

Modeling Barriers to Social Responsibility Accounting (SRA) and Ranking its Implementation Strategies to Support Sustainable Performance – a study in an emerging market

Ahmad Khodamipour

khodamipour@uk.ac.ir

Hassan Yazdifar

h.yazdifar@derby.ac.uk

Mahdi Askari Shahamabad

m.askari@aem.uk.ac.ir

Khajavi, Parvin

parvinkhajavi1991@gamil.com

Abstract

Purpose - Today, with the increasing involvement of the environment and human beings business units, paying attention to fulfilling social responsibility obligations while making a profit has become increasingly necessary for achieving sustainable development goals. Attention to profit by organizations should not be without regard to their social and environmental performance.

Design/methodology/approach - In this study, we identify barriers to social responsibility accounting implementation and provide strategies to overcome these barriers. By literature review, 12 barriers and seven strategies were identified and approved using the opinions of six academic experts. Interpretive Structural Modeling (ISM) has been used to identify significant barriers and find textual relationships between them. The fuzzy TOPSIS method has been used to identify and rank strategies for overcoming these barriers. This study was undertaken in Iran (an emerging market). The data has been gathered from 18 experts selected using purposive sampling and included CEOs of the organization, senior accountants, and active researchers well familiar with the field of social responsibility accounting.

Findings - Based on the results of this study, the cultural differences barrier was introduced as the primary and underlying barrier of the social responsibility accounting barriers model. At the next level, barriers such as "lack of public awareness of the importance of social responsibility accounting, lack of social responsibility accounting implementation regulations and organization size" are significant barriers to social responsibility accounting implementation. Removing these barriers will help remove other barriers in this direction. In addition, the results of the TOPSIS method showed that "mandatory regulations, the introduction of guidelines and social responsibility accounting standards", "regulatory developments and government incentive schemes to implement social responsibility accounting", as well as "increasing public awareness of the benefits of social responsibility accounting" are some of the essential social responsibility accounting implementation strategies.

Practical implications - The findings of the study have implications for both professional accounting bodies for developing the necessary standards and for policymakers for adopting policies that facilitate the implementation of social responsibility accounting to achieve sustainability.

Social implications - This paper creates a new perspective on the practical implementation of social responsibility accounting, closely related to improving environmental performance and increasing social welfare through improving sustainability.

Originality - Experts believe that the strategies mentioned above will be very effective and helpful in removing the barriers of the lower level of the model. For the first time, this study develops a model of social responsibility accounting barriers and ranks the most critical implementation strategies.

Keywords: *Social Responsibility Accounting (SRA), Organizational Sustainability, Sustainable Development, Interpretive Structural Modeling (ISM), Fuzzy TOPSIS*

JEL Classification: *M41, Q56, M48, Q28.*

1. Introduction

Sustainability has become a significant priority for organizations due to its long-term impact on the organization's success and its adaptation to the requirements of the business environment [1-5]. The company must align its activities with society's expectations to be sustainable. The expectations have no longer been limited to profits and providing goods and services for decades [7,6]. Since every economic activity has a significant social and environmental (S&E) impact [8,2], in addition to investors [10,9], other stakeholders and groups in society also demand transparent, accurate, and reliable financial and non-financial information from sustainability reporting [12,11,7,5,4]. Therefore, the issue of sustainable development due to the high environmental and social impact of societies and organizations has attracted increasing attention [13,5] whose primary purpose is to create sustainable value for all stakeholders by focusing on profit, the environment, and society [14,7,2-4] and also provide appropriate strategies to reduce the S&E damage of organizations [1]. Therefore, Sustainability reporting is an evolving corporate style with significant potential to improve the transparency and credibility of information for investors and stakeholders [7]. Meanwhile, accounting has a spirit of sustainability in the organization because it is essential in organizing people to care for social and environmental issues. Therefore, it plays a vital role in sustainability [15].

Due to the inability to report and respond to S&E impacts, growing criticism of the conventional financial reporting framework [17,16,4]. Thus, social responsibility accounting (SRA) is the process of assessing and reporting the S&E impacts, to the community, which has expanded their accountability beyond the role of traditional financial reporting [19-17,4].

Since most companies continue to focus more on the economic dimension of their performance [13], the SRA focuses on the S&E dimensions and examines and reports the effects of the organization's activities on the S&E. As a result, organizations using SRAs can pay more attention to the two dimensions of S&E, which ultimately leads to their sustainability. This strategy helps people understand the social value produced by companies (for society) and its impact on social welfare and shareholders [20], which maintains their legitimacy. Therefore, according to organizational theory, if the SRA is not considered, the organization's activities are limited and reflect a negative image of them to society [20-22].

Although there are potential opportunities to play the role of SRA, and researchers and the environmental protection agency (EPA) pursue ambitious goals, numerous barriers exist to implementing the SRA and achieving sustainability. The increase in unfavorable social and environmental approaches, such as displaced people, social injustice, extinction of animal species, ozone depletion, and climate pollution, is evidence of more worrying conditions than before [23]. This shows that this tool is still not used effectively in many countries and organizations and has been considered more as a voluntary activity [4,23]. Barriers slow down the implementation of SRA, and identifying them can help to use appropriate strategies to overcome these barriers. Therefore, it is essential to fully understand the barriers to SRA and its implementation strategies, which can significantly contribute to the sustainability of communities and organizations.

Most of the literature on barriers and strategies of SRA implementation focuses on examining a limited number of these barriers and strategies. For example, [24] cites the lack of regulation as a barrier for the SRA. Also, he believes that Government intervention and establishing regulatory mechanisms and laws are good strategies to remove this barrier. [25] stated that the lack of awareness and demand from the community for SRA reports is a barrier to the implementation of SRA. The way to overcome it is to increase public awareness and interest in this area. [26] point to barriers of managers' lack of motivation to implement SRA, conflict of interest, and abuse of power by managers and major shareholders. It also considers increasing public awareness as one of the strategies to overcome the obstacles of this approach. [27] cites organization size as a barrier to SRA. Therefore, a review of the research literature

on SRA shows that each of the past studies has examined only a limited number of barriers and strategies, and to the best of our knowledge, the authors have yet to focus on providing a comprehensive and clear vision of the barriers and strategies for implementing the SRA thus far. That is an essential research gap. As a result, there is a fundamental need to model SRA barriers and prioritize its strategy which is the motivation of this study.

Therefore, this study takes the first step to address the following research questions by gathering the views of CEOs of the organization, senior accountants, and active researchers familiar with the field of SRA:

- 1) What are the critical barriers to SRA implementation?
- 2) What are the most effective strategies that encourage the implementation of SRA and sustainability?

The following section provides an overview of the SRA literature and the barriers and strategies for implementing the SRA. The proposed analytical framework in the study and research method is presented in section 3. Section 4 summarizes the study's results on modeling SRA barriers and prioritizing strategies that contribute to the implementation of SRA and sustainable performance. Theoretical concepts and discussion are also presented in section 5, and section 6 concludes the topics of this study.

2. Theoretical framework

Corporate social responsibility is accountability for activities that affect society. Companies should consider the interests of all stakeholders in their decisions, activities, and operations. Stakeholders are those affected by the consequences of the company's decisions and actions [28, 29]. Also, since economic decision-makers always need highly reliable information to make reasonable and rational decisions, companies are obliged to publish all decision-related information to users and decision-makers [30, 31]. Social responsibility accounting is a process to transfer the social and environmental effects that result from the organization's economic efforts and benefit the entire society [15, 29], which provides useful and reliable information for society and decision-makers [7].

The primary basis of social accounting studies is three theories: legitimacy theory, stakeholder theory, and organizational theory [32]. SRA sometimes referred to as "green accounting" [34, 33] or "environmental management accounting" [36, 35], is an integral part of the accounting boundary that combines traditional accounting reports and S&E reports [37] [38]. Accounting disclosure is a good mechanism to facilitate the safe transmission of information between management and investors, which plays an important role in mitigating information asymmetry [39]. Therefore, S&E reports meet the expectations and demands of society about the S&E impact of a company; they also focus on non-economic performance to make organizations more accountable to stakeholders [40]. Companies have an ethical obligation to actively contribute to improving the society in which they do business and, through the SRA, fulfill their duties to society to contribute to fighting poverty, redistributing wealth, and helping to spread justice in the community [41].

Although the definitions of SRA vary, some researchers consider most sustainability reports to be subsets of the SRA. These reports disclose information about product and consumer interests, employee benefits, community activities, and environmental impacts that are considered part of the organization's responsibility to its stakeholders [42-45, 8]. So, these days, different companies worldwide are facing a new role to create sustainability, which is to meet the needs of the current generation without compromising the ability of future generations to meet their needs. As a result, organizations must take responsibility for their operations' impact on communities and the natural environment [4] because the inability to fulfill the organization's social obligations will hurt them [41]. The results of some research show that investing in social responsibility projects has a significant impact on the company's financial

performance [46]. Despite the great importance of SRA, many governments and organizations cannot fully embrace it and face obstacles in its implementation. These barriers make adapting the current accounting methods to implement the circular economy uneven [47]. To overcome these barriers, actionable strategies are needed that must be considered. This section discusses a detailed literature review on barriers to SRA, strategies for implementing SRA, and the proposed research methodology.

2-1. SRA Barriers

2-1-1. Organizational barriers: Organizational barriers include company size; In other words, in small and medium-sized companies, it is possible to save costs by determining the areas for improvement or change [48 ,27]. But more financial resources are needed to hire experts to prepare SRA reports. In contrast, in large companies, only 1% of the company's financial turnover or the inclusion of costs in products and services can cover these costs ,25] [50 ,49. Therefore, the size of the company and financial limitations are the main barrier to implementing such approaches in organizations [51-53 ,48 ,47 ,27]. Organizations refuse to do SRA because of its high cost [54-56 ,41]. All organizations have internal control problems and shortcomings, even those that implement SRA voluntarily [58 ,57 ,48]. This makes it difficult for managers to meet S&E commitments SRA, especially in large and international corporations [57-60]. Thus, the lack of managers' motivation to pay attention to the organization's performance in the implementation of SRA, which is not one of the priorities of the main stakeholders, causes them to behave irresponsibly in the field of SRA ,61 ,59 ,47 ,28] [62.

2-1-2. Executive barriers: Implementing barriers include the lack of rules and regulations and the unwillingness of governments to intervene in SRA matters. Since SRA's voluntary approach has not been successful, companies are likely to refuse to disclose all their negative effects and perform SRA without rules and regulations [64 ,63 ,55 ,24]. Consolidation of power in the hands of managers and major shareholders causes them to pay less attention to S&E issues to maintain their current position, focus on their interests, and be unaware of the interests of other stakeholders (such as employees, users of financial statements, consumers, society, government, etc.) [65-67 ,26]. The CEO's power can be seen as an opportunistic behavior conflicting with society's demands [68] because Managers may act based on their interests instead of increasing collective interests [28]. The research results [69] show that the organizational commitment rate of managers is almost 50%. In addition to the interests of managers and major stakeholders, employees' personal interests may not align with the goals of the SRA. Different attitudes and practices of employees towards the SRA, as the main force within the organization, are very effective in the quality of implementation of this accounting [57-60]. This conflict of interest makes providing complete information to other stakeholders. Thus, the unequal share of information among stakeholders is one of the main limitations of the SRA path and leads to SRA bias [65-67 ,26].

2-1-3. Social barriers: Social barriers include companies' lack of awareness about the role of their social responsibility (SR). This issue in the path of economic development causes them to fail to prepare SRA reports. Hence, it leads to negative reactions to consumers' purchases from the company [70 ,55]. On the other hand, improving non-financial information will help increase stakeholders' trust [29]. Theory and evidence suggest that a good reputation reflects desirable social quality and performance and stabilizes economic sustainability through greater financial returns [29, 68]. Also, the varieties in culture, local conditions, and values of each country, especially between developed and less developed countries, cause differences in their concerns about implementing SRA in different regions. Organizations operate within different cultures, institutions, and laws [29], and the characteristics of other regions play an essential role in reporting business sustainability and are different according to different cultural

conditions [68]. Therefore, the implementation of the SRA should fully reflect the concerns of each region with the specific culture and context of that region [71-75]. For example, they may be ignored because the main social issues in less developed countries are fighting poverty, creating jobs for young people, providing educational opportunities, etc., which are relatively solved in developed countries. Also, little information is available on the impact and benefits of implementing SRA in developing countries [71 ,54 ,41]. Another barrier in this category is the lack of public awareness of the importance of SRA. One of the reasons for accounting research is public awareness in the field of society and the environment. Because training has an important effect on behavior change and is one of the main factors in the development of SRA. No improvement in SRA is achieved without a change in the community's attitude ,54] [77 ,76. Therefore, organizational sustainability is rooted in how it is interpreted and understood [15].

2-1-4. Accounting profession barriers: Barriers to implementing SRA related to the accounting profession include the lack of training and understanding of accountants in the SRA. No significant progress can be expected in this area without changing the accountants' attitude. Since the training of accountants in the field of SRA is not completely desirable, this is a serious barrier to the implementation of the SRA. The effectiveness of SAR training in developed and less developed countries and the differences between these pieces of training is important. The focus of some developed countries is the realization of capitalist policies, which leads to the continuation of injustices and asymmetry of power in society. In developing countries, too, there is no training required to demonstrate the role of accounting in society, which has negative consequences for developing SRAs in these countries [77-79 ,54]. The role of professional accountants goes beyond the preparation or assurance of financial and sustainability reports. Professional accountants must adapt to a world where sustainability is critical to long-term business performance and understand how they contribute to sustainable development in their diverse organizational roles [7]. Another barrier to the accounting profession is the problem with how accountants measure S&E issues [7, 47]. The long-term focus of accounting on measuring events financially, the inability of accounting to respond to issues of public concern (S&E issues that have no monetary value) [54], problems measuring the S&E impacts of each transaction, and lack of standards for pricing S&E impacts [81 ,80] are the important barriers to measuring S&E problems. Some cases even exacerbate this barrier, such as differences in the effects of S&E from industry to industry [82], lack of information [20], the extent of the positive and negative impacts of S&E issues [81], the inability of the market to assess the full effects of S&E issues [80 ,20] and Finally, the bigger problem is the lack of reflection of the non-market value of operating processes in the price system [20].

The identified barriers to SRA, their related categories, and related literature are summarized in Table 1.

Table 1. Identification of barriers to SRA

Barriers to social responsibility accounting (SRA)		Sources
Dimensions	Barrier	
Organizational barriers	B1. Organization size	[23, 27, 45, 49, 83-85]
	B2. Weak internal control system to implement SRA	[55, 56, 85-87]
	B3. Lack of financial resources	[23, 47, 84]
	B4. Lack of motivation within the organization to implement SRA	[47, 55-57]
Executive barriers	B5. Lack of regulations for the implementation of SRA	[22, 60, 88]
	B6. Abuse of power by managers and major shareholders	[24, 55, 56, 61-63, 86, 87]
	B7. Conflict of interest	[24, 61-63]
Social barriers	B8. Companies' lack of awareness of their social responsibility	[64]

	B9. Differences in culture and values of each country	[27, 65-68, 89]
	B10. Lack of public awareness of the importance of SRA	[27, 29, 71]
Accounting	B11. Insufficient training for accountants	[27, 65, 90, 91]
profession barriers	B12. Problems related to measuring S&E costs	[27, 47, 75, 92, 93]

2-2. SRA implementation strategies to support sustainable performance

In the previous section, barriers to SRA were examined. To overcome these barriers, actionable strategies are needed through barriers can be overcome and steps can be taken toward sustainable performance. Consequently, 7 SRA implementation strategies were identified to support sustainable performance, and several researchers endorsed each. These strategies are discussed below:

2-2-1. Improving the internal structure by selecting managers interested in SRA and creating internal incentives to reduce opportunistic actions: Governance structures (e.g., the board of directors) are the primary source of SRA decisions. To implement the SRA, it is necessary to create a system that minimizes the conflict of interests and the use of power in the interests of managers and major shareholders and the loss of employees and the public. The attitude of management as the main force within the organization to the SRA issue is very effective in implementing it. Therefore, selecting managers committed to S&E issues and stakeholder accountability positively affects the implementation of SRA. Senior managers can minimize opportunistic and profiteering actions by creating an internal incentive flow. Therefore, important barriers in the implementation of SRA can be resolved by paying attention to this approach by industry managers [94-97 ,81 ,62 ,57-59 ,51].

2-2-2. Developing appropriate regulations and holding training courses to increase the understanding and skills of accountants in the SRA: One of the reasons for the lack of SRA in developing and less developed countries is the lack of attention to the issue of SRA in the education systems of these countries. Although it is difficult to draw the line between financial, social, and environmental accounting, these countries need to pay more attention to the important role of accounting in society and the environment. This has negative consequences for their social and environmental development. As a result, since education and environmental awareness are positively related to adopting environmental management programs such as the SRA, experts stressed the need to change accounting training programs. This means that these pieces of training should be reformed and modernized by including social issues in the curricula and increasing the number of training courses. Otherwise, there is a risk that accounting will continue with past characteristics such as conservatism. [99 ,98 ,94 ,54 ,21].

2-2-3. Government investment and initiatives in providing the necessary resources to implement the SRA: achieving S&E goals requires providing and utilizing the necessary resources. Therefore, firstly, to help implement the SRA, there is a serious need to design and use various initiatives by the government. Since sustainable development can only be achieved through more active community participation, increased innovation, increased potential investment to overcome challenges, and inclusion in business priorities, it is wrong to conclude that environmental management programs such as SRA can be funded without government funding. The government should initially focus on reducing poverty and unemployment by supporting small and medium enterprises [41, 100, 101].

2-2-4. Mandatory regulations, guidelines introduction, and SRA standards: The government often indirectly influences SRA actions. Political legitimacy is embodied in the compatibility of SRA performance with policies, regulations, and standards set by the government. Therefore, making mandatory regulations for accountants to disclose the S&E effects of projects can be a good strategy for implementing an SRA. Governments should therefore work more closely with businesses and other stakeholders, including accounting entities, to develop long-term guidelines and initiatives for implementing the SRA that include the responsibilities of accountants concerning S&E responsibilities. If the SRA standard is

developed according to the importance of S&E issues and the necessary instructions for its application are developed by companies, this will lead to more disclosure and spending in this field [102-106 ,72 ,17 ,15].

2-2-5. *Increasing public awareness of the benefits of SRA*: One of the reasons for presenting more sustainability reports in larger companies is that more media and grassroots organizations pay attention to these companies. The community's demand for more information about the impact of organizations on society is understandable. Because on the one hand, people are skeptical about the supposed relationship between business profits and social welfare. On the other hand, companies must be accountable to society because of responsibility (altruism) or in their interest (legitimacy crisis). Also, to advance the concept of SRA using the experience of developed countries, both indigenously and globally, there is a need to strengthen society's understanding of the importance and benefits of SRA. Public pressure is, therefore, a stimulus for exposing S&E issues and implementing SRA [107 ,99 ,55 ,26 ,20 ,17].

2-2-6. *Regulatory developments and government incentive schemes to implement SRA*: Applying regulatory mechanisms to achieve S&E results is a beneficial strategy. In recent years, governments have become more active in addressing issues such as corruption, wages, and labor standards in global value chains and the effects of S&E. Part of the reporting behavior can also be related to regulatory developments and formal government encouragement of the SRA. In some developed countries, for example, the government has led many companies to start reporting S&E issues by providing guidelines and incentives for social responsibility reporting and accounting [108 ,106].

2-2-7. *Provide identical models for measuring the costs and benefits of S&E*: Today, most SRA applications are used to assess the compliance of an organization's activities with S&E expectations using descriptive statistics. This approach is neither holistic nor precisely accounting. On the one hand, it does not use monetary units and is not compatible with the basic principles of accounting. An accounting system based on social and environmental accountability (SRA) should be designed to include outstanding evaluation criteria in those areas. Therefore, creating a workable measurement framework for the company's social, environmental, and economic aspects can result from this need. The question is how to quantify and account for what has been called "external costs" in the past, which were beyond the control and calculation of the company. This leads to full cost accounting (FAC), which measures a company's social, environmental, and economic impact. As a result, considering the practical challenges and difficulties of experts in calculating the costs and benefits of S&E, it is suggested that the information provided by organizations and S&E reporting models be integrated [110 ,109 ,80 ,40 ,20 ,15].

The identified SRA implementation strategies considered in this study and related literature are summarized in Table 2.

Table 2. Identification of SRA implementation strategies to support sustainable performance.

Strategy code	SRA implementation strategies to support sustainable performance	Sources
S ₁	Improving the internal structure by selecting managers interested in SRA and creating internal incentives to reduce opportunistic actions	[94 ,81 ,62 ,57-59]
S ₂	Developing appropriate regulations and holding training courses to increase the understanding and skills of accountants in the SRA	[99 ,98 ,94 ,54 ,21]
S ₃	Government investment and initiatives in providing the necessary resources to implement the SRA	[100, 101]
S ₄	Mandatory regulations, the guidelines introduction, and SRA standards	[102-106 ,72 ,17]
S ₅	Increasing public awareness of the benefits of SRA	[107 ,99 ,55 ,26 ,20 ,17]
S ₆	Regulatory developments and government incentive schemes to implement SRA	[108 ,106]
S ₇	Provide identical models for measuring the costs and benefits of S&E.	[110 ,109 ,80 ,40 ,20]

3. Methodology

To fulfill the aim of this study, the research has been designed in three steps. Firstly, the literature review was adopted to identify the barriers to SRA and its implementation strategies to support sustainable performance before applying the proposed research framework. Based on an extensive literature review and opinions of 6 academic experts in the field of SRA, 12 barriers to SRA and seven strategies for implementing SRA were deduced for subsequent analysis using the proposed modeling framework. The proposed research methodology comprises ISM technique and Technique for Order Performance by Similarity to Ideal Solution (TOPSIS) for modeling and finding textual relationships between barriers and ranking implementation strategies for overcoming these barriers and achieving sustainability, respectively.

This paper uses fuzzy set theory with TOPSIS to rank strategies for implementing SRA, and triangular fuzzy numbers (TFN) are used to review the decision maker's preference. Because, in various situations, performance ratings and weights cannot be given precisely, fuzzy set theory is introduced instead of the crisp set theory to model the uncertainty of human judgments [111]; the process is called fuzzy multi-criteria decision-making (FMCDM) [112]. The idea of fuzzy sets combined with the TOPSIS technique helps decision-makers calculate more reliable results that reduce errors due to the ambiguity of human judgment [113].

This study aims not to create a multi-criteria decision framework with complex mathematical functions and operations but to create a general and entirely accepted model for decision-makers who can easily apply it in real-world scenarios. This gives a new perspective on the practical implementation of SRA, closely related to improving environmental performance and increasing social welfare. The proposed research methodology is shown in Fig. 1.

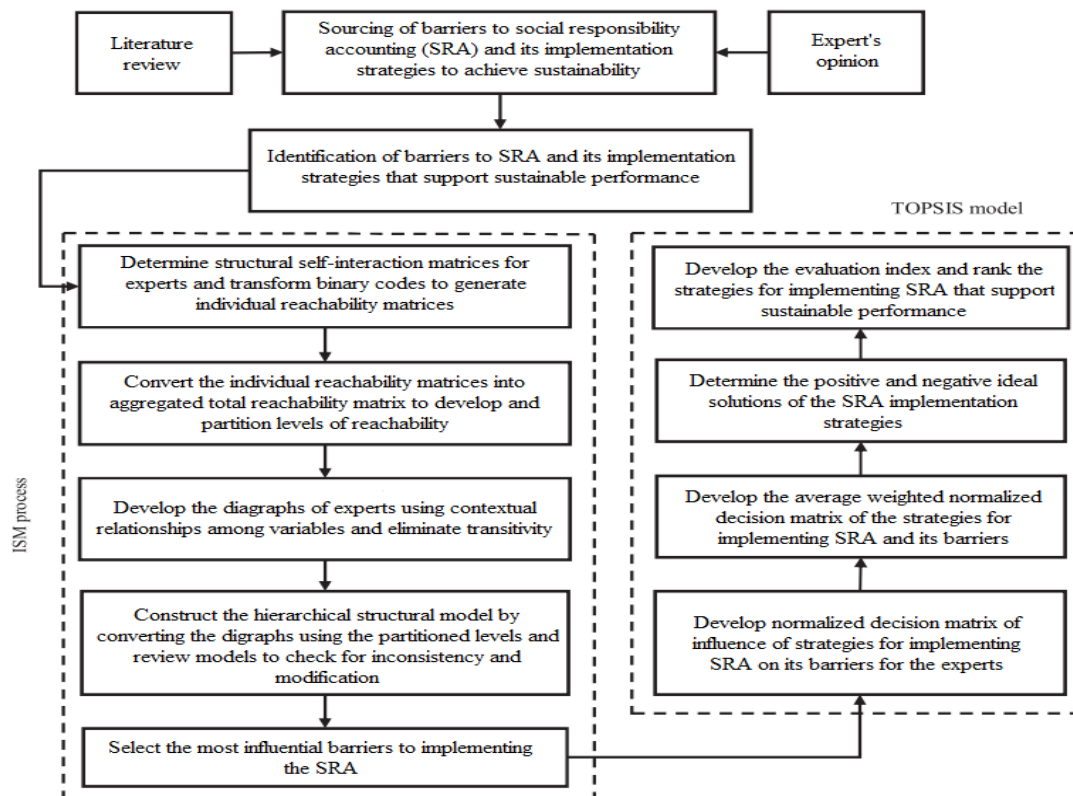


Fig. 1. Research modeling framework.

3-1. ISM method

The ISM technique is a practical methodology for dealing with complex issues, which was first proposed by J. Warfield in 1973 to develop a map of complex relationships between the many elements in a problematic situation [114]. This is one of the methods of system designing,

especially economic and social systems. That interrelated elements are structured into a comprehensive systematic model [115]. ISM has been applied extensively in many prestigious organizations, including NASA, and comprises three modeling languages: words, diagraphs, and discrete mathematics to provide a framework for solving a problem. ISM usually operates without knowing any prior history of the system and imposes rank on the parts [116]. The ISM method helps create order and direction in complex relationships between system parts [114, 115, 117]. The procedure for the ISM research methodology applied in this study is adapted from [2] and is described as follows:

- Step 1:** Identify the system variables for the interpretive structural model. In this study, the system variables are the barriers to SRA.
- Step 2:** Develop the structural self-interaction matrix (SSIM) by examining the pair-wise contextual relationships among system variables by utilizing four symbols to depict the type of interrelationships that exists between them as shown below:
- V: Variable i leads to variable j not in both direction
 - A: Variable j leads to variable i not in both direction
 - X: Variable i leads to variable j in both direction
 - O: Both variable i and j are unrelated
- Step 3:** Prepare the reachability matrix from the SSIM for the eighteen experts in our study by substituting the symbols (V, A, X, and O) in the structural self-interaction matrix by 1 and 0 based on the following rules:
- (i, j) entry in the initial reachability matrix is substituted with 1 and (j, i) is substituted with 0, if (i, j) in the structural self- interaction matrix is V.
 - (i, j) entry in the initial reachability matrix is substituted with 0 and (j, i) is substituted with 1, if (i, j) in the structural self- interaction matrix is A.
 - (i, j) entry in the initial reachability matrix is substituted with 1 and (j, i) is substituted with 1, if (i, j) in the structural self- interaction matrix is X.
 - (i, j) entry in the initial reachability matrix is substituted with 0 and (j, i) is substituted with 0, if (i, j) in the structural self- interaction matrix is O.
- Then, check for transitivity based on the assumption that if a variable A is related to variable B and variable B is related to variable C, then variable A is necessarily related to variable C.
- Step 4:** Partition the obtained matrix into different levels to get the importance level of each system variable.
- Step 5:** Convert a designed directed graph (digraph) based on the reachability matrix's contextual relationships and eliminate the transitive links into an interpretive structural model by replacing nodes with statements. Then, review the ISM to check for inconsistency, make necessary modifications and select the critical barriers to organizational change for sustainability.
- Step 6:** MICMAC analysis to categorize the variables into clusters considering their driving and dependence power. The primary purpose of the MICMAC analysis is to understand the driving and dependence power of each variable within the ISM and to identify critical barriers to SRA.

3-2. Fuzzy Set theory

In several situations, crisp numbered data are insufficient to model real-world systems due to the vagueness, imprecision, and subjective nature of human thinking, judgment, and preferences [118]. Therefore, the fuzzy set theory is used to remove the vagueness or uncertainty caused by human thoughts in Multi-criteria decision-making (MCDM) problems. This theory was introduced by Zadeh et al. [111]. The definition of fuzzy set theory is:

“A triangular fuzzy number (TFN) is denoted by (l, m, u). The values of l, m, and u parameters denote the smallest value, the most promising value and the largest possible value that describes the fuzzy event. In a fuzzy set, the membership function F(x) maps object between 0 and 1” as illustrated in Fig. 2.

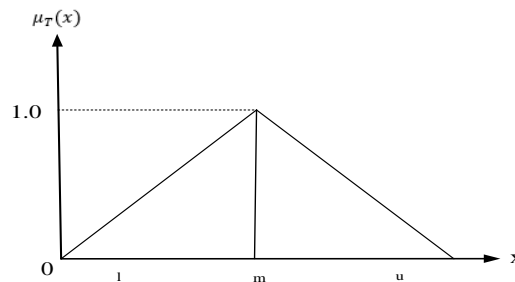


Fig. 2. The membership functions of TFN.

3-3. Fuzzy TOPSIS technique

The Technique for Order Performance by Similarity to Ideal Solution (TOPSIS) is a classic MCDM technique developed by [119]. It is a simple and popular ranking method that selects the options with the shortest distance from the positive ideal option and the farthest distance from the negative ideal option at the same time [120]. In the traditional formulation of the TOPSIS method, personal judgments are represented with crisp values. But in real life, measurement by using crisp values is not always possible. So fuzziness and vagueness are characteristics of many decision-making problems [121]. A better approach may be to use linguistic value rather than crisp value. Fuzzy set theory can be used to present linguistic value[113].

For this reason, the fuzzy TOPSIS method was proposed. It is quite appropriate and effective more than the conventional TOPSIS method to solve multi-criteria decision-making problems under a fuzzy environment and to manage with uncertainty in the judgments and evaluations of the decision-makers [122, 123]. This technique has been applied in diverse areas due to its comprehensibility and simplicity [124, 125]. On the other hand, the other MCDM techniques are unsuitable for making a quick decision on real-life problems [126], as we are facing in this study, i.e., selecting the best SRA implementation strategies to support sustainable performance. This motivated us to choose the fuzzy TOPSIS approach for ranking SRA implementation strategies. The algorithm of the required fuzzy decision-making approach (Fuzzy TOPSIS) applied in this study is adapted from [2, 113, 127] and is given below:

Step 7: Develop the decision matrix of the influence of the SRA implementation strategies on the barriers to SRA based on the expert’s feedback using the linguistic scale. The linguistic scale is shown in Table 3 while the decision matrix of influence scores is shown in Eq. (1). Where, B_i represents barriers to social responsibility accounting, S_j represents SRA implementation strategies to support sustainable performance and R_{ij} represents influence of SRA implementation strategies on the barriers to SRA; $i = 1, 2, \dots, n$ and $j = 1, 2, \dots, m$.

$$\bar{D}^k = \begin{matrix} & B_1 & B_2 & \dots & B_n \\ \begin{matrix} S_1 \\ S_2 \\ \vdots \\ S_m \end{matrix} & \begin{pmatrix} \tilde{R}^k_{11} & \tilde{R}^k_{12} & \dots & \tilde{R}^k_{1n} \\ \tilde{R}^k_{21} & \tilde{R}^k_{22} & \dots & \tilde{R}^k_{2n} \\ \vdots & \vdots & \vdots & \vdots \\ \tilde{R}^k_{m1} & \tilde{R}^k_{m2} & \dots & \tilde{R}^k_{mn} \end{pmatrix} \end{matrix}$$

Step 8: Develop the normalized fuzzy decision matrix based on the following equations.

$$\tilde{R} = [\tilde{r}_{ij}]_{m \times n} \begin{cases} \tilde{r}_{ij} = \left(\frac{a_{ij}}{c_j^+}, \frac{b_{ij}}{c_j^+}, \frac{c_{ij}}{c_j^+} \right) \text{ and } c_j^+ = \max c_{ij} (\text{benefit criteria}) \\ \tilde{r}_{ij} = \left(\frac{a_j^-}{c_{ij}}, \frac{a_j^-}{b_{ij}}, \frac{a_j^-}{a_{ij}} \right) \text{ and } a_j^- = \min a_{ij} (\text{cost criteria}) \end{cases} \quad (2)$$

$$\tilde{r}_{ij} = \left(\frac{a_j^-}{c_{ij}}, \frac{a_j^-}{b_{ij}}, \frac{a_j^-}{a_{ij}} \right) \text{ and } a_j^- = \min a_{ij} (\text{cost criteria}) \quad (3)$$

Step 9: Construct the weighted normalized fuzzy decision matrix by Eq. (4).

$$\tilde{V} = [\tilde{v}_{ij}]_{m \times n} \quad i = 1, 2, 3, \dots, m \quad \text{and} \quad j = 1, 2, 3, \dots, n \quad \tilde{v}_{ij} = \tilde{r}_{ij} \times w_{ij} \quad (4)$$

Where, \tilde{v}_{ij} is the weight assigned to each barrier.

Step 10: Calculate the fuzzy positive ideal solution (FPIS, A^+) and fuzzy negative ideal solution (FNIS, A^-) from weighted-normalized decision-matrix by using Eqs. (5), (6). Then compute the Euclidean distance from fuzzy positive and negative ideal solution for each alternative by using Eqs. (7), (8):

$$V^+ = \{\tilde{v}_1^+, \tilde{v}_2^+, \dots, \tilde{v}_n^+\}, \text{ where } \tilde{v}_j^+ = \begin{cases} \max(\tilde{v}_{ij}) \text{ if } j \in J; \\ \min(\tilde{v}_{ij}) \text{ if } j \in J' \end{cases} \quad (5)$$

$$V^- = \{\tilde{v}_1^-, \tilde{v}_2^-, \dots, \tilde{v}_n^-\}, \text{ where } \tilde{v}_j^- = \begin{cases} \min(\tilde{v}_{ij}) \text{ if } j \in J; \\ \max(\tilde{v}_{ij}) \text{ if } j \in J' \end{cases} \quad (6)$$

$$d_{ij}^+ = \left\{ \sum_{j=1}^n (v_{ij} - v_{ij}^+)^2 \right\}^{1/2}, \quad i=1, 2, \dots, m \quad (7)$$

$$d_{ij}^- = \left\{ \sum_{j=1}^n (v_{ij} - v_{ij}^-)^2 \right\}^{1/2}, \quad i=1, 2, \dots, m \quad (8)$$

Where, V^+ is the positive separation measure, V^- is the negative separation measure, d_{ij}^+ is the positive ideal solution and d_{ij}^- is the negative ideal solution.

Step 11: Determine the closeness coefficient (CC_i) of each SRA implementation strategy using Eq. (9) and rank their status depending upon their values of CC_i . Each SRA implementation strategy near to positive ideal solution is the best strategy.

$$CC_i = \frac{d_i^-}{d_i^- + d_i^+}, \quad i = 1, 2, \dots, m \quad \& \quad C_i \in (0, 1) \quad (9)$$

Table 3. Linguistic scale and triangular fuzzy numbers for ranking the SRA implementation strategies.

Linguistic term	Very High (VH)	High (H)	Medium High (MH)	Medium (M)	Medium Low (ML)	Low (L)	Very Low (VL)
Score	$\tilde{7}$	$\tilde{6}$	$\tilde{5}$	$\tilde{4}$	$\tilde{3}$	$\tilde{2}$	$\tilde{1}$
Triangular fuzzy numbers	(9, 10, 10)	(7, 9, 10)	(5, 7, 9)	(3, 5, 7)	(1, 3, 5)	(0, 1, 3)	(0, 0, 1)

4. Application of the proposed research framework

The proposed research framework was applied to modeling barriers to SRA and ranking its implementation strategies to support sustainable performance. The great attention of societies and organizations to economic issues has increased social inequalities and environmental damage. However, for sustainable performance, they need to pay attention to all three economic, social, and environmental dimensions. SRA is a desirable process to address S&E dimensions that can lead to sustainable development. Therefore, SRA and S&E reporting has become an urgent need for communities and organizations, but there are barriers along the way that make it difficult and slow to implement. Identifying barriers is a basic need to solve SRA problems, and these barriers can only be overcome with proper strategies for implementing the SRA. The proposed research framework first models the SRA barriers and identifies significant SRA barriers. In the second stage, SRA implementation strategies to support sustainable

performance are ranked using the model significant barriers identified in stage 1. This study aids in achieving this objective.

4-1. Data collection

To finalize the barriers to SRA and its implementation strategies to support sustainable performance, six academic experts initially approved 12 barriers and seven strategies that were identified from a systematic literature review. Then in the data collection process, a team of eighteen experts from the 8 CEOs of the organization from the cement, electricity, and insurance industries, six accountants, and four researchers in the field of SRA was formed. The minimum work experience required of managers of organizations and accountants to be selected for the experts' committee is ten years. Established researchers also needed at least three articles in the field of SRA. These experts were from Iran. Data collection was carried out in two stages, as outlined below:

Stage 1: Twelve barriers to SRA were identified from a literature review. The experts were requested to scrutinize the barriers, and agree to the identified barriers. These barriers were further analyzed using experts' input to ascertain the key barriers. The experts were deemed knowledgeable to provide feedback on the ISM questionnaires due to their high level of experience, over ten years, and extensive knowledge in the field of SRA. Questionnaires were distributed to the experts, and information was further consolidated through personal contacts and telephone conversations.

Stage 2: Analyzing the SRA implementation strategies to support sustainable performance about critical barriers to SRA (Independent barriers). The objectives and methodology of this research were communicated to the expert panel, who were then requested to fill a pair-wise comparison matrix, which is the first step of the Fuzzy TOPSIS technique.

4-2. Data analysis

4-2-1. ISM method

After preparing the Structural Self-Learning Matrix and the final reachability matrices, the barriers to SRA are leveled, and finally, the ISM model of barriers is drawn using these levels. The MICMAC technique is then used to classify the barriers on SRA based on their driving and dependence power. Steps 1-6 of the ISM method and their results are discussed in the next section.

Develop the Structural Self-Learning Matrix (SSIM)

Based on step 2, experts assisted in evaluating the contextual relationships between the barriers to SRA. Eighteen 12×12 structural self-interaction matrices (SSIM) were formulated based on four symbols (V, A, X, and O). The frequency of answers for each pairwise comparison was used to integrate the experts' answers in the SSIM matrix. Table 4 shows the SSIM for the system variables in this study.

Table 4. Structural self- interaction matrix for barriers to SRA

Barriers to SRA		B ₁	B ₂	B ₃	B ₄	B ₅	B ₆	B ₇	B ₈	B ₉	B ₁₀	B ₁₁	B ₁₂
B ₁	Organization size	-	V	V	V	O	O	O	V	A	X	O	O
B ₂	Weak internal control system to implement SRA		-	A	X	A	V	A	O	O	O	O	A
B ₃	Lack of financial resources			-	V	O	O	O	O	O	O	X	V
B ₄	Lack of motivation within the organization to implement SRA				-	A	A	X	X	O	A	O	A
B ₅	Lack of regulations for the implementation of SRA					-	V	V	O	A	X	V	V
B ₆	Abuse of power by managers and major shareholders						-	X	A	A	A	O	A
B ₇	Conflict of interest							-	A	O	A	O	A
B ₈	Companies' lack of awareness of their social responsibility								-	A	A	O	O
B ₉	Differences in culture and values of each country									-	V	V	O
B ₁₀	Lack of public awareness of the importance of SRA										-	V	O

B₁₁	Insufficient training for accountants	-	V
B₁₂	Problems related to measuring S&E costs	-	-

Prepare the reachability matrices

The SSIM matrices of the eighteen experts were substituted by 1 and 0 to prepare the initial reachability matrix based on the rules stated in the proposed research methodology (step 3). The initial reachability matrix is shown in Table 5.

Table 5. Initial reachability matrix for barriers to SRA

Barriers to SRA	B ₁	B ₂	B ₃	B ₄	B ₅	B ₆	B ₇	B ₈	B ₉	B ₁₀	B ₁₁	B ₁₂
B₁	1	1	1	1	0	0	0	1	0	1	0	0
B₂	0	1	0	1	0	1	0	0	0	0	0	0
B₃	0	1	1	1	0	0	0	0	0	0	1	1
B₄	0	1	0	1	0	0	1	1	0	0	0	0
B₅	0	1	0	1	1	1	1	0	0	1	1	1
B₆	0	0	0	1	0	1	1	0	0	0	0	0
B₇	0	1	0	1	0	1	1	0	0	0	0	0
B₈	0	0	0	1	0	1	1	1	0	0	0	0
B₉	1	0	0	0	1	1	0	1	1	1	1	0
B₁₀	1	0	0	1	1	1	1	1	0	1	1	0
B₁₁	0	0	1	0	0	0	0	0	0	0	1	1
B₁₂	0	1	0	1	0	1	1	0	0	0	0	1

Subsequently, transitivity was checked in the developed reachability matrix of the experts based on the relationships of the barriers to SRA. The obtained matrix after the transitivity check is depicted in Table 6.

Table 6. Final reachability matrix for barriers to SRA

Barriers to SRA	B ₁	B ₂	B ₃	B ₄	B ₅	B ₆	B ₇	B ₈	B ₉	B ₁₀	B ₁₁	B ₁₂	Driving power
B₁	1	1	1	1	1*	1*	1*	1	0	1	1*	1*	11
B₂	0	1	0	1	0	1	1*	1*	0	0	0	0	5
B₃	0	1	1	1	0	1*	1*	1*	0	0	1	1	8
B₄	0	1	0	1	0	1*	1	1	0	0	0	0	5
B₅	1*	1	1*	1	1	1	1	1*	0	1	1	1	11
B₆	0	1*	0	1	0	1	1	1*	0	0	0	0	5
B₇	0	1	0	1	0	1	1	1*	0	0	0	0	5
B₈	0	1*	0	1	0	1	1	1	0	0	0	0	5
B₉	1*	1*	1*	1*	1	1	1*	1	1	1	1	1*	12
B₁₀	1	1*	1*	1	1	1	1	1	0	1	1	1*	11
B₁₁	0	1*	1	1*	0	1*	1*	1*	0	0	1	1	8
B₁₂	0	1	0	1	0	1	1	1*	0	0	0	1	6
Dependence power	4	12	6	12	4	12	12	12	1	4	6	7	

Level partition

Based on step 4, the final reachability matrix for the barriers to SRA was partitioned into different importance levels. The determined levels of importance for each barrier to SRA are shown in Table 7.

Table 7. Various levels of importance for barriers to SRA

Barriers	Reachability set	Prerequisite set	Intersection set	Level
B₂	B (2, 4, 6, 7, 8)	B (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12)	B (2, 4, 6, 7, 8)	I
B₄	B (2, 4, 6, 7, 8)	B (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12)	B (2, 4, 6, 7, 8)	I
B₆	B (2, 4, 6, 7, 8)	B (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12)	B (2, 4, 6, 7, 8)	I
B₇	B (2, 4, 6, 7, 8)	B (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12)	B (2, 4, 6, 7, 8)	I
B₈	B (2, 4, 6, 7, 8)	B (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12)	B (2, 4, 6, 7, 8)	I

B₁₂	B12	B (1, 3, 5, 9, 10, 11, 12)	B12	II
B₃	B (3, 11)	B (1, 3, 5, 9, 10, 11)	B (3, 11)	III
B₁₁	B (3, 11)	B (1, 3, 5, 9, 10, 11)	B (3, 11)	III
B₁	B (1, 5, 10)	B (1, 5, 9, 10)	B (1, 5, 10)	IV
B₅	B (1, 5, 10)	B (1, 5, 9, 10)	B (1, 5, 10)	IV
B₁₀	B (1, 5, 10)	B (1, 5, 9, 10)	B (1, 5, 10)	IV
B₉	B9	B9	B9	V

Formation of ISM-based model

The ISM model was developed based on the contextual relationships between barriers to SRA in the final reachability matrix and eliminating transitive links (Step 5). The developed ISM is shown in Fig. 3.

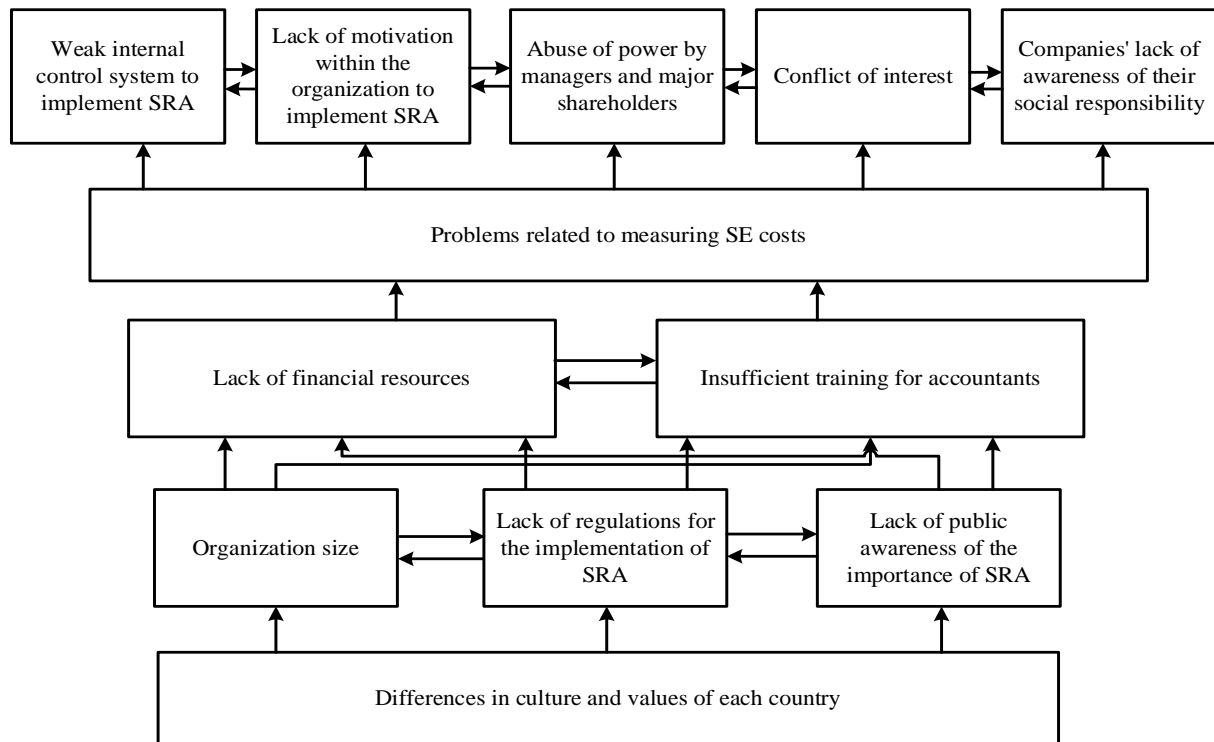


Fig. 3. ISM model of barriers to Social Responsibility Accounting (SRA)

MICMAC analysis

Based on step 6, an analysis was conducted to classify the barriers to SRA based on their driving and dependence power within the ISM. The driving and dependence power in the MICMAC matrix is calculated by summing the numbers along each row and column of each variable on the final reachability matrix (Table 6). The sum of each row and column for each variable is a coordinate that the variable is located on the various clusters. The diagram is shown in Fig. 4. The four clusters that determine the dependence and driving power between variables are:

- Independent - Defines variables with strong driving power but weak dependence power. These variables are seen as key variables.
- Dependent - Defines variables with a weak driving power but a strong dependence power. They are usually variables that are heavily influenced by others.
- Autonomous - Defines variables with weak driving and dependence power. They have minimal relation to other variables and thus are disconnected within the system.
- Link - Defines variables with strong driving and dependence power. They are called unstable since any actions taken using these variables will likely create a corresponding response that affects itself and other variables.

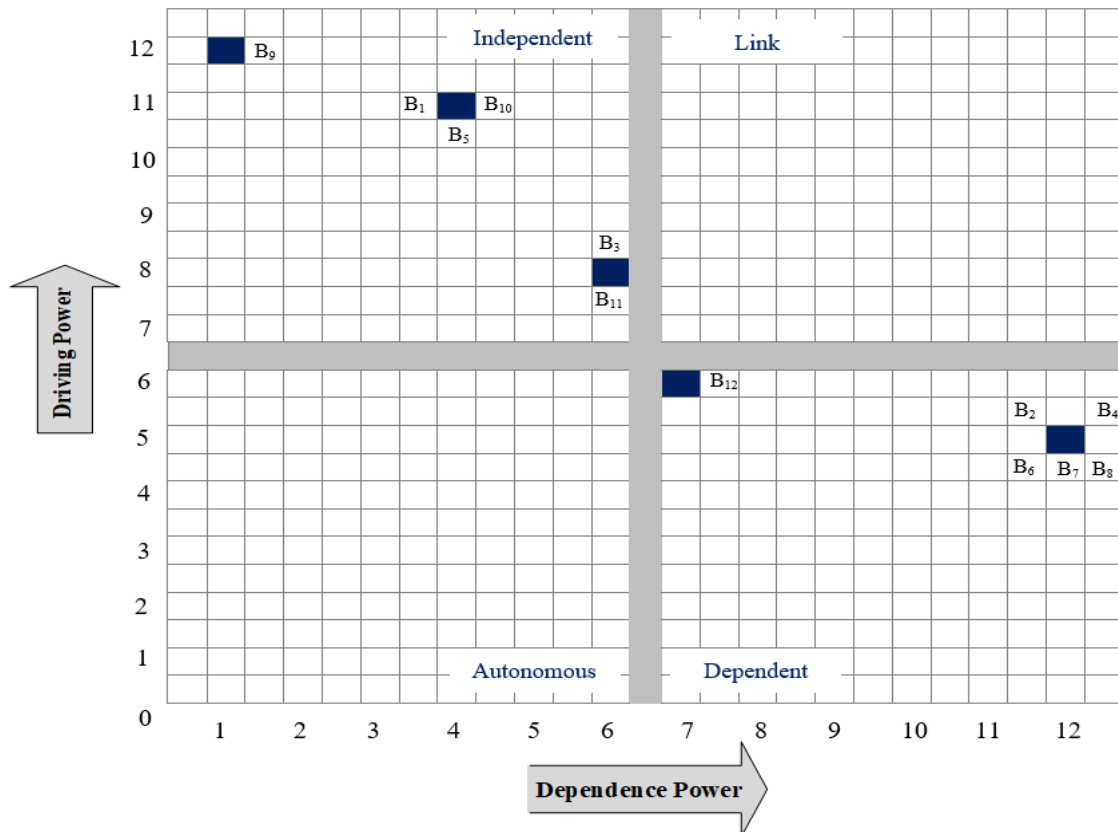


Fig. 4. Driving and dependence power diagram for barriers to implementing SRA

According to Fig. 4, the critical barriers to SRA are ‘differences in culture and values of each country’, ‘organization size’, ‘lack of regulations for the implementation of SRA’, ‘lack of public awareness of the importance of SRA’, ‘lack of financial resources’, and ‘insufficient training for accountants’ which are classified as independent system variables.

In this study, ‘problems related to measuring S&E costs’, ‘weak internal control system to implement SRA’, ‘lack of motivation within the organization to implement SRA’, ‘abuse of power by managers and major shareholders’, ‘conflict of interest’ and ‘companies’ lack of awareness of their social responsibility’ are the dependent system variables.

There are also no variables in the Autonomous cluster, showing no variables with zero interconnections with the others in the MICMAC diagram. As a result, it is fair to assume that all variables are connected in some way due to their levels of driving and dependence power.

There are also no variables in the link cluster.

4-2-2. Fuzzy TOPSIS technique

Based on step 7, experts evaluated the direct influence of each SRA implementation strategy (7 strategies identified) on the critical barriers to SRA (6 Independent barriers of MICMAC) based on linguistic scores given in Table 3. Eighteen initial 7×6 comparison matrices were formulated based on the linguistic scale ratings. Table 8 shows the decision matrix of the influence scores of the SRA implementation strategies for one of the experts.

Table 8. Decision matrix of influence scores for an expert.

SRA implementation strategies to support sustainable performance	key barriers to SRA					
	B ₉	B ₁	B ₅	B ₁₀	B ₃	B ₁₁
S ₁	3	3	2	4	2	1
S ₂	4	2	4	2	1	7
S ₃	3	3	3	5	7	2
S ₄	6	7	5	4	2	2
S ₅	7	3	7	3	3	4

S₆	4	5	4	6	6	3
S₇	7	2	2	6	1	6

Develop the normalized fuzzy decision matrix

The calculated aggregate fuzzy decision matrix of the influence scores of SRA implementation strategies on the barriers to SRA was determined based on the feedback of the expert panel in this study. Eq. (3) was then applied to normalize the decision matrix for the influence of the SRA implementation strategies on the critical barriers to SRA due to the benefit or cost criteria by following Eqs. (2) and (3) in step 8, this study considered six key barriers as cost criteria. Hence, Eq. (3) was used to normalize the fuzzy decision matrix, as shown in Table 9.

Table 9. Normalized fuzzy decision matrix of SRA implementation strategies.

	B₉	B₁	B₅	B₁₀	B₃	B₁₁
S₁	(0.14, 0.29, 1.00)	(0.29, 0.42, 1.00)	(0.25, 0.38, 1.00)	(0.14, 0.20, 0.33)	(0.13, 0.19, 0.50)	(0.17, 0.33, 1.00)
S₂	(0.13, 0.17, 0.33)	(0.25, 0.38, 1.00)	(0.13, 0.19, 0.33)	(0.14, 0.23, 1.00)	(0.13, 0.21, 1.00)	(0.11, 0.13, 0.14)
S₃	(0.14, 0.25, 1.00)	(0.25, 0.40, 1.00)	(0.11, 0.19, 0.50)	(0.13, 0.16, 0.20)	(0.11, 0.13, 0.14)	(0.13, 0.19, 0.50)
S₄	(0.13, 0.15, 0.20)	(0.22, 0.25, 0.29)	(0.13, 0.15, 0.20)	(0.13, 0.17, 0.25)	(0.13, 0.19, 1.00)	(0.11, 0.17, 0.50)
S₅	(0.11, 0.15, 0.25)	(0.25, 0.36, 1.00)	(0.11, 0.13, 0.14)	(0.13, 0.19, 0.50)	(0.13, 0.19, 1.00)	(0.13, 0.17, 0.33)
S₆	(0.11, 0.16, 0.33)	(0.22, 0.30, 0.50)	(0.13, 0.17, 0.25)	(0.13, 0.16, 0.20)	(0.13, 0.15, 0.25)	(0.13, 0.19, 1.00)
S₇	(0.11, 0.15, 0.25)	(0.29, 0.38, 1.00)	(0.20, 0.33, 1.00)	(0.13, 0.18, 0.33)	(0.20, 0.31, 1.00)	(0.13, 0.15, 0.20)

Construct the weighted normalized fuzzy decision matrix

Based on step 9, the weighted normalized fuzzy decision matrix is determined by multiplying the weights of each barrier with SRA implementation strategies (alternatives). These barrier weights were also collected from decision-makers during the response-gathering process. Using Eq. (4), the weighted normalized fuzzy decision matrix is given in Table 10.

Table 10. Weighted normalized fuzzy decision matrix of SRA implementation strategies.

Weights	0.158	0.203	0.136	0.158	0.165	0.180
	B₉	B₁	B₅	B₁₀	B₃	B₁₁
S₁	(0.02, 0.05, 0.16)	(0.06, 0.08, 0.20)	(0.03, 0.05, 0.14)	(0.02, 0.03, 0.05)	(0.02, 0.03, 0.08)	(0.03, 0.06, 0.18)
S₂	(0.02, 0.03, 0.05)	(0.05, 0.08, 0.20)	(0.02, 0.03, 0.05)	(0.02, 0.04, 0.16)	(0.02, 0.03, 0.16)	(0.02, 0.02, 0.03)
S₃	(0.02, 0.04, 0.16)	(0.05, 0.08, 0.20)	(0.02, 0.03, 0.07)	(0.02, 0.02, 0.03)	(0.02, 0.02, 0.02)	(0.02, 0.03, 0.09)
S₄	(0.02, 0.02, 0.03)	(0.05, 0.05, 0.06)	(0.02, 0.02, 0.03)	(0.02, 0.03, 0.04)	(0.02, 0.03, 0.16)	(0.02, 0.03, 0.09)

S_5	(0.02, 0.02, 0.04)	(0.05, 0.07, 0.20)	(0.02, 0.02, 0.02)	(0.02, 0.03, 0.16)	(0.02, 0.03, 0.06)
S_6	(0.02, 0.02, 0.05)	(0.05, 0.06, 0.10)	(0.02, 0.02, 0.03)	(0.02, 0.02, 0.04)	(0.02, 0.03, 0.18)
S_7	(0.02, 0.02, 0.04)	(0.06, 0.08, 0.20)	(0.03, 0.05, 0.14)	(0.03, 0.05, 0.16)	(0.02, 0.03, 0.04)

Calculate the fuzzy ideal solution

In step 10, we computed the FPIS and FNIS for each SRA implementation strategy. The SRA implementation strategy is better if value is near to FPIS. Then the Euclidean distance from fuzzy positive and negative ideal solution for each SRA implementation strategy is calculated by using Eqs. (7), (8) as shown in Table 11.

Table 11. Fuzzy positive and negative ideal solution.

	S_1	S_2	S_3	S_4	S_5	S_6	S_7
d^+	0.3106	0.2637	0.2341	0.1666	0.2309	0.1783	0.2581
d^-	0.4596	0.5160	0.5207	0.5538	0.5256	0.5438	0.5052

Determine the closeness coefficient (CC_i) and final ranking of each alternative

Based on step 11, the closeness coefficient is calculated by using Eq. (9). The ranks are computed after calculating the CC_i value for each SRA implementation strategy. The higher the CC_i value, the higher will be the rank of that SRA implementation strategy. The results are shown in Table 12.

Table 12. CC_i and final ranking of the SRA implementation strategies to support sustainable performance.

SRA implementation strategies	CC_i	Rank
Improving the internal structure by selecting managers interested in SRA and creating internal incentives to reduce opportunistic actions	0.597	7
Developing appropriate regulations and holding training courses to increase the understanding and skills of accountants in the SRA	0.662	6
Government investment and initiatives in providing the necessary resources to implement the SRA	0.690	4
Mandatory regulations, introduction of guidelines and SRA standards	0.769	1
Increasing public awareness of the benefits of SRA	0.695	3
Regulatory developments and government incentive schemes to implement SRA	0.753	2
Provide identical models for measuring the costs and benefits of S&E	0.662	5

4-2-2-1. Sensitivity analysis

To ensure the feasibility and robustness of the TOPSIS process and its results to the utmost extent possible, sensitivity analysis can be performed by changing criteria weights [128]. This study, 30 experiments were conducted to evaluate the ranking of the SRA implementation strategies to support sustainable performance by varying the weight of the barriers to SRA. For example, in Ex1 ($B_9 \rightarrow B_1$), the weight of the first barrier (B_9) is subtracted by 0.1 units and added to the weight of the second barrier (B_1). subsequently, in Ex16 ($B_1 \rightarrow B_9$), the weight of the first barrier (B_1) is subtracted by 0.1 units and added to the weight of the second barrier (B_9). The results of 30 experiments are tabulated in Table 13. Fig. 5 represents variations in the final ranking of the SRA implementation strategies to support sustainable performance with the change of weight of barriers.

The results of the sensitivity analysis (Fig. 5) show that ‘Mandatory regulations, introduction of guidelines and SRA standards’ ranks the highest in 21 experiments by 70%. Also, ‘Regulatory developments and government incentive schemes to implement SRA’ ranks

second highest in 16 experiments, by 53%. In addition, ‘Increasing public awareness of the benefits of SRA’ is the third highest ranked in 15 experiments, by 50%. Therefore, the results of the sensitivity analysis experiment represented that the ranking of SRA implementation strategies is relatively sensitive to the weights of barriers to SRA.

Table 13. Sensitivity analysis

Expt. No.	Varying weights	S ₁	S ₂	S ₃	S ₄	S ₅	S ₆	S ₇
Ex 1	B ₉ →B ₁	0.588	0.622	0.671	0.779	0.646	0.752	0.617
Ex 2	B ₉ →B ₅	0.584	0.672	0.727	0.777	0.710	0.763	0.616
Ex 3	B ₉ →B ₁₀	0.642	0.625	0.748	0.777	0.693	0.769	0.673
Ex 4	B ₉ →B ₃	0.634	0.625	0.752	0.695	0.647	0.767	0.614
Ex 5	B ₉ →B ₁₁	0.587	0.687	0.728	0.758	0.706	0.685	0.683
Ex 6	B ₁ →B ₅	0.586	0.708	0.732	0.776	0.757	0.768	0.649
Ex 7	B ₁ →B ₁₀	0.645	0.653	0.753	0.776	0.737	0.773	0.714
Ex 8	B ₁ →B ₃	0.637	0.652	0.757	0.693	0.680	0.771	0.645
Ex 9	B ₁ →B ₁₁	0.589	0.723	0.733	0.756	0.751	0.688	0.724
Ex 10	B ₅ →B ₁₀	0.643	0.629	0.715	0.780	0.694	0.768	0.707
Ex 11	B ₅ →B ₃	0.635	0.628	0.719	0.698	0.649	0.767	0.642
Ex 12	B ₅ →B ₁₁	0.589	0.690	0.698	0.760	0.707	0.687	0.716
Ex 13	B ₁₀ →B ₃	0.607	0.649	0.709	0.696	0.654	0.763	0.616
Ex 14	B ₁₀ →B ₁₁	0.564	0.718	0.688	0.759	0.714	0.683	0.685
Ex 15	B ₃ →B ₁₁	0.567	0.720	0.686	0.822	0.748	0.683	0.724
Ex 16	B ₁ →B ₉	0.593	0.711	0.675	0.778	0.755	0.766	0.719
Ex 17	B ₅ →B ₉	0.593	0.678	0.650	0.782	0.710	0.762	0.712
Ex 18	B ₁₀ →B ₉	0.567	0.706	0.640	0.781	0.717	0.758	0.680
Ex 19	B ₃ →B ₉	0.570	0.708	0.637	0.859	0.752	0.758	0.719
Ex 20	B ₁₁ →B ₉	0.594	0.666	0.646	0.792	0.709	0.835	0.674
Ex 21	B ₅ →B ₁	0.591	0.626	0.649	0.781	0.648	0.752	0.646
Ex 22	B ₁₀ →B ₁	0.564	0.647	0.639	0.780	0.653	0.749	0.620
Ex 23	B ₃ →B ₁	0.567	0.648	0.636	0.859	0.677	0.749	0.650
Ex 24	B ₁₁ →B ₁	0.591	0.613	0.645	0.792	0.645	0.822	0.612
Ex 25	B ₁₀ →B ₅	0.560	0.703	0.686	0.778	0.718	0.760	0.618
Ex 26	B ₃ →B ₅	0.562	0.705	0.683	0.857	0.754	0.760	0.649
Ex 27	B ₁₁ →B ₅	0.587	0.663	0.694	0.790	0.710	0.841	0.610
Ex 28	B ₃ →B ₁₀	0.618	0.651	0.702	0.856	0.734	0.765	0.714
Ex 29	B ₁₁ →B ₁₀	0.647	0.616	0.713	0.790	0.693	0.847	0.669
Ex 30	B ₁₁ →B ₃	0.639	0.616	0.717	0.702	0.647	0.843	0.609

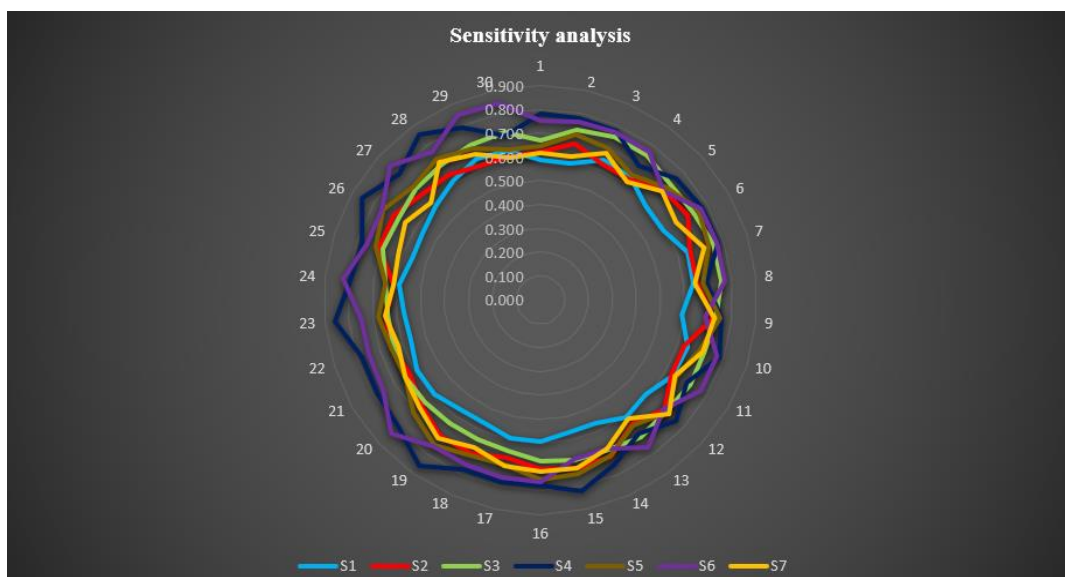


Fig. 5. Result of sensitivity analysis

5. Discussion

The purpose of this study is to identify and model barriers to SRA, along with ranking SRA implementation strategies to support sustainable performance.

5-1. Identification of barriers and strategies to implement SRA

First, the barriers and strategies of SRA implementation were identified by reviewing the research literature and were confirmed through interviews with six academic experts in this field. Finally, 12 barriers and 7 SRA implementation strategies were identified for better focus; barriers are presented in four categories, including organizational barriers, executive barriers, social barriers, and accounting profession barriers. Then, to model the SRA barriers, the ISM method was used, which is a kind of structural analysis of the relationships between the underlying variables of a multifaceted and complex phenomenon. The Fuzzy TOPSIS method was used to rank the strategies. The present study, by recognizing the barriers to SRA and understanding its implementation strategies' importance, helps decision-makers and officials implement SRA and other sustainability concepts, such as corporate social responsibility.

5-2. Model of barriers to SRA

The results of the ISM model showed that the barrier of differences in culture and values of each country, from the subset of social barriers, is of particular importance among the 12 SRA barriers and has been identified as the underlying barrier of the model. As [129] has warned, regardless of the differences in the culture and values of each country, striving for the SRA is nothing more than imposing international SRA initiatives that, instead of facilitating the path, cause more difficulties and barriers. This difference also casts serious doubt on the desirability of the same SRA rules for all countries [54]. The results of this model are consistent with the research [25], which states that at the national level, cultural values along with the economic level determinants of the extent of disclosure of SR issues.

At the next level, the fourth level of the model, the barriers include a lack of public awareness of the importance of SRA, the lack of regulations for the implementation of SRA, and organization size, which should be considered after considering and resolving cultural barriers. Consumers' awareness of SR issues reinforces companies' concerns about performing SRAs. People are reluctant to buy into companies that violate workers' rights [21], environmental issues [70], and human rights. So, they boycott the products and services of these companies [130]. In this regard, the lack of public awareness of the importance of SRA is one of the important barriers to improving SRA. [21] state that the media can play a key role in raising this awareness. To the extent that social and environmental rights organizations, by drawing media attention, put pressure on multinational corporations to respond more broadly [131]. Another barrier at this level, the lack of regulations for the implementation of the SRA, states that the rules and regulations for the implementation of the SRA, with the power it imposes, can even have a significant impact on raising public awareness of the demand for the implementation of the SRA. When people in the community know that there are laws related to S&E issues, they are more motivated to want to report to this section. Studies on S&E issues mainly refer to mandatory laws for countries to obtain reports in this area. Hence the expectation of voluntary disclosure of S&E negative information is far-fetched. Therefore, companies hide information by knowing there are no laws and regulations in this field as long as they feel the heavy shadow of the rules [24]. This lack of regulation for the implementation of the SRA is particularly significant in less developed countries, which still face issues such as women's rights, extreme poverty, and unemployment [54]. Without political responsibility and the non-implementation of relevant laws, we are witnessing severe environmental and societal damage [132]. The organization size is also one of the essential barriers of level 4 that

it seems necessary to pay attention to. In addition to financial problems in small and medium-sized companies [133 ,50], another problem in these companies is less in public view and, ultimately, less pressure from society on these companies, which has led them to refrain from preparing SRA reports, even if they cause serious harm to the community and the environment [26]. The model's results are consistent with [133], KELSALL in his book, pointing out that the reporting process requires resource development. Staff time and financial resources make the SRA process less attractive to organizations.

At the third level of the model, there are barriers, including insufficient training for accountants and a lack of financial resources. With sustainable development, the role of professional accountants in the accounting cycle has changed. They act as guides and triple-line translators (social, environmental, and financial sectors) using the language of corporate sustainability [100]. Therefore, it is true that first, there is a need to pay attention to the differences in S&E concerns among different communities and to formulate SRA enforcement laws by the S&E considerations of each country; however, there is a need to pay attention to accountants' unpreparedness on how to implement SRA [54]. Another barrier to this level is the lack of financial resources in small and medium-sized companies, which makes it very difficult to finance SRA reporting. The results of studies [133 ,50 ,49 ,25] also confirm this.

In the second level of the model, we face the barrier of problems related to measuring S&E costs. Accountants' awareness of the importance of SRA is beneficial. It greatly impacts the implementation of SRA, but the lack of rules for measuring the costs and S&E effects of the company's activities is a major barrier to accounting that must be addressed. Because ultimately, it is the accountants who must find a way to deal with the immeasurability of S&E issues [54]. Today, measurements usually focus only on economic value, which is in the form of market transactions, regardless of the positive or negative effects of activities. On the other hand, the internalization of social costs (health, inequality, and deprivation) is practically non-existent, and most of the positive social factors (entrepreneurship and disability rights) are not internalized as a value produced by organizations [20].

At the first level of the model, barriers such as "weak internal control system to implement SRA, lack of motivation within the organization to implement SRA, abuse of power by managers and major shareholders, conflict of interest and companies' lack of awareness of their social responsibility" are more affected by others and from a systemic point of view, effective and dependent barriers. In other words, these barriers are the output of interactions between other barriers and are less powerful than barriers at lower levels. By removing the barriers at the lower levels, the barriers of the first level will be removed. As a result, policymakers need to focus on the underlying barriers of the model so that all SRA barriers can be overcome. The results of the research [57-60] barrier of weak internal control system, [65-67 ,26] barrier of conflict of interest and abuse of power of managers and major shareholders, [57-60] barrier of lack of motivation within the organization to implement SRA and [70 ,55] barrier of companies' lack of awareness of their social responsibility, confirms the results of our model.

5-3. Ranking of SRA implementation strategies

Also, the results of the Fuzzy TOPSIS method for ranking SRA implementation strategies show that the order of ranking strategies is $S_4 > S_6 > S_5 > S_3 > S_7 > S_2 > S_1$. Among them, "mandatory regulations, introduction of guidelines and social responsibility accounting standards" weighing 0.1593, has the highest value among other SRA implementation strategies, which shows that policymakers need to pay serious attention to this strategy to address the underlying barriers of the SRA barriers model. Voluntary implementation of the SRA has yet to be successful, and companies are refusing to disclose all the harmful effects of S&E issues without rules and regulations [64 ,63 ,55 ,24]. Therefore, the implementation of laws and the provision of a governor who can address the concerns of each region, in addition to resolving

the problem of cultural differences, will also address the lack of regulation. Then, "regulatory developments and government incentive schemes to implement SRA" with a weight of 0.1560, and "increasing public awareness of the benefits of SRA" with a weight of 0.1440, are of the second and third importance among SRA implementation strategies, respectively. Given the results of the ISM model and the TOPSIS ranking, it can be clearly stated that these three strategies address the four underlying barriers of the model, which include "differences in culture and values of each country, lack of public awareness of the importance of SRA, lack of regulations for SRA implementation and organization size is very impressive.

6. Conclusion

This study sought to help implement SRA through a comprehensive literature review of what has been identified to date as barriers to SRA, and the strategies researchers have proposed to address these barriers. ISM has been used to identify important barriers and find textual relationships between them. The fuzzy TOPSIS method, which is one of the MCDM techniques, has been used to rank strategies for overcoming these barriers. Twelve barriers to SRA and seven implementation strategies were identified from the literature. The results of the ISM model showed that differences in culture and values of each country are the most potent barrier to implementing SRA. In confirmation of this, research [75 ,74] points out that any change in the situation in the SRA, in countries with different environments and cultures, should be in resolving the existing inconsistencies (especially between developed and emerging markets) in the global SRA model. Removing this barrier, as a root barrier in the SRA path, will help a lot to remove other barriers; even with SRA laws and regulations, for countries with different environments and cultures, the desirability of its implementation for all countries is questioned [54]. Following the lack of public awareness of the importance of SRA, the lack of regulations for the implementation of SRA and the organization size barrier were identified as the following significant barriers in the model. The results of the Fuzzy TOPSIS method also showed that "mandatory regulations, the introduction of guidelines and social responsibility accounting standards", "regulatory developments and government incentive schemes to implement SRA" as well as "increasing public awareness of the benefits of SRA" are the most effective strategies to overcome SRA implementation barriers, which lead to the removal of the maximum barriers. These three strategies are key solutions to remove the four underlying barriers of the model.

The findings of this study have practical implications for professional accounting bodies to provide and pay more attention to SRA guidelines and standards, and it makes standard-setting institutions in developing countries that have not paid attention to the issue of SRA, focus on the development of standards. Also, these institutions can make more efforts to train accountants in the field of SRA which is one of the important strategies in this study. There are also practical implications for policymakers to help implement this approach. which includes more monitoring of organizations' operations as well as the implementation of incentive plans to move towards SRA and to inform society about the importance of social responsibility and SRA.

7. Study limitation and future research

The modeling framework presented in this study to model the SRA barriers and provide strategies to overcome these barriers eventually led to the identification of 12 barriers and the presentation of 7 strategies that may be identified in future research more barriers and strategies. In addition, this study is geographically limited to Iran, and the study population is limited to 18 experts familiar with SRA. Also, in this research, ISM and fuzzy TOPSIS are the only methods suggested to use other analysis techniques. One possible threat to validity is about sampling method and sample size of decision makers ($n = 18$), which may cause vagueness. Various studies have used purposive sampling [2, 4, 113, 134-136] and a small sample sizes

[2, 4, 113, 114, 127, 135, 137]. Therefore, purposive sampling and small sample size are acceptable for analysis based on the mentioned studies. Moreover, the rank of SRA implementation strategies based on the MCDM approach is considered hasty and affects the results. To address this threat, we have used the fuzzy TOPSIS approach, the most suitable approach to resolve uncertainty in fuzzy group decision problems.

Future research can more broadly pay attention to the barrier of cultural differences as well as the strategies of "mandatory regulations, the introduction of guidelines and social responsibility accounting standards" and "regulatory developments and government incentive schemes to implement SRA." Researchers can also investigate the cause-and-effect relationship between these 12 barriers and 7 strategies using the DEMATEL method. For further research, the ranking results using the TOPSIS method in this study can be compared with other multi-criteria decision-making techniques, such as fuzzy AHP, fuzzy WASPAS, or BWM.

References

1. Thabit, T. and L.K. Ibraheem. *Implementation of Environmental Management Accounting for Enhancing the Sustainable Development in Iraqi Oil Refining Companies*. in Thabit, Thabit H., and Ibraheem, Laith K.(2019). *Implementation of Environmental Management Accounting for Enhancing the Sustainable Development in Iraqi Oil Refining Companies, 3rd Scientific Conference of Administration and Economic College, University of Anbar, Anbar, Iraq*. 2019.
2. Orji, I.J., *Examining barriers to organizational change for sustainability and drivers of sustainable performance in the metal manufacturing industry*. Resources, Conservation and Recycling, 2019. **140**: p. 102-114.
3. Rankin, A., et al., *Sustainability strategies in US agribusiness: Understanding key drivers, objectives, and actions*. International Food and Agribusiness Management Review, 2011. **14**(1030-2016-82912): p. 1-20.
4. Sayyadi Tooranloo, H. and M. Askari Shahamabad, *Designing the model of factors affecting in the implementation of social and environmental accounting with the ISM approach*. International Journal of Ethics and Systems, 2020. **36**(3): p. 387-410.
5. Askari Shahamabad, M., et al., *Prioritization and taxonomy of factors related to environmental tax reform (ETR) using fuzzy AHP approach*. Management of Environmental Quality: An International Journal, 2023. **ahead-of-print**(ahead-of-print).
6. Heard, J.E. and W.J. Bolce, *The political significance of corporate social reporting in the United States of America*. Accounting, Organizations and Society, 1981. **6**(3): p. 247-254.
7. Arianpoor, A. and M. Salehi, *A framework for business sustainability performance using meta-synthesis*. Management of Environmental Quality: An International Journal, 2021. **32**(2): p. 175-192.
8. Gray, R., D. Owen, and C. Adams, *Accounting and accountability: Social and environmental accounting in a changing world*. Accounting, Auditing & Accountability Journal, 1996. **10**: p. 325-364.
9. Bernow, S., B. Klempner, and C. Magnin, *From 'why' to 'why not': Sustainable investing as the new normal*. McKinsey & Company, 2017.
10. COSO, W., *Enterprise risk management: Applying enterprise risk management to environmental, social and governance-related risks by the Committee of Sponsoring Organizations of the Treadway Commission (COSO) and the World Business Council for Sustainable Development (WBCSD)*. World Business Council for Sustainable Development (WBCSD), oO, 2018.
11. Williams, S.M., *Voluntary environmental and social accounting disclosure practices in the Asia-Pacific region: An international empirical test of political economy theory*. The International Journal of Accounting, 1999. **34**(2): p. 209-238.
12. Adams, C.A., *The nature and processes of corporate reporting on ethical issues*. 1999: Cima London.
13. Trianni, A., E. Cagno, and A. Neri, *Modelling barriers to the adoption of industrial sustainability measures*. Journal of Cleaner Production, 2017. **168**: p. 1482-1504.
14. Elkington, J., *Cannibals with Forks: The Triple Bottom Line of 21st Century Business* New Society Publishers. BC New Society Publisher: Gabriola Island, BC, Canada, 1998.
15. Dwiharto, A., et al., *The Answer Social Challenges: Social Accounting and Social Accounting Measurement*. International Journal of Social Service and Research (IJSSR), 2023. **3**(1): p. 82-91.
16. Guthrie, J. and C. Boedker, *Perspectives on "new" models of business reporting: a reflective note*. Accounting, Auditing & Accountability Journal, 2006.

17. Ferry, L. and G. Lehman, *Trends in corruption, environmental, ethical and social accounting*. Accounting Forum, 2018. **42**(1): p. 1-2.
18. Gray, R., D. Owen, and K. Maunders, *Corporate social reporting: Accounting and accountability*. 1987: Prentice-Hall International.
19. Muralikrishna, I.V. and V. Manickam, *Chapter Seven - Environmental Accounting*, in *Environmental Management*, I.V. Muralikrishna and V. Manickam, Editors. 2017, Butterworth-Heinemann. p. 113-134.
20. Retolaza, J.L. and L. San-Jose, *Understanding Social Accounting Based on Evidence*. SAGE Open, 2021. **11**(2): p. 21582440211003865.
21. Islam, M.A., *Social and environmental reporting practices of organisations operating in, or sourcing products from, a developing country: evidence from Bangladesh*. Available at SSRN 2878254, 2009.
22. Hogner, R.H., *Corporate social reporting: eight decades of development at US Steel*. Research in corporate performance and policy, 1982. **4**(1): p. 243-250.
23. Deegan, C., *Twenty five years of social and environmental accounting research within Critical Perspectives of Accounting: Hits, misses and ways forward*. Critical Perspectives on Accounting, 2017. **43**: p. 65-87.
24. Liu, Z. and M. Liu, *Quality evaluation of enterprise environmental accounting information disclosure based on projection pursuit model*. Journal of cleaner production, 2021. **279**: p. 123679.
25. HASSAN, N., *corporate social responsibility disclosure: an examination of framework of determinants and consequences*. 2010, Durham University.
26. Kolk, A. and P. Perego, *Social and environmental accounting*. Wiley Encyclopedia of Management, 2015: p. 1-6.
27. Gray, R., *The social accounting project and Accounting Organizations and Society Privileging engagement, imaginings, new accountings and pragmatism over critique?* Accounting, organizations and society, 2002. **27**(7): p. 687-708.
28. Salehi, M., H. Tarighi, and M. Rezaeehad, *The relationship between board of directors' structure and company ownership with corporate social responsibility disclosure: Iranian angle*. Humanomics, 2017.
29. Khuong, N.V., et al., *The impact of corporate social responsibility disclosure and accounting comparability on earnings persistence*. Sustainability, 2022. **14**(5): p. 2752.
30. Salehi, M., M. Moradi, and N. Paiydarmanesh, *The effect of corporate governance and audit quality on disclosure quality: Evidence from Tehran stock exchange*. Periodica Polytechnica Social and Management Sciences, 2017. **25**(1): p. 32-48.
31. Salehi, M., H. Tarighi, and S. Safdari, *The relation between corporate governance mechanisms, executive compensation and audit fees: Evidence from Iran*. Management Research Review, 2018. **41**(8): p. 939-967.
32. Owusu, C.A. and S. Frimpong, *Corporate social and environmental auditing: Perceived responsibility or regulatory requirement*. Research Journal of Finance and Accounting, 2012. **3**(4): p. 47-57.
33. Marissa Matsler, A., *Making 'green' fit in a 'grey' accounting system: The institutional knowledge system challenges of valuing urban nature as infrastructural assets*. Environmental Science & Policy, 2019. **99**: p. 160-168.
34. Cho, C.H. and D.M. Patten, *Green accounting: Reflections from a CSR and environmental disclosure perspective*. Critical Perspectives on Accounting, 2013. **24**(6): p. 443-447.
35. Asiri, N., T. Khan, and M. Kend, *Environmental management accounting in the Middle East and North Africa region: Significance of resource slack and coercive isomorphism*. Journal of Cleaner Production, 2020. **267**: p. 121870.
36. Qian, W., J. Hörisch, and S. Schaltegger, *Environmental management accounting and its effects on carbon management and disclosure quality*. Journal of Cleaner Production, 2018. **174**: p. 1608-1619.
37. Tzouvanas, P., et al., *Environmental disclosure and idiosyncratic risk in the European manufacturing sector*. Energy Economics, 2020. **87**: p. 104715.
38. Lu, J. and H. Li, *The impact of government environmental information disclosure on enterprise location choices: Heterogeneity and threshold effect test*. Journal of Cleaner Production, 2020. **277**: p. 124055.
39. Shiri, M.M., M. Salehi, and A. Radbon, *A study of impact of ownership structure and disclosure quality on information asymmetry in Iran*. Vikalpa, 2016. **41**(1): p. 51-60.
40. Yongvanich, K. and J. Guthrie, *An extended performance reporting framework for social and environmental accounting*. Business Strategy and the Environment, 2006. **15**(5): p. 309-321.
41. Al-Qudah, L.A., *The role of social responsibility accounting in mitigating the economic impacts of the COVID-19 pandemic in Jordan*. Cogent Economics & Finance, 2023. **11**(1): p. 2171575.
42. Deegan, C., *Australian Financial Accounting*. 2007: McGraw-Hill Australia.
43. Deegan, C., M. Rankin, and J. Tobin, *An examination of the corporate social and environmental disclosures of BHP from 1983-1997: A test of legitimacy theory*. Accounting, Auditing & Accountability Journal, 2002.

44. Mathews, M.R., *Social and environmental accounting: A practical demonstration of ethical concern?* Journal of business ethics, 1995. **14**(8): p. 663-671.
45. Mathews, M.R., *Socially responsible accounting*. 1993: Chapman & Hall.
46. Salehi, M., M.L. DashtBayaz, and S. Khorashadizadeh, *Corporate social responsibility and future financial performance: evidence from Tehran Stock Exchange*. EuroMed Journal of Business, 2018. **13**(3): p. 351-371.
47. Kwarteng, A., C. Agyenim-Boateng, and S.N.Y. Simpson, *The barriers to adapting accounting practices to circular economy implementation: an evidence from Ghana*. Journal of Global Responsibility, 2023. **14**(1): p. 1-26.
48. Raynard, P. and S. Murphy, *Charitable Trust*. Social auditing with, 2000.
49. Kolk, A., *The social responsibility of international business: From ethics and the environment to CSR and sustainable development*. Journal of World Business, 2016. **51**(1): p. 23-34.
50. Laudal, T., *Drivers and barriers of CSR and the size and internationalization of firms*. Social Responsibility Journal, 2011.
51. Shen, L., K. Govindan, and M. Shankar, *Evaluation of barriers of corporate social responsibility using an analytical hierarchy process under a fuzzy environment—A textile case*. Sustainability, 2015. **7**(3): p. 3493-3514.
52. Salehi, M., H. Tarighi, and M. Rezanezhad, *Empirical study on the effective factors of social responsibility disclosure of Iranian companies*. Journal of Asian Business and Economic Studies, 2019. **26**(1): p. 34-55.
53. Dashtbayaz, M.L., et al., *The impact of corporate governance on intellectual capitals efficiency in Iran*. International Journal of Islamic and Middle Eastern Finance and Management, 2020. **13**(4): p. 749-766.
54. Kamla, R., S. Gallhofer, and J. Haslam, *Understanding Syrian accountants' perceptions of, and attitudes towards, social accounting*. Accounting, Auditing & Accountability Journal, 2012.
55. Golob, U. and J.L. Bartlett, *Communicating about corporate social responsibility: A comparative study of CSR reporting in Australia and Slovenia*. Public relations review, 2007. **33**(1): p. 1-9.
56. Berthelot, S., D. Cormier, and M. Magnan, *Environmental disclosure research: a review and synthesis*. Journal of accounting literature, 2003. **22**(1): p. 1-44.
57. Ball, A. and R. Craig, *Using neo-institutionalism to advance social and environmental accounting*. Critical Perspectives on Accounting, 2010. **21**(4): p. 283-293.
58. Larrinaga-Gonzalez, C. and J. Bebbington, *Accounting change or institutional appropriation?—A case study of the implementation of environmental accounting*. Critical perspectives on accounting, 2001. **12**(3): p. 269-292.
59. Cormier, D., I.M. Gordon, and M. Magnan, *Corporate environmental disclosure: contrasting management's perceptions with reality*. Journal of Business Ethics, 2004. **49**(2): p. 143-165.
60. Brint, S. and J. Karabel, *Institutional origins and transformations: The case of American community colleges*. The new institutionalism in organizational analysis, 1991. **337**(360): p. 283-298.
61. Armstrong, J.S. and K.C. Green, *Effects of corporate social responsibility and irresponsibility policies*. Journal of Business Research, 2013. **66**(10): p. 1922-1927.
62. Lerner, L.D. and G.E. Fryxell, *CEO stakeholder attitudes and corporate social activity in the Fortune 500*. Business & Society, 1994. **33**(1): p. 58-81.
63. Belal, A.R., S.M. Cooper, and N.A. Khan, *Corporate environmental responsibility and accountability: what chance in vulnerable Bangladesh?* Critical Perspectives on Accounting, 2015. **33**: p. 44-58.
64. Aurelia-Aurora, D. and M.S. Sorina-Geanina, *Perspectives of environmental accounting in Romania*. Procedia-Social and Behavioral Sciences, 2012. **62**: p. 610-614.
65. Belal, A.R. and S. Cooper, *The absence of corporate social responsibility reporting in Bangladesh*. Critical Perspectives on Accounting, 2011. **22**(7): p. 654-667.
66. Richmond, B.J., L. Mook, and Q. Jack, *Social accounting for nonprofits: Two models*. Nonprofit management and leadership, 2003. **13**(4): p. 308-324.
67. Neu, D., H. Warsame, and K. Pedwell, *Managing public impressions: environmental disclosures in annual reports*. Accounting, organizations and society, 1998. **23**(3): p. 265-282.
68. Zimon, G., A. Arianpoor, and M. Salehi, *Sustainability reporting and corporate reputation: the moderating effect of CEO opportunistic behavior*. Sustainability, 2022. **14**(3): p. 1257.
69. Ebrahimi, M.S. and M. Ghaedian, *Corporate social responsibility and organizational commitment in agricultural cooperatives: evidence from Iran*. Boletín de la Asociación Internacional de Derecho Cooperativo, 2021(59): p. 263-283.
70. Leonidou, C.N. and D. Skarmeas, *Gray shades of green: Causes and consequences of green skepticism*. Journal of Business Ethics, 2017. **144**(2): p. 401-415.
71. Blowfield, M. and J.G. Frynas, *Editorial Setting new agendas: critical perspectives on Corporate Social Responsibility in the developing world*. International affairs, 2005. **81**(3): p. 499-513.

72. Adams, C.A., *Internal organisational factors influencing corporate social and ethical reporting: Beyond current theorising*. Accounting, Auditing & Accountability Journal, 2002.
73. Gallhofer, S. and J. Haslam, *Accounting and emancipation: some critical interventions*. 2002: Routledge.
74. Kamla, R., *Social accounting in a selection of Arab countries: critical and post-colonial perspectives*. 2005, Heriot-Watt University.
75. Kamla, R., *Critically appreciating social accounting and reporting in the Arab MiddleEast: A postcolonial perspective*. Advances in International Accounting, 2007. **20**: p. 105-177.
76. ROGAYAN, D. and D.N. Eveyen El Elyonna, *Environmental awareness and practices of Science students: Input for ecological management plan*. International Electronic Journal of Environmental Education, 2019. **9**(2): p. 106-119.
77. Gonzaga, M.L. *Awareness and Practices in Green Technology of College Students*. in *Applied Mechanics and Materials*. 2016. Trans Tech Publ.
78. Lehman, G., *Disclosing new worlds: a role for social and environmental accounting and auditing*. Accounting, Organizations and society, 1999. **24**(3): p. 217-241.
79. Tinker, T., *The enlightenment and its discontents: Antinomies of Christianity, Islam and the calculative sciences*. Accounting, Auditing & Accountability Journal, 2004.
80. Ramanathan, K.V., *Toward a theory of corporate social accounting*. The accounting review, 1976. **51**(3): p. 516-528.
81. Medawar, C., *The social audit: a political view*. Accounting, organizations and society, 1976. **1**(4): p. 389-394.
82. Guthrie, J., S. Cuganesan, and L. Ward. *Industry specific social and environmental reporting: The Australian Food and Beverage Industry*. in *Accounting Forum*. 2008. Elsevier.
83. Deegan, C., M. Rankin, and J. Tobin, *An examination of the corporate social and environmental disclosures of BHP from 1983-1997: A test of legitimacy theory*. Accounting, Auditing & Accountability Journal, 2002. **15**(3): p. 312-343.
84. Gray, R., R. Kouhy, and S. Lavers, *Corporate social and environmental reporting: a review of the literature and a longitudinal study of UK disclosure*. Accounting, Auditing & Accountability Journal, 1995. **8**(2): p. 47-77.
85. Mathews, M.R., *Social and environmental accounting: A practical demonstration of ethical concern?* Journal of business ethics, 1995. **14**: p. 663-671.
86. Laudal, T., *Drivers and barriers of CSR and the size and internationalization of firms*. Social Responsibility Journal, 2011. **7**(2): p. 234-256.
87. Kamla, R., S. Gallhofer, and J. Haslam, *Understanding Syrian accountants' perceptions of, and attitudes towards, social accounting*. Accounting, Auditing & Accountability Journal, 2012. **25**(7): p. 1170-1205.
88. Cormier, D., I.M. Gordon, and M. Magnan, *Corporate environmental disclosure: contrasting management's perceptions with reality*. Journal of business ethics, 2004. **49**: p. 143-165.
89. Leonidou, C.N. and D. Skarmeas, *Gray shades of green: Causes and consequences of green skepticism*. Journal of business ethics, 2017. **144**: p. 401-415.
90. Adams, C.A., *Internal organisational factors influencing corporate social and ethical reporting: Beyond current theorising*. Accounting, Auditing & Accountability Journal, 2002. **15**(2): p. 223-250.
91. Gallhofer, S. and J. Haslam, *Accounting and emancipation: Some critical interventions*. Vol. 3. 2002: Routledge.
92. Elkington, J. and I.H. Rowlands, *Cannibals with forks: The triple bottom line of 21st century business*. Alternatives Journal, 1999. **25**(4): p. 42.
93. Rogayan Jr, D.V. and E.E.D. Nebrida, *Environmental Awareness and Practices of Science Students: Input for Ecological Management Plan*. International Electronic Journal of Environmental Education, 2019. **9**(2): p. 106-119.
94. McKeiver, C. and D. Gadenne, *Environmental management systems in small and medium businesses*. International small business journal, 2005. **23**(5): p. 513-537.
95. Garanina, T. and O. Kim, *The relationship between CSR disclosure and accounting conservatism: The role of state ownership*. Journal of International Accounting, Auditing and Taxation, 2023. **50**: p. 100522.
96. Shamsadini, K., M. Nemat, and M. Askari Shahamabad, *Provide a model for developing corporate social responsibility*. Journal of Accounting and Social Interests, 2022. **12**(1): p. 81-100.
97. Asiaei, K., et al., *Corporate social responsibility and performance measurement systems in Iran: A levers of control perspective*. Corporate Social Responsibility and Environmental Management, 2023. **30**(2): p. 574-588.
98. Cooper, C., et al., *A discussion of the political potential of social accounting*. Critical Perspectives on Accounting, 2005. **16**(7): p. 951-974.
99. Gallhofer, S., et al., *Developing environmental accounting: insights from indigenous cultures*. Accounting, Auditing & Accountability Journal, 2000.

100. Makarenko, I. and A. Plastun, *The role of accounting in sustainable development*. Accounting and Financial Control, 2017. **1**(2): p. 4-12.
101. Reynolds, T.W., J. Farley, and C. Huber, *Investing in human and natural capital: An alternative paradigm for sustainable development in Awassa, Ethiopia*. Ecological Economics, 2010. **69**(11): p. 2140-2150.
102. Li, J.F., X. Wang, and Y.X. Zhang, *Is it in China's interest to implement an export carbon tax?* Energy Economics, 2012. **34**(6): p. 2072-2080.
103. Dong, Y. and M.Z. Hauschild, *Indicators for Environmental Sustainability*. Procedia CIRP, 2017. **61**: p. 697-702.
104. Kosajan, V., et al., *The design and application of a government environmental information disclosure index in China*. Journal of Cleaner Production, 2018. **202**: p. 1192-1201.
105. Lee, K.H., *Motivations, barriers, and incentives for adopting environmental management (cost) accounting and related guidelines: a study of the republic of Korea*. Corporate Social Responsibility and Environmental Management, 2011. **18**(1): p. 39-49.
106. Rivera-Santos, M., et al., *Social entrepreneurship in sub-Saharan Africa*. Academy of Management Perspectives, 2015. **29**(1): p. 72-91.
107. Pratibha, G., et al., *Identification of environment friendly tillage implement as a strategy for energy efficiency and mitigation of climate change in semiarid rainfed agro ecosystems*. Journal of Cleaner Production, 2019. **214**: p. 524-535.
108. Kourula, A., et al., *New roles of government in the governance of business conduct: Implications for management and organizational research*. 2019, SAGE Publications Sage UK: London, England. p. 1101-1123.
109. Zadek, S., R. Evans, and P. Pruzan, *Building corporate accountability: Emerging practice in social and ethical accounting and auditing*. 2013: Routledge.
110. Dillard, J. and E. Vinnari, *Critical dialogical accountability: From accounting-based accountability to accountability-based accounting*. Critical Perspectives on Accounting, 2019. **62**: p. 16-38.
111. Zadeh, L.A., G.J. Klir, and B. Yuan, *Fuzzy sets, fuzzy logic, and fuzzy systems: selected papers*. Vol. 6. 1996: World Scientific.
112. Singh, R.K. and L. Benyoucef, *A fuzzy TOPSIS based approach for e-sourcing*. Engineering Applications of Artificial Intelligence, 2011. **24**(3): p. 437-448.
113. Khodamipour, A., M. Askari Shahamabad, and F. Askari Shahamabad, *Fuzzy AHP-TOPSIS method for ranking the solutions of environmental taxes implementation to overcome its barriers under fuzzy environment*. Journal of Applied Accounting Research, 2022. **23**(3): p. 541-569.
114. Ansari, M.F., et al., *Analysis of barriers to implement solar power installations in India using interpretive structural modeling technique*. Renewable and sustainable energy reviews, 2013. **27**: p. 163-174.
115. Warfield, J.N., *Developing interconnection matrices in structural modeling*. IEEE Transactions on Systems, Man, and Cybernetics, 1974(1): p. 81-87.
116. Sindhu, S., V. Nehra, and S. Luthra, *Identification and analysis of barriers in implementation of solar energy in Indian rural sector using integrated ISM and fuzzy MICMAC approach*. Renewable and Sustainable Energy Reviews, 2016. **62**: p. 70-88.
117. Sohani, N. and N. Sohani, *Developing interpretive structural model for quality framework in higher education: Indian context*. Journal of Engineering, Science & Management Education, 2012. **5**(2): p. 495-501.
118. Shen, L., et al., *A fuzzy multi criteria approach for evaluating green supplier's performance in green supply chain with linguistic preferences*. Resources, Conservation and Recycling, 2013. **74**: p. 170-179.
119. Hwang, C. and K. Yoon, *Multiple Attributes Decision Making Methods and Applications*, spring. New York, 1981.
120. Azimifard, A., S.H. Moosavirad, and S. Ariaifar, *Selecting sustainable supplier countries for Iran's steel industry at three levels by using AHP and TOPSIS methods*. Resources Policy, 2018. **57**: p. 30-44.
121. Yu, C.-S., *A GP-AHP method for solving group decision-making fuzzy AHP problems*. Computers & Operations Research, 2002. **29**(14): p. 1969-2001.
122. Prakash, C. and M. Barua, *Integration of AHP-TOPSIS method for prioritizing the solutions of reverse logistics adoption to overcome its barriers under fuzzy environment*. Journal of Manufacturing Systems, 2015. **37**: p. 599-615.
123. Kannan, D., A.B.L. de Sousa Jabbour, and C.J.C. Jabbour, *Selecting green suppliers based on GSCM practices: Using fuzzy TOPSIS applied to a Brazilian electronics company*. European Journal of Operational Research, 2014. **233**(2): p. 432-447.
124. Sun, G., et al., *An innovative TOPSIS approach based on hesitant fuzzy correlation coefficient and its applications*. Applied Soft Computing, 2018. **68**: p. 249-267.

125. Erdin, C. and H.E. Akbaş, *A comparative analysis of fuzzy topsis and geographic information systems (gis) for the location selection of shopping malls: A case study from turkey*. Sustainability, 2019. **11**(14): p. 3837.
126. Yoon, K. and C.-L. Hwang, *Manufacturing plant location analysis by multiple attribute decision making: Part I—single-plant strategy*. International Journal of Production Research, 1985. **23**(2): p. 345-359.
127. Rafi, S., et al., *Exploration of DevOps testing process capabilities: An ISM and fuzzy TOPSIS analysis*. Applied Soft Computing, 2022. **116**: p. 108377.
128. Han, H. and S. Trimi, *A fuzzy TOPSIS method for performance evaluation of reverse logistics in social commerce platforms*. Expert Systems with Applications, 2018. **103**: p. 133-145.
129. Belal, A.R. and D.L. Owen, *The views of corporate managers on the current state of, and future prospects for, social reporting in Bangladesh: An engagement-based study*. Accounting, Auditing & Accountability Journal, 2007.
130. Wah, L., *Treading the sacred ground*. Management Review, 1998. **87**(7): p. 18.
131. Li, G., *An analysis: The impact of non-governmental organizations on the practice of public relations*. Public Relations Quarterly, 2001. **46**(4): p. 11.
132. Samkin, G. and C. Wingard, *Understanding systemic change in the context of the social and environmental disclosures of a conservation organisation in a developing country*. Accounting, Auditing & Accountability Journal, 2020.
133. KELSALL, D.C., *Social and Environmental Accounting (SEA)*. 2019, Bookboon.
134. Sirisawat, P. and T. Kiatcharoenpol, *Fuzzy AHP-TOPSIS approaches to prioritizing solutions for reverse logistics barriers*. Computers & Industrial Engineering, 2018. **117**: p. 303-318.
135. Shamsadini, K., M. Askari Shahamabad, and F. Askari Shahamabad, *Analysis of factors affecting environmental audit (EA) implementation with DEMATEL method*. Social Responsibility Journal, 2022. **ahead-of-print**(ahead-of-print).
136. Rahimi, A., K. Shamsaddini, and M. Askari Shahamabad, *Developing a Model to Implement Environmental Taxes*. Journal of Accounting Knowledge (in persian), 2022.
137. Patidar, L., V.K. Soni, and P. Kumar Soni, *Development of a Framework for Implementation of Maintenance Tools and Techniques Using Interpretive Structural Modeling*. Materials Today: Proceedings, 2017. **4**(8): p. 8158-8166.