islamic finance development and banking ESG scores: Evidence from a cross-country analysis. *Research in International Business and Finance*, *51*, 101100. https://doi.org/10.1016/j.ribaf.2019.101100

Schrand, C. M., & Zechman, S. L. C. (2012). Executive overconfidence and the slippery slope to financial misreporting. *Journal of Accounting and Economics*, *53*(1), 311-329. https://doi.org/10.1016/j.jacceco.2011.09.001

Shafayat, H. (2019). *CEO over confidence and tone of annual report* Master Thesis]. https://www.google.com/search?sca_esv=c14839b164416a05&q=21.+Shafayat,+H.+(2019).+CEO+overconfidence+and+tone+of+annual+report.+Master+Thesis,+Saskatoon:+University+of+Saskatchewan.&spell=1&sa=X&ved=2ahUKEwiJpdn4q_CHAxV9TaQEHXPLCNEQBSgAegQIDBAB

Taghavi Gudarzi, M., & Fazilat, F. (2021). Sustainability and environmental changes reporting challenges for public sector accountants. *Public Sector Accounting and Budgeting*, *2*(3), 65-71. https://www.psabjournal.ir/article_193000_5218eaac91a8f306d558793d5421c2ab.pdf

E-ISSN: 3041-8992