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Research Paper

Sustainable Reporting Function and Green Accounting Strategic Consequences (Cross-matrix analysis)

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ABSTRACT

Today, with the growth and development of societies, increasing environmental pollution is not considered a global concern, but a future problem, and based on it, increasing the level of green functions in various fields from accounting to production and supply chain can be considered as one of the most important strategic approaches in this field. Because better management of environmental costs can also improve the company's environmental performance and bring significant benefits to society and contribute to the sustainable development of companies in a competitive market based on corporate socially responsible activities for the future. The purpose of this study is to evaluate the most effective strategic implications of green accounting based on the function of sustainable reporting. In this study, theoretical screening based on similar studies was used to identify the components (the strategic consequence of green accounting) and research propositions (themes of sustainable reporting function). Then, in order to determine the reliability of research components and propositions through the participation of 12 experts and experts in the field of accounting and financial management, Delphi analysis was used. In the quantitative part, the identified components and propositions in the form of matrix questionnaires were evaluated by interpretive analysis by 17 managers of the top 50 companies in 2009. The results showed that the proposition of sustainable responsibility as the most influential theme of the sustainable reporting function causes the effectiveness of the value consequence in green accounting. This result shows that by developing the dimensions of social responsibility in sustainable reporting, the level of inclusive values in the value functions of green accounting is strengthened and builds trust and confidence in the company's performance.

1 Introduction

Economic development and the growing trend of activities and commercial markets, although in line with economic growth and human social welfare, have been accompanied by pressure on the planet's natural systems and the use of non-renewable resources. In the present era, due to the existence of some environmental constraints, especially in world trade and the limitation of competition, inevitably, some

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business units to overcome these restrictions; reduce environmental damage; make more money, or gain popularity and business success have forced them to incur environmental costs. Accordingly, paying attention to environmental accounting can be a strategic issue for managers, the community, and users of financial statements [1]. In fact, the lack of strategic green accounting functions due to the lack of consistency in financial reporting to disclose discretionary information over the past few years has led to a significant increase in environmental waste. As a result, improper waste processing has led to a loss of resources as well as severe environmental and economic problems [2, 3, 4, 5]. Therefore, given the increasing importance and growth of waste and environmental pollutants, many regulators have enacted mandatory laws and regulations to reduce environmental pollution [6]. One of the many regulatory bodies that are the focus of this study was the Accounting Standards Board, which in 1976 formed a committee to oversee the harmful effects of corporations with a view to environmental protection. The nature of this committee was to develop financial reporting approaches and to some extent to monitor the performance of companies operating in the market, which was not so much due to lack of competition, level of pollution, and waste. In 1990, the Accounting Standards Board published Publication No. 8/90 entitled "Investing in Environmental Pollution Costs".

Of course, shareholders believe that green accounting for environmental management in the industry cannot be taken seriously until the environmental costs of companies are determined and the high importance of environmental pollution control activities is clarified for managers and organizational decision-makers. But since 2015, with the signing of the Paris Environmental Agreement, which was drafted with the cooperation of 196 countries, the supervision in the capital market sector has moved towards transparent environmental practices. Because most of the environmental pollutants were companies that were present in the capital market and this issue played an important and significant role in the development of environmental functions, especially green accounting [7]. Evidence shows that multinational corporations are under pressure from regulators to disclose information in the form of sound financial reporting. In this way, they provide activities related to green accounting practices to stakeholders [8]. In fact, sustainable financial reporting to reduce waste and environmental pollution while strategically exploiting limited resources enables companies to benefit from the strategic implications of green accounting [9, 10]. In Iran, too, the issue of environmental pollution has a long history, so that during the years 1961 to 1978, Iran's economy grew by 9% annually, and during the first post-revolutionary economic development program, the annual growth rate was 7.3% per year, but in this measure, the costs of environmental degradation and the destruction of scarce resources were not deducted from GDP, which from this perspective, the lack of green accounting as a strategic basis for decision-making is very evident. In explaining why this research is being done, it should be stated, on the one hand, with the expansion of commercial activities, today, the use of traditional accounting systems, especially in the field of disclosure and evaluation of environmental functions, is not efficient enough and cannot include the environmental and social effects of corporate performance.

Therefore, moving towards sustainable financial reporting as a basis for providing corporate performance information about economic activities; social; Environment, and corporate governance while contributing to greater productivity at the same time, enhances the information transparency of the company, and this can help increase the effectiveness of the strategic consequence of green accounting. On the other hand, the need to pay attention to this sector led to the protection of the public interest, according to Article 190 of the Fifth Development Plan Law, all executive bodies and public non-governmental organizations and institutions should be obliged to implement policies for the optimal use of

basic resources and the environment in order to reduce government expenditure credits, and to implement a green accounting program, including energy consumption management; Water; Raw materials and equipment (such as paper); Reduce solid waste and recycle it (in buildings and vehicles) in accordance with regulations issued by the Environmental Protection Agency and its deputy and these approvals have been approved by the Council of Ministers and must be implemented [11]. Even with such guidelines and regulations, although it can be considered a way to strategically develop green accounting in recent years, it is certainly not enough, and compliance with international environmental standards and standards can be considered a breakthrough for growth and development in this sector. According to the explanations given, the purpose of this study is to evaluate the most effective strategic consequence of green accounting based on the function of sustainable reporting.

2 Literature Review

2.1 Sustainable Financial Reporting

External reporting practices have continued to evolve due to the ongoing demand for complete, reliable, and relevant firms information. Besides changes made within the financial reporting (FR) environment, sustainability reporting (commonly known also as environmental, social, and governance [ESG] reporting) has been long introduced to accompany FR [12]. More recently, integrated reporting (IR) has also been promoted to deal with the lapses of existing corporate reports, promote corporate strategy, incorporate prospective information into reporting practices and improve information quality. in other words, integrated reporting (IR) has gained prominence as an evolutionary step in organizations' reporting, as it combines financial and non-financial information into a single document to create an advanced tool for sustainability reporting [13]. The IR combines holistically financial and non-financial information, thus being a suitable tool for Capital market companies or listed firms to both improve the quality of financial information for the benefit of capital providers and enhance transparency, accountability, and legitimacy towards all stakeholders interested in non-financial dimensions leading to Inclusive value [14]. The term sustainability is derived from a broader concept called sustainable development. According to the World Commission on Environment and Development, sustainable development is a development that meets the needs of the current generation; without jeopardizing the ability and right of the next generation to meet its needs from the environment and natural resources.

The term sustainability can be considered an attempt to provide the best results for human beings and the current and future environment and includes the continuation of economic dimensions; social and environmental of human society [15]. From a historical point of view, the development and focus of sustainability-oriented reporting have evolved. In the 1970s, traditional financial reporting in Western countries was sometimes supplemented by additional social reporting, and in the 1970s the focus shifted to environmental issues such as waste generation and pollution, replacing the social reporting priority. At the end of the 1990s, simultaneous attention to the environmental and social dimensions of a report led to its reporting being separated from traditional financial statements. This process is considered in conjunction with the development and development of voluntary standards through the global reporting model for sustainability reporting [16]. Sustainable reporting is a comprehensive report based on pluralistic values that, in addition to disclosing information about economic functions; social and environmental also provide the functional areas of the corporate governance system to stakeholders. In 2016, the Global Initiative Reporting Organization developed the first global standards for sustainability reporting. The standard consisted of 36 articles, 3 of which were general; 6 economic articles; There were 8 environmental items, and 19 social items. Although these standards include all of the above topics for

sustainability reporting and provide multilateral standards for non-financial reporting; it focuses on social and environmental issues, covering only a limited number of economic indicators, and more detailed regulatory reporting on economic issues within existing regulatory frameworks for financial reporting, such as accepted US accounting principles and international reporting standards. Mali refers [11]. But at present, despite the guidelines and standards of the global reporting model for sustainability reporting, the current sustainability-focused reporting practice is essentially voluntary in nature; in such a way that companies are free to disclose or not disclose this information.

In other words, there is currently no obligation to disclose sustainability information in annual reports. In light of this discretion, in corporate reporting there are many titles to describe current reports such as corporate citizenship reporting; Corporate social responsibility; Sustainable development, sustainable development costs, and ultimately sustainable reporting is used [17]. The lack of a law on sustainability reporting has also created a number of problems. According to the Institute of Chartered Accountants of England and Wales (ICAEW), these problems are:

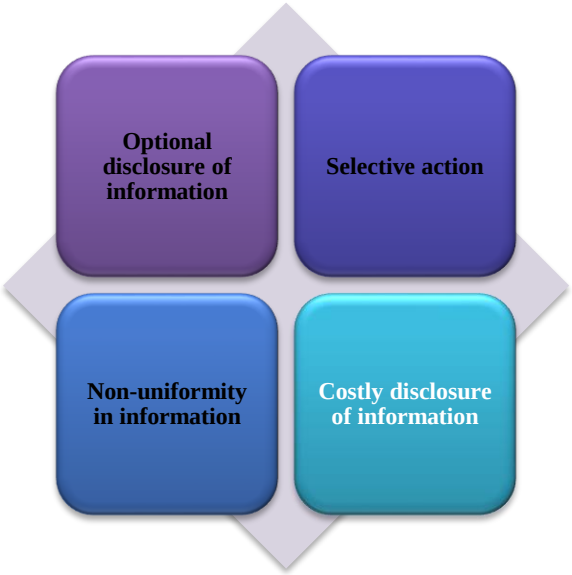

Fig.1: Reasons for the Ineffectiveness of Sustainable Reporting

Based on this framework, the above can be explained:

- Because these reports are voluntary, not all companies disclose such information.
- Information may be disclosed that is incomplete or unreliable, and many companies only disclose information that reflects a positive aspect of them.
- Lack of uniformity in the information presented in different years, causes the distortions of the financial statements to be exposed.
- Some companies, especially small and medium-sized companies, believe that the costs of providing additional information in this area are greater than the benefits.

On the other hand, Alvareza and Ortas [18] believe that understanding the factors influencing the dissemination of sustainability reporting may help companies improve reporting transparency for users as well as their image in the community. In such a situation, all countries should take appropriate measures in this direction, considering the growing importance of the issue of sustainable development. Considering the very important role of companies in this field, one of the useful measures in this field is the design of companies' sustainability reporting model to be done according to the necessary measures to

implement sustainability reporting [11].

2.2 Green Accounting Strategic and Sustainable Reporting

Unlike financial reporting, sustainability reporting is voluntary in the majority of states. For this reason, most companies presenting information about social and environmental protection actions use voluntary reporting systems, such as the guidelines in the Global Reporting Initiative (GRI), the Greenhouse Gas (GHG) Protocol developed by the World Resource Institute and, in recent years, the integrated reporting developed by the International Integrated Reporting Council [19]. Although efforts were made toward standardizing the information regarding sustainable reporting (GRI and GHG), there are still differences in the content and quality of reports compiled [20]. While other forms of voluntary standards (ISO) managed to solve this variability in terms of implementation, this aspect has not been solved in the field of sustainability reporting. The lack of compulsoriness and standardization in this field leads to inconsistencies in the companies' assessment and reporting of sustainability reporting [21]; this vulnerability is also generated by the fact that, unlike financial statements, no certification is required for these reports. In fact, the voluntary publication of sustainability information can help soften the negative effects generated by complex financial statements [22].

Stock exchange listing is a driving factor for the increasing quality of sustainability reporting, as companies have to comply with such requirements formalized in listing agreements. Moreover, even the listing category carries a certain influence, and listed firms in the main category tend to report more information. Given that the voluntary publishing of information regarding sustainable development is the most frequently encouraged, the literature shows that firms tend to report good news and avoid publishing bad news to improve their image [23]. This behavior corresponds to the impression management theory, which determines that companies use strategies for improving the positive aspects of performance in terms of sustainability and omit negative aspects. Companies with low environmental performances avoid publishing information owing to the high risk of litigation, which can negatively impact future benefit flows. Frequent legislative modifications in the field of environmental protection are yet another factor that can influence how performance in this field is estimated and reported. In addition, a major part goes to the size and business sector of the company. Thus, firms operating in business sectors with environmental impacts tend to present general information that is difficult to check [24]. Improving environmental performances generates real economic benefits, but they also have a negative impact owing to future costs. On the other hand, the quality of published reports expressed in terms of the level of detail regarding environmental protection actions provides access to more favorable financing conditions.

In fact, companies that publish high-quality environmental information show effective corporate governance and face fewer difficulties in accessing capital markets. Social responsibility practices influence the growth and streamlining of companies, in terms of both operational performance (by increasing sales) and increased market value, as well as by reducing the risk of litigation resolution. The voluntary publishing of social responsibility activities can also lead to a decrease in the cost of capital of a firm. On the one hand, social responsibility actions can be a marketing strategy for firms; on the other hand, they can also be a good means for "washing away their sins", as firms have the chance to present their image favorably and contribute via their involvement in the social progress to the economic growth [25]. Based on the theoretical foundations and according to the analytical approaches of this research, the research questions are presented as follows:

1. What are the strategic consequences of green accounting as a basis for interpretive analysis?

2. What are the themes of the function of sustainable reporting as a reference in interpretive analysis?
3. What are the most effective consequences of a green accounting strategy based on a sustainable reporting function?

2.3 Prior Researches

Palea [24] conducted a study entitled " Accounting for sustainable finance: does fair value measurement fit for long-term equity investments?". The paper grounds in a wide literature review on the effects of fair value accounting on investors' asset allocation strategies. By critically integrating literature on the notion of long-term investment with theories and possible accounting approaches, the paper provides implications for a revision of the current measurement system for long-term equity investments. The literature review supports the view that fair value accounting has played a role in discouraging equity investments over time, thus leaving economies with poorer risk-sharing and weaker long-term investments. Haladu et al Bin-Nashwan [25] conducted a study entitled "Investigating the Impact of Environmental Institutions on Sustainable Corporate Reporting in Nigeria". The role of environmental institutions in Nigeria, such as the Department of Petroleum Resources (DPR); National Standard Enforcement Institute and Environmental Monitoring (NESREA), and the Nigerian Stock Exchange (NSE) reviewed sustainability reporting practices.

The study was conducted between 2015 and 2019 and examined 78 companies affected by the impact of institutional oversight on environmental performance. The results showed that the impact of institutional oversight on sustainable reporting is positive and direct. But the Nigeria Stock Exchange's influence as a drafting authority on companies to disclose more complete information for the purpose of sustainable reporting was greater. Rossi et al [26] conducted a study entitled "Investigating the Impact of Business Ethics and Social Responsibility on Voluntary Disclosure of Intellectual Capital: Sustainable Reporting." In this study, 83 companies out of the top 100 companies announced by the Fortune Institute as a sample were examined and the results showed, business ethics have a positive and direct effect on social responsibility in the voluntary disclosure of intellectual capital, and this issue can contribute to the development of corporate reporting due to the reduction of information asymmetry and conflict of potential interests. Abdollahzadeh and Amin [27] conducted a study entitled "The Impact of Planned Behavior Theory, Ethical Commitment and Risk Perception on the Tendency to Account and Report on Corporate Sustainability". The statistical population includes financial managers and senior experts in the field of accounting of companies listed on the Tehran Stock Exchange, except for financial intermediation companies such as banks, investment funds, insurance companies, etc., which has a population of 276 so that each person as a representative Each company is considered.

The statistical sample was determined using Cochran's formula at a 5% error level of 161 people. In order to measure the research variables, a standard questionnaire with a five-point Likert scale was used. To reach the statistical sample size, a research questionnaire was sent to 200 companies listed on the Tehran Stock Exchange in 2019 randomly and electronically. Finally, 163 questionnaires were answered. In this research, the structural equation model has been used to test the hypotheses. The results of the structural equation model showed that attitude; mental norm; perceived behavioral control; ethical commitment has a positive effect on the willingness to perform sustainable accounting and reporting. While a significant effect of risk perception of managers and accountants of companies on the tendency to accounting and sustainability reporting has not been observed. The results of this study

provide a broad insight into the goals of managers for the desire for accounting and sustainability reporting. Therefore, the findings of this study can be used to strengthen the attitude; mental norm; use perceived behavior control and ethical commitment to engage in sustainability accounting and reporting in order to achieve sustainable development.

3 Methodology

In terms of outcome categorization, this research is part of developmental research, because the lack of theoretical coherence in terms of concepts and theories related to this field, has led to this research seeking to identify the strategic implications of green accounting based on sustainable reporting function. On the other hand, based on the data type, this research is meta-synthesis, because in the qualitative part through theoretical screening based on the meta-analysis method, this research seeks to identify the strategic consequential components of green accounting and sustainable reporting function themes and then in the quantitative part through matrix analysis.

Based on a multi-criteria decision-making polar matrix examines a model for determining the most effective strategic implications of green accounting based on the sustainable reporting function. Usually, decision-making processes are based on components and themes that are examined in the form of matrix analysis and based on the pairwise comparison, which is one of the best processes, interpretive ranking analysis (IRP), which is the basis of analysis in this study.

3.1 Statistical Population of the Research

In the qualitative part, this study, through the basis of homogeneous sampling, selected 12 experts and experts in the field of accounting and financial management at the university level to participate in determining the components and themes based on a theoretical approach to the research topic. Also, based on the meta-synthesis analysis, in this part of the research conducted on sites such as University Jihad in Iran; Iran Database of Publications; Islamic Computer Science Research Center of Iran, International ScienceDirect; Emerald insight reference, and OnlineLierary reference were used to determine the components (strategic consequences of green accounting) and research topics (sustainable reporting function). In the second phase, in order to perform the interpretive analysis of prioritization, 17 managers of the top 50 companies in 2009 were used as the target community in the quantitative section. The selection was based on the purposive sampling method.

Individuals in the target community of the qualitative section as members of the focus group, after evaluating the identified components and themes, determined the theoretical adequacy of each component and theme based on Delphi analysis. In the quantitative section, matrix questionnaires are designed and distributed among the members of the target community in the quantitative section. It should be noted that since interpretive ranking analysis (IRP) is an analysis based on matrix analysis and analysis in operations, it should be done by participants based on a specific criterion such as experience or expertise Based on this, it is limited in terms of sample size and according to studies such as [12] and [16].

4 Empirical Results

In order to link the strategic consequential components of green accounting and the themes of the sustainable reporting function, meta-synthesis is used to prioritize the components and themes identified in the form of research matrix checklists in the quantitative section to enter the phase of the interpretive

ranking process.

4.1 Meta-Synthesis Findings

The method of meta-synthesis through theoretical and research screening seeks to identify components and topics related to the research topic. The time period for analyzing similar research was from 2017 to 2021. In other words, in order to find similar articles and research and use international and domestic research databases and references, research related to the research goal was identified.

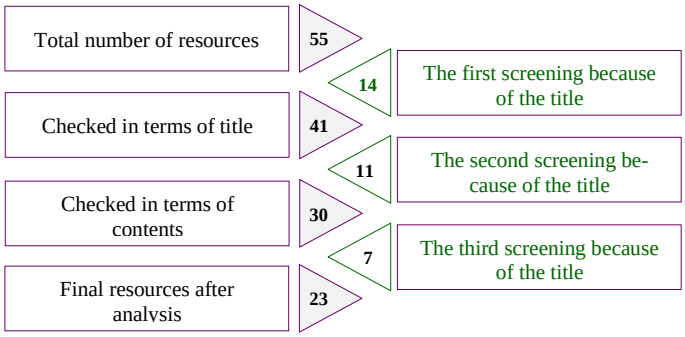

Fig. 2: Screening of Initial Research

As shown in Fig. 2, all of the primary sources identified are 55. After several stages of the screening process in terms of content, title and analysis, finally, 21 studies relevant to the content, title, and analytical processes of this study. 12 studies related to determining the strategic consequence components of green accounting and 11 studies related to the themes of sustainable reporting function were selected. At this stage, concepts should be broken down into components and themes to determine the most important component of the green accounting strategic outcome based on the sustainable reporting function in the form of scorecards.

Therefore, to answer the first and second questions of the research through the criterion of critical appraisal, which includes 10 criteria, the objectives of the research are the logic of the research method, the research design, the sampling, the data collection, the reflectivity, the accuracy of the analysis, the theoretical and transparent expression of the findings and the value of the research. In section a) the strategic consequential components of green accounting are determined and in section b) the themes of power domination are determined.

4.1.1 Identify the Strategic Implication Components of Green Accounting (X)

In this section, according to the explanations given, the strategic consequence components of green accounting with the symbol (X) are identified. Table 1 evaluates how to evaluate the components based on a 50-point index in the form of scores from 1 to 5 based on the 10 criteria described. The scores presented based on the mode index showed that the three studies were excluded due to the fact that they received less than 30 out of 50 points and according to the guidelines of the adequacy score of this analysis, the researchers that scored 30 and above were approved. For this reason, they were excluded from the investigation. Next, the strategic consequential components of green accounting are extracted. Accordingly, the following scoring method is used to determine the mentioned components. Based on this method, all sub-criteria extracted from the text of the approved articles are written in the column of

the table, and then in the row of each table, the names of the approved research researchers are given.

Table 1: The Critical Analysis Process of Screened Research

	1	2	3	4	5	6	7	8	9	10	11	12
Critical appraisal criteria / research	Mubarik et al [28]	Brooks & Schopohl [29]	Fu and Su [30]	Maama & Appiah [31]	Mata et al [32]	Kumar & Dixit [33]	Welbeck [10]	Feger & Mermet [34]	Baharloo et al [35]	Sedighiyan et al [36]	Dehghani Soltani eh al [37]	Akbari & Pourzamani [38]
Research purpose	4	3	2	3	3	4	3	3	4	3	3	2
The logic of the research method	4	3	2	2	4	3	4	4	3	4	4	3
Research plan	4	3	3	3	3	4	3	3	4	3	3	2
Sampling	4	4	3	3	3	4	4	4	4	4	3	2
Data collecting	5	3	3	3	4	3	4	4	3	4	2	2
Generalized Findings	4	4	2	2	3	4	4	3	3	3	3	3
Ethical	5	4	3	2	4	4	3	4	3	4	2	3
Statistical analysis	5	3	3	2	3	5	4	4	3	4	3	2
Theoretical capability	4	4	3	2	3	3	4	3	4	3	2	4
Research value	4	4	3	3	4	4	4	4	4	4	3	2
Total	39	**34**	**27**	**25**	**34**	**38**	**37**	**34**	**35**	**34**	**29**	**25**

Based on each researcher's use of the sub-criteria written in the table column, the symbol "☑" is inserted, then the scores of each ☑ are added together in the sub-criteria column, and scores above the average of the research are selected as research components.

Table 2: The Process of Determining the Main Components of Research

Researchers	**Competitive consequences**	Control consequences	Social consequences	**consequences**	Cultural consequences	**Legal consequences**
Mubarik et al [28]	☑	-	-	☑	-	-
Brooks & Schopohl [29]	☑	☑	-	☑	☑	☑
Mata et al [32]	-	-	☑	-	-	☑
Kumar & Dixit [33]	☑	-	☑	☑	-	☑
Welbeck (2017)	-	-	☑	☑	☑	☑
Welbeck [10]	☑	☑	-	☑	-	☑
Baharloo et al [35]	☑	-	-	☑	-	☑
Sedighiyan et al [36]	-	☑	☑	-	☑	-
Akbari & Pourzamani [38]	☑	☑	-	☑	-	-
Total	**6**	**4**	**4**	**7**	**3**	**6**

Based on this analysis, it was found that three components have the highest frequency and therefore in this study are examined as strategic consequential components of green accounting.

4.1.2 Identify the Themes of the Sustainable Reporting Function (Y)

As above, following the appraisal evaluation method in this section, the function of sustainable reporting is determined. In this section, according to the explanations given, the function of stable reporting is identified with the symbol (Y). Table 3 evaluates how the topics are evaluated based on a 50-point index in the form of scores of 1 to 5 based on the 10 criteria described.

Table 3: The Process of Critical Analysis of Screened Research

Criteria for Evaluation	Research purposes	The logic of the research method	Research plan	Sampling	Collecting data	Reflexivity	Ethical considerations	Accuracy of analysis	Theoretical of the findings	Research value	Total	Confirm ☑	Delete ☒
Baboukardos et al [39]	4	3	3	4	4	4	3	4	4	4	37	☑	-
Calderon et al [40]	3	3	3	2	3	2	3	2	2	3	**27**	-	☒
Schiehll & Kolagar [41]	4	4	5	5	4	4	4	5	4	5	43	☑	-
Vieira & Radonjic [42]	4	5	4	4	4	3	4	4	4	4	40	☑	-
Ismaeel & Zakaria [43]	2	2	3	3	2	4	2	3	2	3	**26**	-	☒
Laskar [44]	4	4	3	4	2	3	4	4	4	4	36	☑	-
Bhatia & Tuli [45]	2	2	2	1	2	3	2	3	3	2	**22**	-	☒
Farrokhi et al [11]	5	3	4	3	4	3	4	3	4	4	37	☑	-
Amirbeiyki Langroudi et al [46]	3	3	3	3	2	3	3	4	4	5	32	☑	-
Abdi et al [47]	4	4	3	4	3	3	3	4	3	4	35	☑	-
Khozein et al [48]	3	2	3	2	3	2	2	2	3	3	**25**	-	☒

The scores presented based on the fashion index showed that out of a total of 11 studies related to the function of sustainable reporting, 4 studies, considering that they received below 30 out of a total of 50 points, confirmed, deleted, and for this reason, they were excluded from the investigation. Then the research topics are extracted. Accordingly, the following scoring method is used to determine the themes of sustainable reporting function. The results show the confirmation of 6 themes of information-based sustainable reporting function based on high-frequency distribution. In this section,

4.2 Interpretive Ranking Analysis (IRP)

As described, in the qualitative part of the study, the strategic components of green accounting (X) and the themes of the sustainable reporting function (Y) were identified. In this section, in order to affect the line "*i*" on column "*j*" or vice versa or vice versa, the processes related to this analysis are performed. Therefore, in order to create interactive matrixes, the level of direct, symmetrical, or indirect communication must first be considered in line with the explanations. In order to create an interpretation of the interaction of the components of the strategic outcome of green accounting with the themes of the sustainable reporting function, Table 5 is presented. Based on the results obtained, this section assesses the

level of effectiveness of each of the themes of the sustainable reporting function. This evaluation is a scoring method based on the development of a pairwise comparison score form, the result of which is used in the following sections of the matrix prioritization analysis.

Table 4: The Process of Determining the Main Components of Research

Researches	The Institutionalism of Sustainable Monitoring	Sustainable structuralism	Sustainable standardism	Sustainable culture building	Sustainable socialism	Internalization of sustainable monitoring	Sustainable education and scholarship	Sustained internal control	Sustainable leadership	Sustainable technology
Baboukardos et al [39]	☑	-	-	☑	-	-	☑	-	-	☑
Schiehll & Kolagar [41]	☑	☑	-	-	-	☑	-	☑	-	☑
Vieira & Radonjic [42]	-	☑	☑	-	☑	-	☑	☑	-	-
Laskar [44]	☑	-	☑	-	☑	-	-	☑	☑	-
Farrokhi et al [11]	☑	-	☑	☑	☑	☑	☑	-	☑	-
Amirbeiyki Langroudi et al [46]	-	-	-	-	☑	-	-	☑	-	☑
Abdi et al [47]	☑	-	☑	-	☑	-	☑	-	-	☑
Total	5	2	4	2	5	2	4	4	2	4

Table 5: Cross-Matrix of Strategic Consequences of Green Accounting with Sustainable Reporting Function

	Y1	Y2	Y3	Y4	Y5	Y6
X1		Sustainable standardization is the basis for the competitive consequences of green accounting	Sustainable socialism is the basis for the competitive consequences of green accounting	Sustainable education and scholarship are the basis for the competitive implications of green accounting		Sustainable technology is the basis for the competitive implications of green accounting
X2			Sustainable socialism is the basis for the value consequences of green accounting	Sustainable education and scholarship are the basis for the competitive implications of green accounting		Sustainable technology is the basis for the value implications of green accounting
X3	Institutionalization of sustainable oversight is a factor for the legal consequences of green accounting	Sustainable standardization is the basis for the legal consequences of green accounting			Sustained internal control's basis for the legal consequences of green accounting	

Table 6: Parallel Comparison of Sustainable Reporting Function

Number	Couple comparison	Yes/No	Description of how the impact
□ Y4 **Couple comparison at the institutional level of sustainable supervision**			
1	Y1 – Y2	Yes ☒ No ☐	Sustainable oversight institutionalism is the basis for the development of sustainable reporting standards
2	Y2 – Y1	Yes ☐ No ☐	
3	Y1 – Y3	Yes ☐ No ☐	
4	Y3 – Y1	Yes ☒ No ☐	Sustainable socialism is the basis for the development of the institutionalization of sustainable supervision
5	Y1 – Y4	Yes ☐ No ☒	
6	Y4 – Y1	Yes ☐ No ☒	
7	Y1 – Y5	Yes ☐ No ☒	
8	Y5 – Y1	Yes ☒ No ☐	Sustainable oversight institutionalism is the basis for the development of sustainable internal control
9	Y1 – Y6	Yes ☐ No ☒	
10	Y6 – Y1	Yes ☐ No ☒	
□ Y2 **Couple comparison at the level of sustainable standardise**			
11	Y2 – Y3	Yes ☒ No ☐	Sustainable standardization is the basis for the development of sustainable monitoring institutionalism
12	Y3 – Y2	Yes ☐ No ☒	
13	Y2 – Y4	Yes ☒ No ☐	Sustainable standardization is the basis for learning sustainable education
14	Y4 – Y2	Yes ☐ No ☒	
15	Y2 – Y5	Yes ☒ No ☐	Sustainable standardization is the basis for the development of sustainable internal control
16	Y5 – Y2	Yes ☐ No ☒	
17	Y2 – Y6	Yes ☐ No ☒	
18	Y6 – Y2	Yes ☐ No ☒	

Table 7: Access Matrix

	Y	Y1	Y2	Y3	Y4	Y5	Y6
The Institutionalism of Sustainable Monitoring	Y1	**1**	0	0	1	0	1
Sustainable standardism	Y2	1	**1**	0	0	0	1
Sustainable socialism	Y3	1	1	**1**	1	1	1
Sustainable education and scholarship	Y4	0	1	0	**1**	0	0
Sustained internal control	Y5	1	1	0	1	**1**	1
Sustainable technology	Y6	0	0	0	1	0	**1**

Table 8: Achievement Matrix in Terms of the Degree of Transferability

	Y	Y1	Y2	Y3	Y4	Y5	Y6
The Institutionalism of Sustainable Monitoring	Y1	**1**	0	$^{*}1$	1	$^{*}1$	$^{*}1$
Sustainable standardism	Y2	1	**1**	0	$^{*}1$	$^{*}1$	$^{*}1$
Sustainable socialism	Y3	1	1	**1**	1	1	1
Sustainable education and scholarship	Y4	0	1	0	**1**	0	$^{*}1$
Sustained internal control	Y5	1	1	0	1	**1**	**1**
Sustainable technology	Y6	0	0	0	1	0	**1**
Transitional effect		**1***	**Direct effect**				**1**

Table 6 was presented as part of the influence of relationships, which shows, for example, a pairwise comparison of the institutional themes of sustainable supervision Y1, the two themes of institutionalism of sustainable monitoring Y1, and sustainable standardize Y2 as the effect j ← i (direct effect of row i on column j) are connected, this means that the institutionalization of sustainable oversight is the basis for the development of sustainable reporting standards. In order to form the structural self-interaction matrix "SSIM", pairwise comparisons of research topics are presented in Table 7. For pairwise comparisons, the i-th index was compared in pairs with all elements from (i + 1) n to nth. For each relationship, the answer is yes "Y" or "N" and if the answer is yes, the reason is stated. In this case, the interpretive logic of pair relationships is presented in the form of the scientific basis of interpretive logic. In this step, the relations are entered as an achievement matrix in the form of "1" or "0", which are presented

in Table 7. According to Table 6, the cells with the option "Yes" are numbered 1 and the cells with the option "No" are numbered 0. In fact, this matrix is obtained by converting its structural interaction matrix into a zero and one binary matrix. Then, in this stage, points are formed based on the interaction of the compared indicators to form the interaction achievement matrix. In order to determine the level of direct and transferable influence of research topics, in the next step, the percentage percentages of the total level of influences are determined, which are presented in the form of Table 9.

Table 9: Percentage Score of Impact Levels of Sustainable Reporting Functions

Reference variable	Direct	Transferable	Interpretive	Overall	Percentage of interpretive
Y1	2	3	1	6	16067
Y2	2	3	2	7	19.44
Y3	6	0	2	8	22.22
Y4	2	1	2	5	13.88
Y5	5	0	1	6	16.67
Y6	2	0	2	4	11.12
Total	19	7	10	**36**	
Percentage	77.52	1.449	2.797		

The results showed that 52.77% of the themes of sustainable reporting function are direct and 19.44% have transitional effects. From the total impact based on the pairwise scale between the research topics, it was found that the percentage of the impact of the sustainable socialism theme is higher than the other themes of the sustainable reporting function. This means that the impact of a significant dimension in the level of sustainable reporting functions of the Iranian capital market is based on the socialism of reporting. Therefore, considering the influential role of sustainable socialism, the level of influence of the theme of sustainable socialism on strengthening the strategic consequences of green accounting is determined. To do this, the matrix relation of a matrix must be used. For the $A_{(n*n)}$ matrix, the P (nonsingular) matrix can be found to give $P^{-1}AP = D$ a diagonal matrix. In general, the coefficient of two matrices n * n can be defined as follows:

$$AB = A[X_1, X_2, \cdots X_n] = [AX_1, AX_2, \cdots AX_n] \quad (1)$$

Where X_1, X_2, $\cdots$ and X_n are columns B. So if X1, X2, and X3 represent the X columns and the diameter matrix D is

$$D = \begin{bmatrix} d_{11} & & \\ & d_{22} & \\ & & d_{33} \end{bmatrix} \quad (2)$$

The result of AP = PD is equal to $[AX_1, AX_2, AX_3] = [d_{11}, d_{12}, d_{33} E_3]$ or

$$AX_1 = d_{11}X_1, AX_2 = d_{22}X_2, AX_3 = d_{33}X_3 \quad (3)$$

Accordingly, according to the matrix of research components that have independent special vectors X_1 to X_3, respectively, the level of being thick is determined by the relation of determining imaginary eigenvalues, ie 1^*. For this purpose, since $\lambda_1 = a + \beta$, the special vector V_1 will also be imaginary. The solution of such a system of equations is as follows:

$$X_1 = V_1 e^{\lambda_1 t}, X_2 = \overline{V}_1 e^{\overline{\lambda}_1 t}$$

Table 10: Interpretive Influence of Strengthening the Strategic Consequences of Green Accounting

		Competitive consequences	Value consequences	Legal consequences
	X	X1	X2	X3
Competitive consequences	X1	-		
Value consequences	X2	1*	-	
Legal consequences	X3	1*	1*	-

As can be seen, the theme of sustainable socialism is influential in all three components of the strategic consequences of green accounting. Based on the level of dependence and influence, the most influential component of the strategic outcome of green accounting based on the interpretive ranking process (IRP) should be determined.

Table 11: Prioritize the Level of Dependence and Influence of the Strategic Consequences of Green Accounting

		X1	X2	X3	Dependency level D	Difference D − B	Rank
Competitive consequences	X1		1	2	3	-1	Second
Value consequences	X2	3		2	5	3	First
Legal consequences	X3	1	1		2	-2	Third
Infiltration level B		4	2	4	10		

This table shows that the highest level of impact of the strategic implications of green accounting is related to the value consequence of "X2", which shows that socialism in sustainable reporting as a theme of social responsibility helps companies to pursue value implications in green accounting by pursuing green accounting. The learner acquires a market and a social environment. This value leads to greater interaction between the company and stakeholders and an understanding of social issues and concerns and helps to reduce information asymmetries to form reciprocal and pluralistic values and to develop public trust in the market. On the other hand, the level of dependence as the sum of the strategic consequences of green accounting indicates the impact of other components, so the highest impact in this section is related to the impact of value consequences on other consequences. After determining the most important components of research in this section to determine the set of output indicators; Common input and elements are used to formulate the hierarchical model "TISM", ie the model of structural layers.

Table 12: A Set of Output Indicators, Inputs and **Abbreviation** in Elements of Propositions

Y	**Input index**	**Output index**	**Abbreviation**	**Level**	
Y1	1,3,4,5,6,	1,2,3,5	1,3,5	II	Second
Y2	1,2,4,5,6	2,3,4,5	2,4,5	III	Third
Y3	1,2,3,4,5,6	1,2	1,2	IV	Forth
Y4	2,4,6	1,2,3,4,5	2,4,6	I	First
Y5	1,2,4,5,6	1,2,3,5	1,2,5	II	Second
Y6	4,6	1,2,3,4,5,6	4,6	I	First

As it turned out, sustainable socialism "Y3" has the most influential theme among other themes of sustainable reporting function. It was also found that the least effective proposition is sustainable education "Y4" and sustainable technology "Y6", which shows a small role in the development of sustainable reporting function, which is based on the presentation of a conical matrix to identify the most effective sustainable reporting function. Finally, with the identification of the most influential theme of the sustainable reporting function, weights are given to each of the components of the research, namely the strategic implications of green accounting. In other words, this section seeks to determine the level

of impact of determining the strategic consequence of green accounting.

Table 13: Selection of the Most Important Consequences of the Green Accounting Strategy

		X1	X2	X3	Dependency level D	Difference D − B	Rank
Legal consequences	X1		*0.43*	*0.85*	*1.28*	***-0.48***	*Third*
Value consequences	X2	*1.02*		*0.96*	*1.98*	***0.92***	*First*
Competitive consequences	X3	*0.74*	*0.63*		*1.37*	***-0.44***	*Second*
Infiltration level B		*1.76*	*1.06*	*1.81*			

By comparing the simple interpretive prioritization process in Table 13 and the interpretive prioritization in the above table to select the most important strategic consequence of green accounting based on the sustainable reporting function, most of these rankings are similar in both cases. These results can be seen in the following table.

Table 14: Comparative Ratings for the Simple and Weighted Interpretive Prioritization Process

Consequences of a green accounting strategy		**Interpretive weighting ranking**	**Simple interpretive ranking**
Competitive consequences	X1	3	2
Value consequences	X2	1	1
Legal consequences	X3	2	3

In fact, in the analysis of interpretive ranking process (IRP) weights, it should be noted that the high weight of each component indicates the most effective strategic outcome of green accounting based on the sustainable reporting function. Based on this result, it should be stated that the most effective strategic consequence of green accounting from sustainable socialism is the value consequence of green accounting. It is considered a green accounting strategic consequence in the firm was used Rough analysis. However, the ultimate step in recognizing the key framework for creating green accounting strategic consequences within the firm must be the VIKOR Gray approach. This analysis is performed through equations (4) to (14).

$$S_i^L = \sum_{j\in B} W_j^L \left(\frac{f_j^* - f_{ij}^U}{f_j^* - f_j^-}\right) + \sum_{j\in B} W_j^L \left(\frac{f_{ij}^L - f_j^*}{f_j^- - f_j^*}\right) \tag{4}$$

$$S_i^U = \sum_{j\in B} W_j^U \left(\frac{f_j^* - f_{ij}^L}{f_j^* - f_j^-}\right) + \sum_{j\in B} W_j^U \left(\frac{f_{ij}^U - f_j^*}{f_j^- - f_j^*}\right) \tag{5}$$

$$R_i^L = \max_j \begin{cases} W_j^L \dfrac{f_j^* - f_{ij}^U}{f_j^* - f_j^-} \Big| \, j \in B \\ W_j^L \dfrac{f_{ij}^L - f_j^*}{f_j^- - f_j^*} \Big| \, j \in C \end{cases} \tag{6}$$

$$R_i^U = max_j \begin{cases} W_j^U \dfrac{f_j^* - f_{ij}^L}{f_j^* - f_j^-} \Big| \, j \in B \\ W_j^U \dfrac{f_{ij}^U - f_j^*}{f_j^- - f_j^*} \Big| \, j \in C \end{cases} \tag{7}$$

Where W_j^L is the lower limit and W_j^U is the upper limit of each criterion's weight.

Then Calculate values of $\left[Q_i^L Q_i^U\right]$

$$Q_i^L = v\left(\frac{S_i^L - S^*}{S^- - S^*}\right) + (1-v)\left(\frac{R_i^L - R^*}{R^- - R^*}\right) \tag{8}$$

$$Q_i^U = v\left(\frac{S_i^U - S^*}{S^- - S^*}\right) + (1-v)\left(\frac{R_i^U - R^*}{R^- - R^*}\right) \quad (9)$$

$$S^* = \mathrm{Min}_i S_i^L \text{ ‘} S^- = \mathrm{Max} S_i^U \text{ ‘ } R^* = \mathrm{Min}_i R_i^L \text{ ‘ } R^* = \mathrm{Max}_i R_i^U \quad (10)$$

Q is a cumulative index. in addition, v indicates the weight of the maximum criterion policy and is shown a Shown as $v \in [0.1]$: usually $v = \frac{0}{5}$

Then Ranking choices according to S, R, and Q.

Since the Gray Vikor method suggests the interval weights for the choices of the research, the weight of the choices, similar to the Vikor method, cannot be easily ranked according to the Q index. In order to rank the interval weights, several ways are described below.

$$A = [a_1 . a_2]; B[b_1 . b_2] \quad (11)$$

$$C = [c_1 . c_2] = A - B = [a_1 - b_2 . a_2 - b_1] \quad (12)$$

$$\mathrm{IF} \frac{|c_1|}{c_2 - c_1} < \frac{|c_2|}{c_2 - c_1} \rightarrow \mathrm{Then}\ A > B \quad (13)$$

$$\mathrm{IF} \frac{|c_1|}{c_2 - c_1} < \frac{|c_2|}{c_2 - c_1} \rightarrow \mathrm{Then}\ A \leq B \quad (14)$$

This implies, that propositions A, B, C, and D, are first determined based on equations (4) to (8), and the propositions are then defined, using VIKOR Gray's principal proposition, that is Q, based on equations (9) and (13). The outcome of the equations is shown in Table 15.

Table 15. Analysis of Gray VIKOR Method propositions

U-BEEs	Code	S_i^U	S_i^L	R_i^U	R_i^L	Q_i^U	Q_i^L
Competitive consequences	X1	1.021878	2.001920	0.357082	0.524165	0.421879	0.673827
Value consequences	X2	1.608903	2.754837	0.390290	0.754832	0.619286	0.800368
Legal consequences	X3	1.438927	2.365281	0.382716	0.553678	0.4620201	0.702605
Evaluation criteria	propositions			S^*	S^-	R^*	R^-
	Value of propositions			0.700286	3.172677	0.526359	1

As Proposition Q constitutes the key rule of rough analysis, namely the major feature in changing or strengthening propositions, it was decided in this study that Q was connected to capital functions (Y2) based on Table 15 most effective strategic consequence of green accounting from sustainable socialism is the value consequence of green accounting.

5 Conclusion

The purpose of this study was to evaluate the most effective strategic implications of green accounting based on the function of sustainable reporting. As indicated in the research process, the analysis pursued two goals. The result of the analysis of the first goal and based on the weighted interpretive analysis of each of the components and propositions, it was determined that the most prominent proposition of the function of sustainable reporting is the theme of sustainable socialism. In the analysis of the result of this section should be stated, sustainable socialism as an effective dimension in sustainable reporting focuses on the development processes of corporate social responsibility to stakeholders in the form of groups of people; Guilds; NGOs, etc., to act on the basis of normative mechanisms and social commitment, even in the absence of formal laws and requirements, voluntarily and in accordance with a comprehensive approach with pluralistic values, and commit to providing them with clear and consistent reports. This level of consistency in reporting, although sometimes not measurable due to the social

intentions of companies, promotes social values, to reduce the trauma of social distrust in capital market companies, especially the recent events on the negative growth of the willingness to invest in the stock market, and companies responsibly seek social compliance with the concerns of groups of domestic and international institutions; the environment; economic conditions; individual satisfaction of human resources, etc. to disclose their operational realities. On the other hand, in line with the main goal of the research, which is to determine the most effective strategic consequences of green accounting based on the function of sustainable reporting, the results are determined. Under sustainable socialism, the most effective strategic consequence of green accounting is value consequences.

In fact, this consequence includes the level of value created for the company in a competitive market will bring trust and confidence to the company. The trust and confidence that is created due to the importance of the company's social responsibility to stakeholders, and this issue, while reducing the agency costs, strengthen the company's position in sustainable development from an environmental perspective. In other words, the company is trying to reduce production emissions and overhead costs due to a lack of resources. Provide maximum value to stakeholders. These values are due to the role that green accounting provides to stakeholders in the disclosure of complete information, and this leads to pervasive values in green accounting functions that increase the dynamics of the company's interaction with shareholders and investors. It is important to note this, disclosure of environmental costs in the form of green accounting functions, in order to preserve the wealth of shareholders, will create value-creating consequences in the firm, which reflects the company's approach to social needs and causes values increasingly lead to satisfaction with engaging with external stakeholders. Creating value implications for green accounting can also help improve the company's social popularity, which will have beneficial effects on the stock prices of such firms on the stock exchange. Thus, the socialization of the firm's sustainability in reporting creates cohesive values of the firm's operational effectiveness that can strengthen the firm's trust in the long run.

The result obtained in this section with the research of Mata et al [32]; Kumar and Dixit [5]; Feger and Mermet [34]; Dehghani Soltani et al [37] and Akbari and Pourzamani [38]. Based on the results, it is suggested that sustainable socialism in financial reporting can lead to effective functions, not as a symbolic activity, but as a social function of the company society and stakeholders. Accordingly, the development of a social performance charter as a codified policy, while being a symbol of the company's commitment to society, helps the company in the external evaluation phase to identify opportunities and threats to formulate its strategies more effectively on the social environment. These approaches place the company not only in its area of expertise but also as a business on the path to economic sustainability; social; political; cultural and ... in a comprehensive way. Green accounting is suggested in terms of value implications first, regulatory bodies such as the Securities and Exchange Commission and other responsible organizations to disclose the performance of companies in the environmental sector by using the necessary instructions, such as strengthening the integrity of the information disclosure system, to help increase the capacity to publish management interpretive reports based on companies' foresight in the environmental field, and reduce the level of information asymmetries.

Second, the companies themselves, by using agile financial reporting structures and by using an expert audit committee and experienced and knowledgeable internal auditors, to provide environmental consultants with disclosure of appropriate information to shareholders; investors; NGOs, etc., as a leading company in the field of transparent environmental practices, use the capacities of this sector to their advantage.

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