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Explain and Prioritize Information Disclosure Factors Related to Sustainable Development Accounting with Fuzzy Approach

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ABSTRACT

This research was conducted with the aim of explain and prioritize information disclosure factors related to sustainable development accounting with fuzzy approach" in 2019 of companies active on the Iranian Stock Exchange. The research data were collected by exploratory method. Qualitative data were obtained through the study of research and credible sources in the field of sustainable development accounting and using coding through content analysis, the initial variables of the model were identified; 61 indicators were extracted from the initial codes in 4 dimensions including: environment, social factors. Economic and governance factors were categorized. In the quantitative section, the statistical population of the study included knowledgeable and professional and academic experts in the field of accounting. Using the targeted sampling method, 25 experts were selected as statistical samples. In the quantitative part, using fuzzy Delphi technique in one step, the indicators were screened. In the next step, prioritization of criteria and sub-criteria was done by hierarchical analysis method with fuzzy approach; among the main criteria, environmental dimension with weight 0.405 in rank 1 The social dimension with a weight of 0.296 was ranked 2nd, the economic dimension with a weight of 0.186 was ranked 3rd and the leadership dimension with a weight of 0.113 was ranked 4th. Finally, based on the calculated final weight, the strategic approach to environmental impacts with a weight of 0.955 in the first place, management and efficiency in consumption in the second place, social development and humanity in the third place and management Waste and waste came in fourth.

1 Introduction

An increasing number of companies and organizations want to sustain their operations and contribute to sustainable development. Sustainability reporting can help organizations measure and inform their economic, environmental, social, and governance performance. Sustainability - the ability to sustain something for a long time or indefinitely - is based on performance in these four key areas. Systematic sustainability reporting helps organizations measure the effects they create or experience, set goals, and manage change. Sustainability Reporting is a key platform for informing about performance and performance effects, both positive and negative [21]. Sustainable accounting expands the boundaries of accounting to account for environmental, social, and economic costs and benefits that fall to a wide

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range of people with different organizational interests [2]. Thus, the point of distinction between sustainable accounting and conventional accounting is related to the specific costs and benefits that occur directly in an organization in economic, social, and environmental dimensions. The concept of sustainable development accounting requires a relationship with sustainability management and sustainability reporting [5]. A sustainability report should provide a balanced and logical presentation of the sustainability performance of the reporting organization (including both positive and negative issues). Therefore, sustainability reporting is a vital resource for managing change relative to a sustainable global economy [29]. A resource that combines long-term profitability with ethical behavior, social justice, and environmental care. Sustainability reports may, for purposes such as optimization and performance appraisal of sustainability performance in accordance with rules, norms, codes, performance standards and voluntary initiatives, demonstrate how an organization affects stakeholders and is affected by expectations in the field of sustainable development, And compare performance in an organization and between different organizations over time [6].

An effective sustainability reporting cycle should provide an advantage for all reporting organizations. Internal benefits for companies and organizations can include: increasing understanding of risks and opportunities; emphasizing the relationship between financial and non-financial performance; long-term management of strategy and policy and business plans; facilitating processes, reducing costs and improving efficiency; Sustainability according to rules, norms, codes, performance standards and voluntary initiatives; comparing performance internally, inter-organizationally and between different sectors of the industry. However, the external benefits of sustainability reporting are: improving brand reputation and loyalty; the ability of stakeholders to understand the true value of the organization and its tangible and intangible assets; Demonstrate how the organization is effective and effective based on expectations about sustainable development [11]. Also, the sustainability report reflects the values and model of governance of the organization and shows the relationship between the strategies of the organization and its commitment to a sustainable global economy. This also has a theoretical framework, and various theories such as political economy theory, legitimacy theory, stakeholder theory, and organizational theory explain the company's motivation to disclose sustainability information, and indicators and standards have been developed to measure firms' sustainability [28]. Instructions from the World Reporting Organization, the International Committee of the Reporting Committee and the Sustainability Accounting Standards Board have been instrumental in helping organizations prepare sustainability reports. Therefore, as the importance of sustainable development accounting has become clear in recent years, has taken [1].

Despite the growing importance of voluntary disclosures by companies on sustainability reporting issues, this issue has not been considered as it should be in Iran. Therefore, Iran as a developing country with a sustainable development approach based on the constitution, general policies of the vision document and the Fifth Economic and Social Development Plan and the privatization process; It seems necessary to be able to help the understanding and development of sustainable development accounting information disclosure in Iranian companies based on a research study and its results. Therefore, identifying and prioritizing reliable and scientific indicators that have considered all aspects and have all the required information in their published report and also have positive and useful functions, is the purpose of this study. So far, no research has been conducted to identify and prioritize the indicators of information disclosure factors related to sustainable development accounting with a fuzzy approach in Iran and even in the world with this approach.

2 Literature Review

Today, companies cannot win the competition and bring customers with them only through operational or financial superiority. In today's world, there is more to it than meets the eye. The present is the time when customers and members of society expect companies and organizations to be responsible and to consider future generations in their activities and operations [1]. Emphasizing organizations to future generations in their activities as well as resource consumption is a positive step towards sustainable development and shows the organization's clear accountability to stakeholders, which requires the development of organizational boundaries and reporting in order to respond appropriately and transparency of information for the spectrum. It has a wide range of stakeholders [24].

Sustainability reporting is a measure of measurement, disclosure, and accountability to internal and external stakeholders for the organization's performance toward sustainable development goals [26]. Sustainability reporting is a broad term that is similar to other terms (such as corporate social responsibility) used to describe reporting on economic, environmental, and social effects. A sustainability report should provide a balanced and logical presentation of the reporting organization's sustainability performance [17]. Therefore, sustainability reporting is a vital resource for managing change relative to a sustainable global economy [13]. A resource that combines long-term profitability with ethical behavior, social justice, and environmental care. Sustainability reports may for purposes such as optimizing and evaluating sustainability performance according to rules, norms, codes, performance standards, and voluntary initiatives, demonstrate how an organization affects stakeholders and is affected by expectations in the area of sustainable development, and compare performance in an organization and between different organizations over time [6].

Reporters instructions Global, Integrated Reporting Committee and the International Accounting Standards Board to provide stability to the organization's sustainability reporting have helped. Reporters global indices are now very popular and is used in various studies as indicators of disclosure. But as the research question suggests, these indicators are the general indicators of sustainable development that need to be localized for use in accounting. Based on the literature and research in this area was investigated. The research is summarized in the table below.

Table 1: Initial Coding Research in the Field of Accounting Evaluation of Sustainable Development

Author	Research Title	Results
Darabi and Akbari [8]	Investigating the factors affecting the implementation of environmental accounting	It reflects the risks posed by environmental threats - the responsibility of companies to respond to their activities for environmental sustainability - the legitimacy of companies by society - the new relationship between companies and the sustainability of the environment - the change of fundamental trends in the long run to protect the environment And the establishment of sustainable development as a necessary short-term goal - the barriers to current accounting to measure the performance of companies in the environment - reporting on environmental accounting has been confirmed.[8]
Naderi Khorshidi and Solgi [23]	Investigating the effect of organizational capabilities and industry structure on social of responsibility	Intra-organizational factors, profitability and operational capability, and industry structure factors, including the level of competition, the type of industry, and industry profitability, have a significant relationship with social responsibility.[23]

Table 1: Continue

Author	Research Title	Results
Huang et al. [15]	Identify indicators and criteria for sustainable development	The researchers identified factors such as economic considerations, ecological considerations, green city index, and economic factors as indicators of sustainable urban development.[15]
AfzalianMand et al. [2]	The Role of Sustainable Development Accounting in Supporting Sustainable Industrial Development	The results showed that there is a positive and significant correlation between sustainable development accounting and environmental management accounting and maintaining sustainable industrial development.[2]
Zayn al-Din et al. [31]	Social accounting, environmental knowledge, and accountable behavior of accountants	Accountants and enforce compliance with the professional code of ethics in reporting accounting environment in addition to helping managers in decision making, thereby gaining confidence so the financial information and helping their community.[31]
Fakhari et al. [10]	Explain the model for ranking companies in terms of environmental and social reporting and corporate governance (ESG) by hierarchical analysis	The findings show that the average ESG exposure score in Iran is about 29%. Disclosure of corporate governance information has been on the rise in the reports of Iranian companies during the years under study, while disclosure of environmental and social information and, ultimately, disclosure of ESG have been variable.[10]
Jizi [16]	Investigating the factors influencing the disclosure of sustainable development accounting information	As the level of independence of the board of directors increases, the quality of disclosure of accounting information for sustainable development improves, and this factor has a direct impact on improving the company's image among investors. And as the number of women on the board increases, so does the desire of companies to disclose sustainable development accounting information.[16]
Kuzey, Cemil and Uyar, Ali. [18]	Determinants of sustainability reporting and its impact on company value	The findings indicate an increase in GRI-based awareness of sustainability reporting among the companies under review, as well as an improvement in the quality of reporting.[18]
Shammakhi, H. [27]	Developing a Paradigm for Fair Valuation in Tehran Stock Exchange	To study fair value in a precise and comprehensive way, effective variables are divided into three main categories. First: evaluation variables including cash flow , discount rate, and earnings per share; second: intra-organizational variables of corporate governance including the type of ownership , management quality , the amount of reward, compensation and quality of organizational structure; third: variables relating to reporting quality such as offering reliable and on time information. Other variables such as firm size and operation cycle have also been studied. And according to selected sample, methods and statistical analysis, a paradigm for fair valuation has been developed.[27]
Mans-Rossi et al. [21]	Investigating the Factors Affecting Sustainability Reporting in European Countries	Companies have shown a growing interest in sustainable reporting, with a strong emphasis on the three elements of environment, staff, and community.[21]
Kim et al. [19]	Investigating the effect of corporate social responsibility on financial performance	When the intensity of competition is high, social responsibility significantly improves financial performance; in contrast, when market competition intensity is low, irresponsible behaviors have a greater impact on improving financial performance.[19]
Ahmed [3]	Quality of sustainability reporting in Bangladesh	In most cases, it was found that the stability report information did not meet G R I standards.[3]

Table 1: Continue

Author	Research Title	Results
Yumin Xiao[30]	Research on Environmental Accounting Information Disclosure under the Background of Sustainable Development	environmental accounting, and analyzes the relationship between sustainable development and environmental accounting information disclosure, and secondly expounds the importance of environmental accounting information disclosure, Finally, suggestions are made for improving the way and quality of corporate environmental accounting information disclosure.[30]
Rashidi- Baqhi, M. [25]	CEO Risk-Taking Incentives based on Environmental Sustainability	The results show that environmental sustainability has led to negative changes in risk taking behavior such that under environmental sustainability, managers capable to use of resources and as a result, can see CEO risk taking increase. [25]
Arab, R., Gholamrezapoor, M., Toraj, E. [4]	The Mediating Effect of Information Asymmetry and Agency Costs on the Relationship Between CSR and Investment Efficiency	The results indicate that corporate social responsibility is negatively correlated with investment inefficiency. In other words, corporate social responsibility leads to reduced investment inefficiency. Also, information asymmetry plays a mediating role in the relationship between corporate social responsibility disclosure and underinvestment, whereas the variable of agency cost mediates the association between corporate social responsibility disclosure and overinvestment.[4]
Masoumi et al. [22]	Identification of variables affecting the sustainability reporting of companies listed on the Tehran Stock Exchange	The size of the company, liquidity, institutional shareholders and the duality of the CEO's duties do not have a significant effect on the level of sustainability reporting of companies.[22]
Bram and Peters [6]	Sustainability of the company and sustainability reports: The role of accounting in the field of sustainable development	In countries that are more important to stakeholders, companies have better sustainability practices, and accounting processes in these companies are much more transparent. In addition, it was found that the specific characteristics of each company play a role in determining the accounting share in sustainable development.[6]

3 The Concept of AHP and FAHP

3.1 Analytic Hierarchy Process(AHP)

The Analytic Hierarchy Process (AHP) is one of the most popular multi-criteria decision making techniques developed by Thomas L. Saati in the 1970s. This method can be useful when the decision-making process is faced with multiple options and decision indicators Indicators can be quantitative or qualitative. The AHP method is based on pairwise comparisons. In this method, the decision maker begins his work by providing a decision hierarchy tree. This tree, indicators and decision options Then a series of pairwise comparisons are performed. These comparisons determine the weight of each factor in terms of competing options. Finally, the AHP logic combines the matrices from the pairwise comparisons in such a way that Make the best decision.

Despite the general popularity of AHP in decision-making processes, this method is incapable of expressing the exact value of decision-makers 'opinions in comparing different options and is criticized for its lack of inherent ambiguity and lack of explicitness in mapping decision-makers' perceptions with exact numbers. In the real world, decision-makers are faced with issues, limitations, and outcomes that are not really clear and transparent [14]. In 1983, two Dutch researchers, Larhorn and Pedrick, proposed a method for the fuzzy hierarchical analysis process based on the logarithmic least squares method. The number of calculations and the complexity of the steps of this method have made it less widely used.

In 1996, another method called developmental analysis method was proposed by a Chinese researcher named Chang [9].

3.2 Fuzzy Analytic Hierarchy Process(FAHP)

When the decision maker is faced with an uncertain and complex problem and expresses his comparative judgments in uncertain proportions such as about "twice as important" and "between two to four times less important", the steps of the standard hierarchical analysis process In particular, the vector-specific prioritization approach cannot be considered as correct methods [14]. In 1996, a Chinese researcher named Yong Chang proposed a method of developmental analysis. In this methodology, the triangular fuzzy numbers of all the elements are in the judgment matrix. The weight vectors of this method, due to the simplicity of its calculations, are used in most researches.

In recent years, fuzzy logic has been used in the development of hierarchical analysis algorithm, which has increased the capabilities of this method and at the same time modelling errors and the lack of conceptual accuracy and data. Despite its general popularity, hierarchical analysis has been criticized for its inability to combine inherent ambiguity and its lack of explicitness about the perception of decision makers' perceptions of exact numbers. Fuzzy logic, as opposed to classical logic, is a powerful tool for solving problems involving complex systems in which problems or issues depend on human reasoning, decision-making, and inference. Real phenomena are not just black or just white, they are somewhat Gray. Real phenomena are always fuzzy, vague and inaccurate. The range of total membership functions is a set of two members zero and one, while the range of fuzzy membership functions of the closed range is zero and one. Fuzzy set theory is a mathematical theory designed to model the ambiguity of human knowledge-related processes [9]. The decision maker can freely choose the range of values; Thus, the fuzzy AHP uses a range of values to express decision uncertainty. In this method, fuzzy numbers are used to compare pairs of options and geometric mean method is used to obtain weights and advantages. The steps of this method are described in detail in Section 5-2.

4 Research Method

The present research of the purpose type is applied, in terms of the research method, the mixed method has been used. Considering that the main purpose of this research is to explain and prioritize the factors of disclosure of information and accounting for sustainable development, so it can be said that the present research is in terms of purpose in the field of exploratory-applied research. Library and field methods have been used to collect data, so a descriptive survey is a survey. The main tools for collecting research data are interviews and questionnaires. Methodologically, research is mixed. In the first stage of the research, in accordance with the research goals and questions, the research method in this stage is qualitative and inductive with the content analysis approach. The second stage of research is quantitative using operational research techniques [1].

The statistical population of this research in the qualitative section includes all research conducted in the field of disclosure of sustainable development accounting information. According to the research strategy, theoretical sampling has been used in the qualitative part. The theoretical model for extracting variables consists of selected studies based on their relationship to the research question. In the quantitative section, the statistical population includes academic and professional experts. Table 2 lists the criteria for selecting experts. The sampling method is non-probable (targeted) and from the snowball method. Accordingly, in this study, the views of 25 knowledgeable and knowledgeable experts with

valuable scientific, experimental or research backgrounds in the field of accounting reporting have been used, with the conditions listed in Table 2.

Table 2: Sampling Criteria Experts

Expert Index	Symbol	The Bet	Eligible Expert
Related experience	α	Over 10 years or α≥10	19
Level of Education	β	Graduate (≤ β) M.Sc.)	19
The Final Experts	α ∩ β	Experience over 10 years old and graduate degree	19

The method of data analysis is in the qualitative part, content analysis, and in the quantitative part, it is fuzzy Delphi technique and fuzzy hierarchy analysis. It should be noted that although experts use their mental competencies and abilities to answer questions, it should be noted that the traditional process of quantifying people's perspectives does not fully reflect human thinking style. In other words, the use of fuzzy sets is more consistent with linguistic and sometimes ambiguous human explanations [12].

4.1 Fuzzy Delphi Method (FDM)

Fuzzy Delphi technique has been used to identify the criteria for evaluating the disclosure of sustainable accounting information. In this research, triangular fuzzy numbers according to Table 3 have been used to fuzzy the view of experts.

Table 3: Five-Degree Fuzzy Spectrum for Evaluating Indicators

Language Variable	Fuzzy Value	The Fuzzy Equivalent of a Triangle
Very insignificant	1	(0, 0, 0.25)
Very insignificant to insignificant	2	(0, 0.25, 0.5)
Insignificant	3	(0.25, 0.5, 0.75)
Insignificant to medium importance	4	(0.5, 0.75, 1)
medium	5	(0.75, 1, 1)

In the next step, the fuzzy average of people's scores should be calculated. The fuzzy n triangular fuzzy number will be calculated as follows:

$$\tilde{F}_{AVE} = (\mathrm{L}, \mathrm{M}, \mathrm{U}) = \frac{\sum l_i^k}{n}, \frac{\sum m_i^k}{n}, \frac{\sum u_k^i}{n} \quad (1)$$

In this relation, the fuzzy number $\tilde{\mathrm{f}}_i = \left(l_i^k, m_i^k, u_i^k\right)$ is equivalent to the fuzzy equivalent of the k expert's view of the i criterion. Eventually, fuzzy disinfection will be performed. For fuzzy decoupling, the surface center method is used as follows:

$$\mathrm{DF}_{\mathrm{ij}} = \frac{\left[\left(\mathrm{u}_{\mathrm{ij}} - \mathrm{l}_{\mathrm{ij}}\right) + \left(\mathrm{m}_{\mathrm{ij}} - \mathrm{l}_{\mathrm{ij}}\right)\right]}{3} + \mathrm{l}_{\mathrm{ij}} \quad (2)$$

In this study, the tolerance threshold of 0.7 is considered. Therefore, the fuzzy value greater than 0.7 is acceptable, and any index with a score above 0.7 is confirmed [11].

5 Research Findings

In the data analysis stage, first, the final research indicators were screened with fuzzy Delphi technique, and in the second stage, the indicators were categorized, categories and classes were extracted, and finally, using fuzzy hierarchy analysis, the variables were prioritized.

5.1 Screening of Sustainable Accounting Information Disclosure Indicators

Fuzzy Delphi method was used to identify indicators for disclosure of sustainable development accounting information. A five-point spectrum has been used to shape the experts' perspective, according to Table 3. In the next step, the fuzzy average of people's scores is calculated. Finally, the surface center method has been used for fuzzy disinfection. Since the tolerance threshold value is considered to be 0.7, the fuzzy value greater than 0.7 is acceptable, and any indicator with a high tolerance threshold is confirmed. The summary of the results of the phases of fuzzy Delphi technique in Table 4 is as follows.

Table 4: Summary of the Results of Fuzzy Delphi Technique Rounds

Indices	Lower Bound	Probable Value	Upper Bound	Fuzzy Average	Definite Value	Results Round 1
1	0.616	0.804	0.938	(0.616,0.804,0.938)	0.786	Acceptance
2	0.580	0.772	0.918	(0.58.0.0772.0.918)	0.757	Acceptance
3	0.616	0.804	0.938	(0.616,0.804,0.938)	0.786	Acceptance
4	0.630	0.828	0.952	(0.63.0.828.0.952)	0.803	Acceptance
5	0.640	0.834	0.956	(0.64.0.834.0.0956)	0.810	Acceptance
6	0.556	0.744	0.890	(0.556,0.744,0.89)	0.730	Acceptance
7	0.606	0.798	0.934	(0.606,0.798,0.934)	0.779	Acceptance
8	0.556	0.746	0.892	(0.556,0.746,0.892)	0.731	Acceptance
9	0.598	0.788	0.928	(0.598,0.788,0.928)	0.771	Acceptance
10	0.588	0.782	0.924	(0.588,0.782,0.924)	0.765	Acceptance
11	0.586	0.764	0.904	(0.586.0.764.0.0904)	0.751	Acceptance
12	0.600	0.788	0.918	(0.6,0.788,0.918)	0.769	Acceptance
13	0.618	0.800	0.936	(0.618.0.8.0.936)	0.785	Acceptance
14	0.664	0.838	0.960	(0.664,0.838,0.96)	0.821	Acceptance
15	0.598	0.788	0.928	(0.598,0.788,0.928)	0.771	Acceptance
16	0.596	0.778	0.914	(0.596,0.778,0.914)	0.763	Acceptance
17	0.572	0.766	0.904	(0.572,0.766,0.904)	0.747	Acceptance
18	0.552	0.754	0.896	(0.552,0.754,0.896)	0.734	Acceptance
19	0.562	0.758	0.904	(0.562,0.758,0.904)	0.741	Acceptance
20	0.562	0.756	0.908	(0.562,0.756,0.908)	0.742	Acceptance
21	0.576	0.780	0.922	(0.576.0.78.0.922)	0.759	Acceptance
22	0.584	0.790	0.928	(0.584.0.79.0.928)	0.767	Acceptance
23	0.538	0.752	0.904	(0.538,0.752,0.904)	0.731	Acceptance
24	0.590	0.778	0.922	(0.59,0.778,0.922)	0.763	Acceptance
25	0.632	0.824	0.950	(0.632.0.824.0.95)	0.802	Acceptance
26	0.634	0.820	0.948	(0.634,0.82,0.948)	0.801	Acceptance
27	0.594	0.796	0.932	(0.594,0.796,0.932)	0.774	Acceptance
28	0.596	0.792	0.930	(0.596.0.792.0.93)	0.773	Acceptance
29	0.572	0.762	0.912	(0.572.0.762.0.912)	0.749	Acceptance
30	0.584	0.764	0.914	(0.584.0.764.0.914)	0.754	Acceptance

Table 4: Continue

Indices	Lower Bound	Probable Value	Upper Bound	Fuzzy Average	Definite Value	Results Round 1
31	0.640	0.834	0.956	(0.64.0.834.0.0956)	0.810	Acceptance
32	0.540	0.728	0.876	(0.54,0.728,0.876)	0.715	Acceptance
33	0.542	0.732	0.880	(0.542,0.732,0.88)	0.718	Acceptance
34	0.670	0.852	0.968	(0.67.0.852.0.968)	0.830	Acceptance
35	0.594	0.784	0.912	(0.594,0.784,0.912)	0.763	Acceptance
36	0.750	0.900	1,000	(0.75.0.9.1)	0.883	Acceptance
37	0.710	0.876	0.984	(0.71.0.876.0.984)	0.857	Acceptance
38	0.690	0.864	0.976	(0.69.0.864.0.976)	0.843	Acceptance
39	0.660	0.846	0.964	(0.66.0.0846.0.964)	0.823	Acceptance
40	0.680	0.858	0.972	(0.68.0.858.0.0972)	0.837	Acceptance
41	0.660	0.846	0.964	(0.66.0.0846.0.964)	0.823	Acceptance
42	0.626	0.812	0.938	(0.626.0.812.0.938)	0.792	Acceptance
43	0.660	0.846	0.964	(0.66.0.0846.0.964)	0.823	Acceptance
44	0.600	0.810	0.940	(0.6.0.81.0.94)	0.783	Acceptance
45	0.580	0.798	0.932	(0.58,0.798,0.932)	0.770	Acceptance
46	0.610	0.816	0.944	(0.61.0.816.0.944)	0.790	Acceptance
47	0.650	0.840	0.960	(0.65.0.84.0.96)	0.817	Acceptance
48	0.580	0.772	0.918	(0.58.0.0772.0.918)	0.757	Acceptance
49	0.592	0.774	0.920	(0.592,0.774,0.92)	0.762	Acceptance
50	0.644	0.826	0.952	(0.644.0.826.0.952)	0.807	Acceptance
51	0.700	0.870	0.980	(0.7,0.87,0.98)	0.850	Acceptance
52	0.690	0.864	0.976	(0.69.0.864.0.976)	0.843	Acceptance
53	0.670	0.852	0.968	(0.67.0.852.0.968)	0.830	Acceptance
54	0.620	0.822	0.948	(0.62.0.822.0.948)	0.797	Acceptance
55	0.660	0.846	0.964	(0.66.0.0846.0.964)	0.823	Acceptance
56	0.600	0.810	0.940	(0.6.0.81.0.94)	0.783	Acceptance
57	0.620	0.822	0.948	(0.62.0.822.0.948)	0.797	Acceptance
58	0.660	0.846	0.964	(0.66.0.0846.0.964)	0.823	Acceptance
59	0.630	0.828	0.952	(0.63.0.828.0.952)	0.803	Acceptance
60	0.610	0.816	0.944	(0.61.0.816.0.944)	0.790	Acceptance
61	0.584	0.764	0.914	(0.584.0.764.0.914)	0.754	Acceptance

Fig 1: Fuzzy Hierarchical Model

According to the results, all the indicators were approved by the experts. In the next step, the categories and classes were determined according to Table 5.

Table 5: Secondary Coding and Formation of Conceptual Codes and Categories

Dimensions	Symbol	The Main Category	Symbol	Sub-Category	Symbol
The Social Dimension	C1	Company social accounting for the community	S11	Observance of human rights principles	S111
				Social development and philanthropy	S112
		Company social accounting for employees	S12	Human resource management and development	S121
				Employee health management	S122
		Company social accounting for customers	S13	Customer relationship management	S131
				Complaint management and customer satisfaction	S132
Environmental Dimension	C2	Strategic approach to environmental accounting	S21	Strategic approach to environmental impacts	S211
				Environmental education	S212
				Environmental management system	S213
		Energy Consumption Management Accounting	S22	Management and efficiency in consumption	S221
				Waste and waste management	S222
		Investment Management and Environmental Financing	S23	Asset Management Environment Investment	S231
				Environmental financing	S232
The Economic Dimension	C3	Sustainable financial performance	S31	Brand management	S311
				Financial performance	S312
		Products and services provided	S32	Responsible products and services	S321
				Anti-competitive behavior	S322
		risk management	S33	Sustainable risk management	S331
				Business risk management	S332
Then Lead	C4	The rule of law	S41	Compliance with the rules	S411
				Advocates for the rights of stakeholders	S412
		Corporate governance	S42	Strategic transparency	S421
				of Board and Committee	S422
		Promote ethical awareness accounting	S43	Transparency of accounting mindset	S431
				,awareness of The strategy accounting ,ethics	S432

The main components are: social dimension, environmental dimension, economic dimension, and leadership dimension. Each of these criteria consists of a number of sub-criteria. The main dimensions with the symbol C_i and the main categories of the research with the symbol S_ij are named in Table 5 so that it can be easily traced and studied during the research.

5.2 Prioritize the Factors of Disclosure of Sustainable Development Accounting Information

The next step was to prioritize the components of disclosure of sustainable accounting information. The fuzzy hierarchical analysis process (FAHP) method has been used to determine the priority of information disclosure factors. The analysis process is as follows: 1- Pair comparison of the main dimensions

based on the purpose and weight determination of the main dimensions 2- Pair comparison of the main categories of each criterion and determining the weight of the main categories of each cluster. A nine-hour scale was used to compare the pair of elements [12]. Also, in this study, a fuzzy approach has been used to quantify the values. Therefore, the hourly fuzzy spectrum is used according to Table 6.

Table 6: Pair Comparison Spectrum with Triangular Fuzzy Numbers

Theoretical Terms of Comparison i Than j	Fuzzy Equivalent	Inverse Fuzzy Equivalent
Equally Preferred	(1, 1, 1)	(1,1,1)
Between	(1, 2, 3)	$\left(\frac{1}{3},\frac{1}{2},1\right)$
Moderately Preferred	(2, 3, 4)	$\left(\frac{1}{4},\frac{1}{3},\frac{1}{2}\right)$
Between	(3, 4, 5)	$\left(\frac{1}{5},\frac{1}{4},\frac{1}{3}\right)$
Strongly Preferred	(4, 5, 6)	$\left(\frac{1}{6},\frac{1}{5},\frac{1}{4}\right)$
Between	(5, 6, 7)	$\left(\frac{1}{7},\frac{1}{6},\frac{1}{5}\right)$
Very strongly Preferred	(6, 7, 8)	$\left(\frac{1}{8},\frac{1}{7},\frac{1}{6}\right)$
Between	(7, 8, 9)	$\left(\frac{1}{9},\frac{1}{8},\frac{1}{7}\right)$
Extremely Preferred	(9, 9, 9)	$\left(\frac{1}{9},\frac{1}{9},\frac{1}{9}\right)$

In the first step, the main dimensions are compared in pairs based on the goal. In this study, because there are four criteria, the number of comparisons made is equal to:

$$\frac{n(n-1)}{2}=\frac{4(4-1)}{2}=6 \tag{3}$$

Thus, 6 pairs of comparisons were made from the perspective of a group of experts. Experts' views have been quantified using a fuzzy scale. The geometric mean was used to summarize the views of the experts. Consolidation of experts 'views: To consolidate the experts' views, it is better to use the geometric mean of each of the three triangular fuzzy numbers [20].

$$F_{AGR}=\left(\prod(l),\prod(m),\prod(u)\right) \tag{4}$$

The pairwise comparison matrix is the main dimension according to Table 7.

Table 7: Pair Comparison Matrix the Main Dimensions of Information Disclosure

	C1	C2	C3	C4
C1	(1, 1, 1)	(0.6, 0.8, 1.2)	(1.13, 1.39, 1.67)	(2.12, 2.65, 3.33)
C2	(0.84, 1.25, 1.66)	(1, 1, 1)	(1.81, 2.28, 2.73)	(3.06, 3.66, 4.21)
C3	(0.6, 0.72, 0.89)	(0.37, 0.44, 0.55)	(1, 1, 1)	(1.41, 1.58, 1.75)
C4	(0.3, 0.38, 0.47)	(0.24, 0.27, 0.33)	(0.57, 0.63, 0.71)	(1, 1, 1)

After forming the matrix of paired comparisons, the special vector is calculated. First, the fuzzy expansion of each row is calculated. Each pair of matrix comparisons $\tilde{X}$ is displayed as $\tilde{x}_{ij}$. The fuzzy expansion of each row is also represented by the symbol $\tilde{S}_i$. Therefore, the fuzzy expansion of each row will be calculated as follows:

$$\tilde{S}_i = \sum_{j=1}^{n} x_{ij} \tag{5}$$

The fuzzy expansion of the elements of each row will be as follows:

$(1, 1, 1) \oplus (0.6, 0.8, 1.2) \oplus (1.13, 1.39, 1.67) \oplus (2.12, 2.65, 3.33) = (4.85, 5.84, 7.2)$

$(0.84, 1.25, 1.66) \oplus (1, 1, 1) \oplus (1.81, 2.28, 2.73) \oplus (3.06, 3.66, 4.21) = (6.71, 8.2, 9.61)$

$(0.6, 0.72, 0.89) \oplus (0.37, 0.44, 0.55) \oplus (1, 1, 1) \oplus (1.41, 1.58, 1.75) = (3.38, 3.74, 4.19)$

$(0.3, 0.38, 0.47) \oplus (0.24, 0.27, 0.33) \oplus (0.57, 0.63, 0.71) \oplus (1, 1, 1) = (2.11, 2.28, 2.51)$

Therefore, the fuzzy expansion of the preferences of each of the main dimensions will be as follows:
$\tilde{S}_1 = (4.85, 5.84, 7.2)$
$\tilde{S}_2 = (6.71, 8.2, 9.61)$
$\tilde{S}_3 = (3.38, 3.74, 4.19)$
$\tilde{S}_4 = (2.11, 2.28, 2.51)$
The fuzzy sum of the sum of the elements of the preferences column is then calculated:

$$\sum \tilde{S}_i = \sum_{i=1}^{n} \sum_{j=1}^{n} x_{ij} \tag{6}$$

The sum of the elements of the main dimension preferences column will be as follows:

$$\sum \tilde{S}_i = (17.05, 20.06, 23.5)$$

To normalize the preferences of each criterion, the sum of the values of that criterion must be divided by the sum of all the preferences (column elements). Because the values are fuzzy, the fuzzy sum of each row is multiplied by the inverse of the sum.

$$if\ \tilde{F} = (l, m, u)\ then\ \tilde{F}^{-1} = \left(\frac{1}{u}, \frac{1}{m}, \frac{1}{l}\right) \tag{7}$$

So based on Equation 5 we have:

$$(\sum \tilde{S}_i)^{-1} = (0.043, 0.05, 0.059)$$

Therefore, the results of normalization of the obtained values will be as Table 8. In this study, the surface center method is used for de-fuzzyization as follows:

$$DF_{ij} = \frac{[(u_{ij} - l_{ij}) + (m_{ij} - l_{ij})]}{3} + l_{ij} \tag{8}$$

Table 8: Results of Normalization of Values Obtained

W	TFN
$\widetilde{W}_{C1}$	(0.206, 0.291, 0.422)
$\widetilde{W}_{C2}$	(0.286, 0.409, 0.563)
$\widetilde{W}_{C3}$	(0.144, 0.187, 0.246)
$\widetilde{W}_{C4}$	(0.09, 0.114, 0.147)

After forming the matrix of the obtained comparisons, a special vector is calculated. First, the fuzzy expansion of each row was calculated; then the fuzzy sum of the total elements of the preferences column was calculated, and after normalizing the preferences of each criterion, the fuzzy decomposition of the values was performed by the surface center method. The results of the calculations are shown in Table 9.

Table 9: Results Defuzzification Weights Main Dimensions

COA	Deffuzy	Normal	Rank
C1	0.306	0.296	2
C2	0.419	0.405	1
C3	0.192	0.186	3
C4	0.117	0.113	4

Accordingly, the special vector of priority of the main dimensions will be (W_1).

$$W_1 = \begin{bmatrix} 0.296 \\ 0.405 \\ 0.186 \\ 0.113 \end{bmatrix}$$

Based on a special vector obtained: The environmental dimension weighs 0.405 and ranks 1st. The social dimension weighs 0.296 and is ranked 2nd. The economic dimension weighs 0.186 and is ranked 3rd. The leading dimension with a weight of 0.113 is ranked 4th. The incompatibility rate of the comparisons made is 0.028, which is less than 0.1, so the comparisons can be trusted. In the second step of the FAHP method, the main categories related to each category of factors should be compared in pairs. And all the steps taken to prioritize each of the main dimensions are calculated for each of the main categories, and the final priority of the main categories of information disclosure is given in Table 10. Based on the special vector obtained in prioritizing the sub-criteria related to social elements, the company's social accounting index for society with a weight of 0.387 in rank 1, the company's social accounting for customers with a weight of 0.351 in rank 2 and the company's social accounting for employees with a weight of 0.262 in rank 3 In prioritizing the sub-criteria of environmental factors, the energy consumption management accounting index with a weight of 0.446 in the rank of 1; The strategic approach to environmental accounting with a weight of 0.391 is ranked 2nd and the Investment Management and Financing Index with a weight of 0.163 is ranked 3rd. In the prioritization of sub-criteria related to economic factors, the sub-criterion of products and services provided with a weight of 0.417 is ranked 1st. Risk management with a weight of 0.301 is ranked 2nd and the Sustainable Financial Performance Index with a weight of 0.281 is ranked 3. It also showed the prioritization of sub-criteria related to governance factors; The orbital law index with a weight of 0.354 is ranked 1st. The Ethics Promotion Index with a weight of 0.331 is ranked 2nd and the Corporate Governance Index with a weight of 0.315 is ranked 3rd. Then, the sub-categories of each of the main categories are compared

and weighted in pairs. Because each major category has two sub-categories, only one pair comparison has been made. In that case, the incompatibility rate will be zero.

Table 10: The Final Priority of the Main Categories of Information Disclosure

Then	Weight	The Main Category	Initial Weight	The Final Weight
Social Factors	0.296	Company social accounting for the community	0.387	0.114
		Company social accounting for employees	0.262	0.078
		Company social accounting for customers	0.351	0.104
Environmental Factors	0.405	Strategic approach to environmental accounting	0.446	0.181
		Energy Consumption Management Accounting	0.391	0.158
		Investment Management and Environmental Financing	0.163	0.066
Economic factors	0.186	Sustainable financial performance	0.281	0.052
		Products and services provided	0.417	0.078
		risk management	0.301	0.056
Leadership factors	0.113	The rule of law	0.354	0.040
		Corporate governance	0.315	0.036
		Promote ethical awareness accounting	0.331	0.037

Table 11: The Final Priority of the Information Disclosure Components

Sub-Category	Sym-bol	Initial Weight	The Final Weight	Rank
Observance of human rights principles	S111	0.341	0.0390	10
Social development and philanthropy	S112	0.659	0.0754	3
Human resource management and development	S121	0.530	0.0411	8
Employee health management	S122	0.470	0.0365	12
Customer relationship management	S131	0.631	0.0656	5
Complaint management and customer satisfaction	S132	0.369	0.0384	11
Strategic approach to environmental impacts	S211	0.529	0.0955	1
Environmental education	S212	0.250	0.0451	7
Environmental management system	S213	0.221	0.0399	9
Management and efficiency in consumption (water, paper, energy)	S221	0.574	0.0909	2
Waste and waste management	S222	0.426	0.0675	4
Asset Management Investment Environment	S231	0.518	0.0343	14
Environmental financing	S232	0.482	0.0319	15
Brand management	S311	0.605	0.0317	17
Financial performance	S312	0.395	0.0207	22
Responsible products and services	S321	0.590	0.0458	6
Anti-competitive behavior	S322	0.410	0.0318	16
Sustainable risk management	S331	0.630	0.0352	13
Business risk management	S332	0.370	0.0207	21
Compliance with the rules	S411	0.442	0.0177	23
Advocates for the rights of stakeholders	S412	0.558	0.0223	20
Strategic transparency	S421	0.662	0.0236	18
Board and Committee of	S422	0.338	0.0120	25
Moral transparency	S431	0.605	0.0227	19
The strategy of awareness of ethical	S432	0.395	0.0148	24

To determine the ultimate priority of information disclosure components using the FAHP method, it is sufficient to multiply the weight of the sub-criteria in your cluster by the weight of the main dimensions. Each of these matrices is calculated in the previous steps. The final priority of the indicators has been calculated using definite values. The results of the calculation are done and the weights related to the indicators are given in Table 11. Finally, based on the final weight calculated, the strategic approach to environmental impacts weighing 0.0995 in first place, management and efficiency in consumption (water-paper-energy) weighing 0.0909 in second place, social development and philanthropy weighing 0.0754 in Third place and waste and waste management with a weight of 0.0675 were in the fourth place and the rest of the indicators were in the next ranks according to Table 11. Therefore, these weights are used to evaluate the elements influencing the disclosure of information related to sustainable development accounting [1].

6 Conclusion

The popularity of sustainable development accounting has increased dramatically over the past two decades. As many companies are choosing new methods as well as ways to disclose their financial information about core, social activities, the results of their effects, etc. In fact, sustainability requires values for environmental resources and is based on common forms. Social are public authorities, meaning that stakeholders need new and advanced environmental management accounting (EMA) tools to explain sustainability [8]. Finally, sustainability alone cannot be explained at the organizational level. But it is more recognizable by examining its impact on the environment, that is, beyond legal boundaries, which include the supply chain, customer use, and greater use in society. As a result of this; Shareholders, suppliers and government agencies want to have a better understanding of how the resource management company allocates itself to achieve the organization's goals as well as to achieve sustainable development. One of the most important and practical methods is to evaluate the performance of sustainability with the help of indicators. Some researchers have tried to achieve a set of sustainability indicators. Although there is general agreement on the key issues of firm sustainability, there is no agreement on their measurement criteria.

In this regard, this study was conducted with the aim of explain and prioritize information disclosure factors related to sustainable development accounting with fuzzy approach" in 2019 of companies active on the Iranian Stock Exchange. Out of the 147 initial codes, 61 indicators have been extracted, including 25 sub-categories and 12 main categories in 4 dimensions. And the indicators were finalized using the fuzzy Delphi technique in one step. The results of the study in determining the priority of criteria and sub-criteria by hierarchical analysis method with fuzzy approach showed; among the main criteria, based on a special vector obtained: the environmental dimension with a weight of 0.405 is ranked 1st. The social dimension weighs 0.296 and is ranked 2nd. The economic dimension weighs 0.186 and is ranked 3rd. The leadership dimension with a weight of 0.113 is ranked 4th. Finally, in addition to enriching the literature on sustainable accounting disclosure, this study is expected to be useful for corporate analysts, managers, and policymakers to develop appropriate policies in environmental, social, economic, and corporate governance issues and to disclose everything. Most of them provide more transparent information to stakeholders in financial statements, which ultimately leads to the long-term sustainable performance of companies. In this regard, most researchers, in their research, stated that the most important dimension in the sustainability report is the environmental dimension, which company managers and investors pay the most attention to when making investment decisions, and predict that environmental factors They will become the key to the success and survival of companies. Therefore,

it is expected that this research, in addition to enriching the literature on the study of sustainable development accounting information disclosure, can be useful for analysts, managers and policy makers of corporate affairs to formulate appropriate policies in the field of environmental, social, economic and corporate governance issues and disclose any The more they provide financial information, the clearer the information to stakeholders, which ultimately leads to the sustainable performance of companies in the long run.

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