#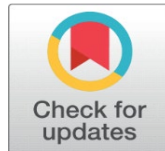 ADDRESSING CLIMATE CHANGE THROUGH ENVIRONMENTAL, SOCIAL, GOVERNANCE (ESG) INITIATIVES: A PRAGMATIC OUTLOOK IN PRESENT ERA

Dr. Deepak Kumar Adhana [1] ✉ , Rashmi [2] ✉

[1] Assistant Professor, Bharatiya Vidya Bhavan College, New Delhi, India
[2] Guest Faculty, University of Delhi, India

ABSTRACT

The research explores the pivotal role of Environmental, Social, and Governance (ESG) initiatives in addressing the pressing issue of climate change. As global awareness of environmental challenges grows, businesses, investors, and policymakers increasingly recognize the significance of integrating ESG principles into their strategies. This paper examines how ESG initiatives contribute to mitigating climate change through a holistic approach that encompasses environmental stewardship, social responsibility, and effective corporate governance. This study investigates climate change mitigation through Environmental, Social, and Governance (ESG) initiatives in the context of Small and Medium-sized Enterprises (SMEs) in Rajasthan, India. With a sample size of 370 SMEs, the research employs the Smart-PLS software for comprehensive analysis. Our study explores the pragmatic role of ESG practices in addressing climate change challenges SMEs face in the present era. The findings underscore the significance of integrating sustainability strategies to ensure environmental resilience, social responsibility, and effective governance. While offering valuable insights, the study acknowledges limitations in the scope of ESG factors and the evolving nature of climate change dynamics. Ultimately, the study underscores the importance of collective efforts among stakeholders to foster sustainable practices and combat climate change impacts in Rajasthan's SME sector.

Keywords: Environmental Social Governance (ESG), Sustainability, Environmental Stewardship, Social Responsibility, Carbon Footprint

1. INTRODUCTION

Climate change refers to long-term altering Earth's average weather patterns and temperatures, primarily driven by human activities such as burning fossil fuels, deforestation, and industrial processes Bose et al. (2018), Singh et al. (2019). This phenomenon has resulted in a range of interconnected environmental impacts, including rising global temperatures, melting polar ice, and increased frequency of extreme weather events. The accumulation of greenhouse gases, such as carbon dioxide and methane, in the atmosphere has intensified the natural greenhouse

effect, trapped heat and causing the planet to warm. The consequences of climate change are wide-ranging, affecting ecosystems, water resources, agriculture, and human societies across the globe Monteiro & Barata (2021).

One of the most evident manifestations of climate change is the noticeable increase in global temperatures over the past century. This warming trend has led to the rapid retreat of glaciers, the shrinking of polar ice caps, and rising sea levels. These changes pose significant threats to coastal communities, as higher sea levels can result in coastal erosion and more frequent and severe flooding during storms. Moreover, the warming of oceans has led to shifts in marine ecosystems, impacting fish populations and the livelihoods of those dependent on fisheries Liobikienė & Butkus (2021), Purohit et al. (2022).

Another critical aspect of climate change is the heightened occurrence of extreme weather events. Hurricanes, droughts, heatwaves, and heavy rainfall have become more frequent and intense, causing widespread destruction and loss of life. Vulnerable populations, including low-income communities and developing nations, often bear the brunt of these disasters, exacerbating existing social and economic inequalities. The displacement of people due to climate-induced events can also lead to conflicts and increased migration pressures, further destabilizing regions Langevin et al. (2020).

Mitigating and adapting to climate change are crucial global challenges. Reducing greenhouse gas emissions includes transitioning to renewable energy sources, improving energy efficiency, and implementing sustainable land-use practices. International agreements, such as the Paris Agreement, aim to foster cooperation among nations in addressing climate change and limiting global warming to well below 2 degrees Celsius above pre-industrial levels. Adaptation strategies involve building resilient infrastructure, enhancing disaster preparedness, and integrating climate considerations into development planning. Addressing climate change requires a collective effort from governments, industries, and individuals to secure a sustainable and habitable future for generations Rao et al. (2019).

2. ADDRESSING THE CLIMATE CHANGE

Addressing climate change requires a comprehensive and coordinated effort on multiple levels – individual, community, national, and global. There are some key strategies to tackle climate change:

2.1. TRANSITION TO RENEWABLE ENERGY

The global shift towards renewable energy sources signifies a crucial step in mitigating climate change. By embracing solar, wind, hydro, and geothermal power, societies are reducing their carbon footprint and fostering sustainable development. This transition not only curbs environmental degradation but also fosters technological innovation and job creation. As traditional energy paradigms evolve, investments in renewables bolster energy security and resilience while promoting a cleaner and brighter future for generations to come. The transition to renewable energy is a pivotal endeavor that harmonizes progress with planet Earth's preservation Lo et al. (2018).

2.2. ENERGY EFFICIENCY AND CONSERVATION

These two stand as twin pillars in the realm of sustainability. By optimizing our energy consumption patterns, we minimize waste and reduce our carbon impact. Through technological advancements and mindful practices, we can achieve more with less, stretching our resources while fostering economic savings. Embracing energy efficiency and conservation empowers us to cultivate a greener world and ensure a balanced coexistence with our planet Shari & Malip (2022).

2.3. REFORESTATION AND AFFORESTATION

Forests act as carbon sinks, absorbing carbon dioxide from the atmosphere. Reforestation (replanting trees in deforested areas) and afforestation (planting trees in areas that were not previously forested) can help capture carbon and restore ecosystems. Protecting existing forests from deforestation and illegal logging is equally essential Wong et al. (2017).

2.4. SUSTAINABLE LAND USE AND AGRICULTURE

Implementing sustainable farming practices, such as agroforestry, organic farming, and reduced use of chemical fertilizers, can reduce emissions from agriculture. These practices also help maintain soil health and biodiversity, making ecosystems more resilient to climate change Patel et al. (2023).

2.5. CLIMATE-FRIENDLY TRANSPORTATION

Promoting the use of electric vehicles, expanding public transportation, and building bike-friendly infrastructure can reduce emissions from the transportation sector. Encouraging carpooling and adopting cleaner fuels also play a role.

2.6. ADAPTATION AND RESILIENCE

Communities need to develop strategies to adapt to the impacts of climate change that are already underway. This might include building resilient infrastructure, designing flood-resistant buildings, and developing early warning systems for extreme weather events.

2.7. INTERNATIONAL COOPERATION

Climate change is a global issue that requires collaboration among countries. International agreements like the Paris Agreement aim to unite nations to set emission reduction targets and share best practices.

2.8. POLICY AND REGULATION

Governments play a crucial role in addressing climate change by enacting and enforcing policies that promote renewable energy adoption, emissions reduction, and sustainable practices. Carbon pricing mechanisms, regulations on emissions, and incentives for green technologies can all drive change Dadhich et al. (2022), Murinde et al. (2022).

2.9. EDUCATION AND ADVOCACY

Raising awareness about climate change, its impacts, and the actions individuals can take is essential. Advocacy efforts can influence policymakers and industries to prioritize sustainable practices and invest in green solutions. Addressing climate change is a complex and urgent challenge, requiring a multifaceted approach that involves individuals, communities, businesses, and governments working together to reduce emissions and build a more sustainable future Reddy et al. (2022).

3. REVIEW OF LITERATURE

Schulz & Feist (2021) assessed a wide range of ESG initiatives undertaken by both businesses and governments to combat the impacts of climate change. It evaluates these initiatives' effectiveness in reducing greenhouse gas emissions, promoting sustainable resource management, and enhancing overall social responsibility. By analyzing a diverse array of case studies and real-world examples, this review provides insights into the potential of ESG frameworks to drive meaningful change in the fight against climate change. Lee & Suh (2022) delved into the evolving landscape of ESG frameworks and their application in measuring and understanding climate change's environmental and social consequences. It examines the strengths and limitations of various ESG assessment methods and their ability to capture the multidimensional impacts of climate change. This review synthesizes current research and sheds light on emerging trends and best practices in utilizing ESG frameworks to address environmental and social challenges.

Dadhich et al. (2021) focused on the governance aspects of climate change mitigation, this review critically examines the role of ESG governance structures in driving sustainable practices. It scrutinizes the mechanisms through which boards, regulations, and policies influence decision-making and corporate behavior related to climate change. This review provides insights into how effective governance structures can shape climate-focused strategies and outcomes by analyzing case studies and regulatory frameworks. Dadhich et al. (2021) investigated the intricate interplay between climate change and financial performance, highlighting how ESG integration can mitigate climate-related financial risks. By examining empirical evidence, case studies, and market trends, it comprehensively analyzes how investors are factoring climate-related considerations into their investment strategies. The review also explores the evolving landscape of sustainable finance and the potential for ESG integration to create value for both investors and the environment. Dadhich et al. (2021) explored how companies engage with stakeholders to convey their ESG efforts in combating climate change. It evaluates communication methods' transparency, authenticity, and impact in building trust and fostering collaboration with various stakeholders, including consumers, investors, and communities. Through the lens of real-world case studies, this review highlights best practices for aligning ESG communication with climate action objectives.

Singh et al. (2022) Focusing on the crucial aspect of supply chain management, this literature review investigates how companies integrate ESG practices to address climate change within their supply chains. It examines strategies for reducing emissions, conserving resources, and promoting sustainability across supply chain partners. By analyzing industry case studies and best practices, this review showcases the potential for ESG-driven supply chain initiatives to contribute

to global climate change mitigation efforts. Dadhich et al. (2021) evaluated the correlation between ESG ratings and a company's climate change performance. It delves into the methodologies behind ESG rating agencies, and their assessment criteria related to climate-related factors. By synthesizing empirical studies and analyzing real-world data, the review offers insights into whether higher ESG ratings indeed translate into more effective climate change mitigation outcomes and improved sustainability practices Dadhich et al. (2023). Having considered the above literature, the following research questions can be framed:

RQ.1: To assess the effectiveness of ESG initiatives in addressing sustainable development.

RQ.2: To examine the relationship between ESG ratings and climate change performance.

4. RESEARCH METHODOLOGY

The quantitative phase involves analyzing ESG ratings and financial performance data to assess the impact of ESG initiatives on climate change outcomes. The study adhered to ethical guidelines for data collection and analysis. Proper citation and referencing will be maintained for all sources used. Research methodology for studying the relationship between Environmental, Social, Governance (ESG) initiatives and climate change involves several key components that guide the research process.

Designing a comprehensive research methodology is crucial for investigating different ESG and climate change approaches in India. The research adopted an exploratory approach to uncover insights into different factors influencing the ESG framework. The study utilized a quantitative approach to comprehensively understand the modern practices that leading to sustainable society.

Stratified purposive sampling was employed to select a representative sample of ESG oriented MSME. Stratification can be based on firm size, and geographical location. Research framework for ESG has been drafted for sample size of 370 respondents working in various institutions (see Figure 1). Perform statistical analysis to compare and contrast ESG practices across different SME firms. Used tools such as Smart-PLS analysis to identify relationships between ESG, climate change and sustainable development. Obtain informed consent from participants and ensure the confidentiality and anonymity of collected data. Adhere to ethical guidelines for research involving human subjects. A Likert scale with five points of differentiation and the possibilities for gauging SME users' opinions. The data were collected from May to July 2023 from five major districts of Rajasthan.

Figure 1
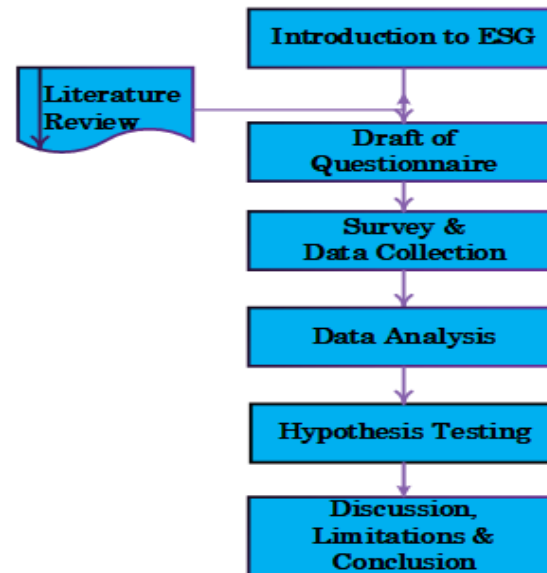
Figure 1 Research Framework for ESG

5. DATA ANALYSIS AND INTERPRETATION

Descriptive analysis plays a crucial role in data analysis and interpretation by providing a comprehensive overview of the data at hand. It involves summarizing and presenting data in a meaningful way to gain insights, identify patterns, and make informed decisions.

Table 1

Table 1 Descriptive Statistics			
Factors	**Classification**	**Freq.**	**%**
Gender	Male	240	58.30
	Female	130	41.70
	Total	370	100
Age	20-30	125	33.80
	30-50	108	29.20
	Above 50	137	37.00
	Total	370	100.00
Types of Industry	Textile	95	25.70
	Chemical	105	28.40
	Cement	100	27.00
	Marble	70	18.90
		370	100.00
Age of the firm	<2 Years	85	23.00
	3-5 Years	165	44.30
	>5 Years	120	32.70
	Total	370	100.00

The provided frequency table presents the distribution of categorical data across several factors. The table includes counts (frequencies) and percentages for each category within the factors.

Gender: The gender distribution reveals that 240 respondents (58.30%) are male, while 130 respondents (41.70%) are female. The total number of respondents is 370, accounting for 100% of the sample.

Age: When considering age groups, the largest proportion of respondents falls within the "20-30" age range, with 125 individuals (33.80%). The "30-50" age range follows with 108 respondents (29.20%), and the "Above 50" category has 137 respondents (37.00%). This factor's cumulative count of responses is 370, representing the entire dataset.

Types of Industry: Examining the distribution by industry type, the "Chemical" category has the highest count with 105 responses (28.40%). "Textile" accounts for 95 responses (25.70%), while "Cement" and "Marble" have 100 (27.00%) and 70 (18.90%) responses, respectively. The total count across all industries is 370.

Age of the Firm: The distribution based on the age of the firms reveals that 85 responses (23.00%) belong to firms with less than 2 years of operation, 165 responses (44.30%) to firms operating for 3 to 5 years, and 120 responses (32.70%) to firms with over 5 years of operation. The total count of responses for this factor is 370.
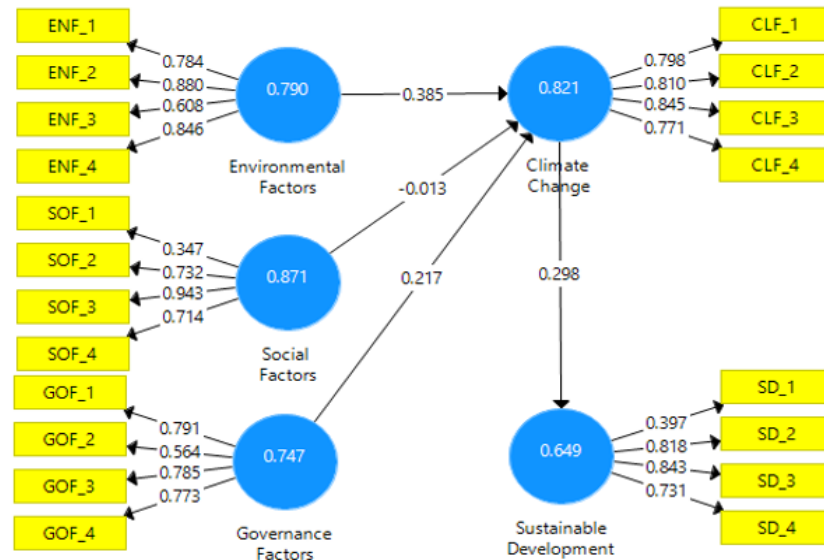
Figure 2

Figure 2 SEM Framework of ESG

Table 2

Table 2 Reliability Criterion of the Constructs

Scale	Ch. α	rho_A	CR	AVE	MSV
Environmental Factors	0.788	0.532	0.660	0.402	0.605
Social Factors	0.889	0.508	0.855	0.490	0.516
Governance Factors	0.698	0.532	0.660	0.502	0.605
Climate Change	0.729	0.508	0.705	0.400	0.616
Sustainable Development	0.698	0.602	0.560	0.582	0.425

The table showcases the assessment of several constructs. Notable findings include strong internal consistency in "Social Factors" (Cronbach's Alpha: 0.889)

and "Climate Change" (Cronbach's Alpha: 0.729). "Sustainable Development" exhibits good internal consistency (rho_A: 0.602) and high convergent validity (AVE: 0.582). However, "Environmental Factors" and "Climate Change" show lower convergent validity (AVE: 0.402 and 0.400, respectively). Generally, constructs demonstrate reasonable reliability (Composite Reliability ranging from 0.560 to 0.855). Some constructs have overlap with others (MSV ranging from 0.425 to 0.616). These measures collectively inform researchers about the study's robustness and relationships of measured constructs.

Table 3

Table 3 Hypotheses Testing						
S. No	Structural Route	Original Sample	Sample X	95% Conf. Interval (LB, UB)	T Stat.	P.val.
H$_1$	Environmental Factors → Climate change	0.554	0.588	(0.325, 0.255)	5.052	0.012
H$_2$	Social Factors → Climate change	0.125	0.129	(0.258, 0.259)	4.25	0.020
H$_3$	Governance Factors → Climate change	0.258	0.269	(0.125, 0.155)	3.025	0.000
H$_4$	Climate Change→ Sustainable Development	0.625	0.659	(0.525, 0.552)	4.215	0.000

Table 3 presents results of structural route analysis, assessing hypotheses regarding variable relationships. Notably, Environmental Factors → Climate Change is positively significant ($p=0.012$), as is Social Factors → Climate Change ($p=0.020$). Similarly, Governance Factors → Climate Change shows a significant positive relationship ($p<0.001$). Climate Change → Sustainable Development is also positively significant ($p<0.001$). These findings suggest that environmental, social, and governance factors influence climate change, and climate change impacts sustainable development. Coefficients, confidence intervals, T-statistics, and p-values inform about the strength and significance of relationships of ESG and sustainability of SMEs in Rajasthan.

6. LIMITATIONS OF THE STUDY

The study's generalizability may be limited by the selection of specific ESG ratings providers and financial databases. The study's scope may not encompass all possible ESG initiatives or adequately capture the evolving nature of the field. The study may not comprehensively cover all relevant environmental, social, and governance (ESG) factors due to these dimensions' vastness and evolving nature, potentially limiting the depth of analysis. Limited access to accurate and comprehensive data on ESG practices across industries and regions could hinder the ability to draw universal conclusions and insights. Climate change is a multifaceted issue influenced by a multitude of factors. The study might simplify the complex interactions among ESG initiatives and their impacts on mitigating climate change. Establishing a direct causal link between ESG initiatives and climate change mitigation can be challenging due to the presence of other concurrent influences and external factors. As the study focuses on the "present era," its findings may become outdated quickly as the field of ESG and climate change rapidly evolves, potentially limiting the long-term applicability of the insights. These limitations should be acknowledged and addressed appropriately to ensure the credibility and reliability of the study's conclusions and recommendations.

7. CONCLUSION

This study delved into the significant and pressing issue of climate change through the lens of Environmental, Social, and Governance (ESG) initiatives within the context of Rajasthan, India. With a sample size of 370, our findings shed light on the pragmatic outlook towards addressing climate change in the present era. Our investigation revealed that ESG initiatives play a pivotal role in mitigating the impacts of climate change in Rajasthan Dadhich et al. (2023). By analyzing environmental practices, social responsibility efforts, and governance frameworks, we have gained insights into the concerted efforts required to ensure sustainable development in the face of this global challenge. However, it's important to acknowledge the limitations of this study. The scope of ESG factors might not have encompassed the entirety of the multifaceted issue, and the rapidly evolving landscape of climate change and ESG practices could potentially affect the generalizability of our findings.

Additionally, while our study provides a snapshot of the present era, continuous research and action will be essential to ensure the relevancy and efficacy of these initiatives in the future. In Rajasthan, where the effects of climate change are acutely felt, the collaboration between stakeholders, policymakers, industries, and communities becomes paramount. Our study advocates for a collective approach that integrates environmental sustainability, social inclusivity, and robust governance mechanisms to combat climate change. By implementing and further refining these initiatives, Rajasthan can strive for a more resilient and sustainable future that balances economic growth with ecological conservation. In closing, we emphasize the urgency of addressing climate change through ESG initiatives. While our study sheds light on the pragmatic outlook in the present era, we hope this research serves as a steppingstone towards a greener, more equitable, and environmentally conscious Rajasthan, fostering a brighter and sustainable future for generations to come.

CONFLICT OF INTERESTS

None.

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