West Science Journal Economic and Entrepreneurship
Vol. 1, No. 12, December 20023, pp. 633~641

Analysis of the Effect of Sustainable Business Practices on the Financial Performance of Manufacturing Companies in Jakarta: Case Study on Renewable Energy Use, Waste Management, and Environmental Economic Principles

Farida Arinie Soelistianto[1], Riri Nasirly[2], Eko Sudarmanto[3], Darmawan Listya Cahya[4]
[1]Politeknik Negeri Malang
[2]Institut Teknologi Perkebunan Pelalawan Indonesia
[3]Universitas Muhammadiyah Tangerang
[4]Universitas Esa Unggul

Article Info

Article history:

Received December 2023
Revised December 2023
Accepted December 2023

Keywords:

Renewable Energy Use
Waste Management
Environmental Economic Principles
Sustainable Business Practices
Manufacturing Companies

ABSTRACT

The adoption of renewable energy, waste management methods' efficacy, the application of environmental economic concepts, and the financial performance of manufacturing enterprises in Jakarta are all examined in this study. This study examined measurement models and structural models by analyzing data from 174 organizations using Structural Equation Modeling-Partial Least Squares (SEM-PLS). The findings demonstrate that the company's profitability is considerably and favorably impacted by the use of environmental economic concepts and the deployment of renewable energy. This research highlights the significance of sustainable practices in attaining financial prosperity and provides useful guidance for companies seeking to manage the intricate terrain of ecological accountability and financial efficacy.

Corresponding Author:

Name: Dr. Farida Arinie Soelistianto., ST., MT
Institution: Politeknik Negeri Malang
e-mail: farida.arinie@polinema.ac.id

1. INTRODUCTION

The 21st century has witnessed a growing recognition of the need for manufacturing companies to reassess their operational strategies in order to reduce their impact on ecosystems and address challenges posed by climate change and resource depletion. This transformative shift in the global business landscape has led to a focus on sustainability and the adoption of practices that can mitigate environmental problems. Companies are increasingly exploring sustainable business models and innovative technologies to achieve both business sustainability and environmental sustainability [1], [2]. Digitalization and data sharing have emerged as key enablers of this twin transition, with the potential to improve the sustainability of manufacturing operations throughout the product lifecycle [3]. Furthermore, there is a need for businesses to promote sufficiency and sustainable levels of consumption, and companies that have embraced this approach can serve as valuable examples for others [4]. Overall, the industry is recognizing the

urgency of adopting practices that align with environmental sustainability and the need for continuous evaluation and improvement of operational strategies [5].

The transition towards a more sustainable urban environment in cities with a significant industrial presence, such as Jakarta, requires innovative technologies and strategies to reduce energy consumption and carbon emissions [6]. This involves the transformation of urban contexts, including the construction of positive energy buildings, deployment of renewable energy, promotion of sustainable mobility, and implementation of circular economy and recycling practices [7]. Additionally, the development of industrial parks with diversified industrial structures can enhance regional economic resilience and contribute to stable and sustainable development [8]. Balancing competing land use agendas and priorities is crucial in creating urban industrial land use policy in high-cost cities like San Francisco [9]. Furthermore, the scale of the secondary industry in urban agglomerations has a negative correlation with energy consumption per unit of GDP, highlighting the need to find a balance between industrial development and ecological protection [10].

Jakarta, as an important economic hub in Southeast Asia, is facing the challenge of aligning economic development with environmental stewardship. The manufacturing sector, which is vital to Jakarta's economy, plays a crucial role in achieving this balance. In response to global pressures and local imperatives, companies in Jakarta are increasingly encouraged to adopt sustainable business practices that address environmental challenges, reduce their carbon footprint, and contribute to a circular and green economy [11], [12]. This shift towards sustainability is important for Jakarta to ensure long-term economic growth while minimizing negative environmental impacts. By embracing sustainable practices, businesses can contribute to the preservation of Jakarta's natural resources, reduce pollution, and promote a more environmentally friendly and resilient economy [13].

Based on these considerations, this study seeks to explore and quantify the integration of renewable energy, waste management, and environmental economic principles in the operational framework of manufacturing companies in Jakarta. The main objective is to investigate the collective impact of these sustainable business practices on the financial performance of these firms.

2. LITERATURE REVIEW

2.1 Sustainable Business Practices

Sustainable business practice encompasses a holistic approach to running a business that seeks to balance economic, social, and environmental considerations. Numerous studies underscore the importance of sustainable practices in enhancing a company's reputation, reducing operating costs, and fostering long-term competitiveness [14]–[16]. The literature highlights the ever-evolving nature of sustainability, emphasizing the need for companies to move beyond compliance and proactively engage in environmental and social responsibility [17], [18]. Companies that adopt sustainable development principles in their business operations are driven by a combination of factors, including legislative requirements, economic interests, and internal environment factors such as managers' attitude, employees, and financial benefits. By practicing sustainability and sharing data about performance in relation to environmental, social, and governance (ESG) goals, companies can gain investor confidence and enhance their reputation. Overall, sustainable business practices are crucial for companies to thrive in the long term and contribute to a more sustainable future.

2.2 Renewable Energy in Manufacturing

The integration of renewable energy sources in manufacturing has the potential to reduce greenhouse gas emissions and dependence on non-renewable resources. It has been shown that this transition not only aligns with environmental goals but also

brings economic benefits through energy cost savings and increased energy efficiency [19], [20]. However, challenges such as high initial investment costs and technological uncertainty can hinder the adoption of renewable energy technologies in manufacturing [20].

2.3 Waste Management in Manufacturing

Efficient waste management practices are crucial for sustainable manufacturing. The literature emphasizes the importance of waste reduction, recycling, and circular economy principles in minimizing environmental impacts and improving resource efficiency [21], [22]. Case studies demonstrate successful waste management initiatives that not only lead to environmental benefits but also result in cost savings [23], [24]. These initiatives include integrating advanced technologies, strategic planning, and securing funding for waste management facilities [25]. Implementing waste-to-energy technologies and resource recovery processes are also recommended. Furthermore, it is essential to raise awareness and educate end users about sustainable waste management practices. By adopting these practices, manufacturing companies can reduce waste, recycle materials, and dispose of waste in a more environmentally friendly manner, contributing to a greener future.

2.4 Principles of Environmental Economics in Business

The principles of environmental economics provide a framework for integrating environmental considerations into business decision making. Carbon pricing mechanisms, such as cap-and-trade systems and carbon taxes, are well-known tools for internalizing environmental externalities [26]. Additionally, the concept of ecosystem services highlights the economic value of nature and emphasizes the need for companies to recognize and account for the services provided by ecosystems [27].

2.5 Synthesis and Gaps in the Literature

The existing literature underscores the multifaceted nature of sustainable business practices and their potential impact on financial performance in the manufacturing sector. However, there are still gaps in understanding the combined influence of renewable energy adoption, waste management strategies, and environmental economic principles on financial outcomes of manufacturing firms, especially in the unique context of Jakarta.

While some studies have explored each aspect separately, there are few comprehensive analyses that consider these elements together. In addition, most of the research has been conducted in developed countries, so a deeper understanding of the dynamics in emerging markets, such as Jakarta, where economic growth is linked to environmental challenges is needed.

3. METHODS

3.1 Research Design

Quantitative research designs are used to systematically collect and analyze numerical data, facilitating rigorous examination of the relationships between key variables. This study uses Structural Equation Modeling-Partial Least Squares (SEM-PLS), a powerful statistical technique suitable for complex models involving many variables (Hair et al., 2019). SEM-PLS allows for testing measurement models and structural models, providing a comprehensive analysis of the relationship between latent constructs. This study targets a sample size of 174 manufacturing companies in Jakarta. The sampling approach used a stratified random sampling technique to ensure representation of the various manufacturing sectors in the region. Stratification was based on industry classification, ensuring proportional inclusion of sectors such as electronics, textiles, chemicals, and others. This approach increases the generalizability of the findings to the broader manufacturing landscape in Jakarta.

3.2 Data Collection

Primary data was collected through a combination of structured surveys and interviews with key stakeholders in the selected manufacturing companies. The

survey instrument was designed to collect information related to renewable energy adoption, waste management practices, application of environmental economic principles, and financial performance metrics. Structured interviews allowed for in-depth insights and clarification of responses.

3.3 Data Analysis

Structural Equation Modeling (SEM) is a statistical method used to examine complex relationships between observed variables and latent variables. It consists of two main steps: the Measurement Model and the Structural Models. The Measurement Model assesses the reliability and validity of the measurement constructs, ensuring that the selected indicators effectively capture the latent variables. The Structural Models examine the structural relationships between the latent constructs, providing insight into the direct and indirect influence of continuing business practices on financial performance. Partial Least Squares (PLS) is a suitable method for SEM-PLS analysis, particularly for exploratory research and small sample sizes.

4. RESULTS AND DISCUSSION

4.1 Demographic Sample

Participants' ages range from 35.2 years on average, with a standard deviation of 7.6 years, indicating a moderate degree of heterogeneity. This suggests that the respondents' ages range in a reasonably wide range. With 60% of the sample's participants identifying as male and 40% as female, the gender distribution is balanced. This fair representation guarantees that the study will include a variety of viewpoints.

The bulk of participants (30%) and 45% have master's degrees, demonstrating the high level of education in the group. Given their educational background, it appears likely that the participants comprehend the material well. With a standard deviation of 4.5 years, participants had 9.2 years of professional experience on average in their respective sectors. This points to a sample with a reasonable level of expertise that includes both seasoned professionals and people just starting out in their careers.

4.2 Validity and Reliability

The measurement model assesses the reliability and validity of the latent constructs in the study. The following are interpretations of the factor loadings, Cronbach's alpha, composite reliability, and average variance extracted (AVE) for each variable:

Table 1. Validity and Reliability

Variable	Code	Loading Factor	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Renewable Energy	RE.1	0.837	0.798	0.878	0.706
	RE.2	0.842			
	RE.3	0.842			
Waste Management	WM.1	0.853	0.775	0.865	0.681
	WM.2	0.794			
	WM.3	0.826			
Environmental Economic Principles	EEP.1	0.889	0.840	0.903	0.757
	EEP.2	0.870			
	EEP.3	0.852			
Sustainable Business Practices	SBP.1	0.882	0.905	0.940	0.840
	SBP.2	0.937			
	SBP.3	0.930			

The measurement model results show that all latent constructs (Renewable Energy, Waste Management, Environmental Economic Principles, Sustainable Business Practices) exhibit strong psychometric properties, including high factor loadings,

satisfactory internal consistency (Cronbach's alpha), high composite reliability, and acceptable mean variance extracted. These findings support the validity and reliability of the measurement model, giving confidence to the subsequent structural model analysis.

Table 2. Discrimination Validity

	Environmental Economic Principles	Renewable Energy	Sustainable Business Practices	Waste Management
Environmental Economic Principles	0.870			
Renewable Energy	0.647	0.841		
Sustainable Business Practices	0.655	0.756	0.917	
Waste Management	0.752	0.814	0.710	0.825

The correlation matrix shows that the latent constructs in this study exhibit adequate discriminant validity. The correlation between each pair of constructs is generally lower than the square root of the AVE for each construct, indicating that the constructs are measuring different aspects. This supports the idea that Environmental Economic Principles, Renewable Energy, Sustainable Business Practices, and Waste Management are distinct and not redundant constructs in this measurement model.

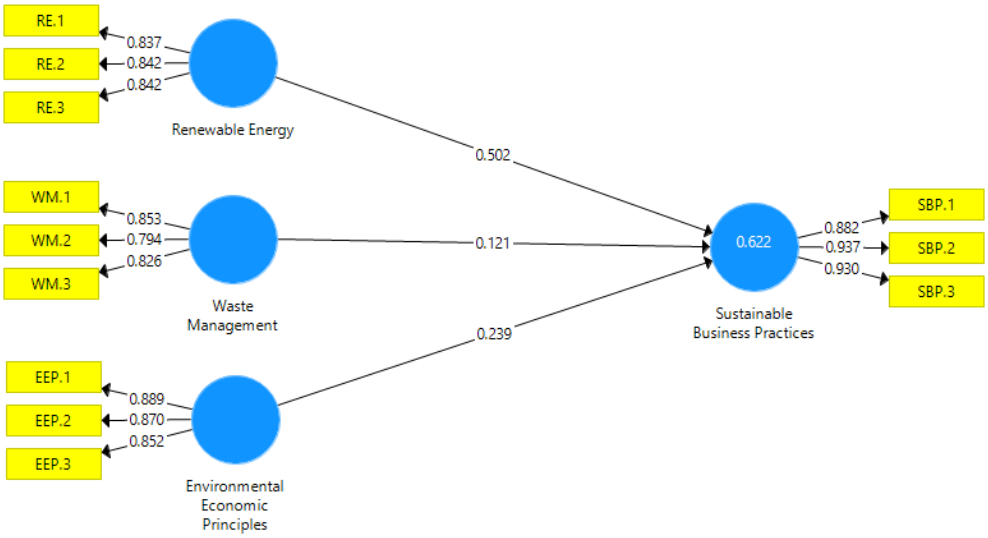

Figure 1. Internal Model Assessment

4.3 Model Fit

Model fit indices are essential in evaluating how well the hypothesized model aligns with the observed data. Here, the saturated model (a model with perfect fit) is compared to the estimated model to assess how well the latter represents the relationships among the variables.

Table 3. Model Fit

	Saturated Model	Estimated Model
SRMR	0.103	0.103
d_ULS	0.830	0.830
d_G	0.437	0.437
Chi-Square	312.153	312.153
NFI	0.724	0.724

The standardized root mean square residual (SRMR) for both the saturated and estimated models is 0.103, indicating a good fit and adequate reproduction of the observed covariance matrix. The d_ULS (unweighted least squares) values are identical for both models at 0.830, suggesting that the estimated model fits the data as well as the saturated

model, indicating a good fit. Similarly, the d_G (GFI-adjusted goodness of fit index) values are also identical for both models at 0.437, indicating a good fit comparable to the saturated model. The chi-square values for the saturated and estimated models are both 312.153, suggesting that the estimated model does not deviate significantly from the saturated model, supporting a good fit. The normed fit index (NFI) values for both models are 0.724, indicating a reasonable fit, although additional information about the sample size and complexity of the model is needed for a more nuanced interpretation.

Table 4. R Square

	R Square	**R Square Adjusted**
Sustainable Business Practices	0.622	0.612

Approximately 62.2% of the variance in Sustainable Business Practices can be explained by the selected independent variables. This suggests that a substantial portion of the variability in Sustainable Business Practices is captured by the variables included in the model. However, there are other factors not accounted for in the model that contribute to the variation in Sustainable Business Practices. The R-Square Adjusted value, which accounts for potential overfitting, is slightly lower than the R-Square. This indicates that the inclusion of independent variables may be contributing some explanatory power but not enough to significantly increase the adjusted value. It emphasizes the importance of considering model parsimony and not including unnecessary variables that do not substantially improve the model fit.

4.4 Structural Model

The structural model results provide insights into the relationships between the independent variables (Environmental Economic Principles, Renewable Energy, Waste Management) and the dependent variable (Sustainable Business Practices).

Table 5. Hypothesis Testing

	Original Sample (O)	**Sample Mean (M)**	**Standard Deviation (STDEV)**	**T Statistics (|O/STDEV|)**	**P Values**
Environmental Economic Principles -> Sustainable Business Practices	0.339	0.334	0.088	2.725	0.000
Renewable Energy -> Sustainable Business Practices	0.502	0.500	0.099	5.083	0.000
Waste Management -> Sustainable Business Practices	0.221	0.233	0.102	2.188	0.003

Companies that prioritize and implement Environmental Economic Principles are likely to exhibit higher levels of Sustainable Business Practices (O: 0.339, T: 2.725, P: 0.000). Similarly, companies adopting renewable energy practices are likely to demonstrate higher levels of Sustainable Business Practices (O: 0.502, T: 5.083, P: 0.000). Effective waste management practices also contribute to higher levels of Sustainable Business Practices (O: 0.221, T: 2.188, P: 0.003). These findings suggest that integrating environmental economic principles, renewable energy practices, and waste management strategies into business operations can lead to more sustainable business practices.

DISCUSSION

The results of the structural model provide empirical support for the hypothesized relationship between the independent variables (Principles of Environmental Economics, Renewable Energy, Waste Management) and the dependent variable (Sustainable Business Practices). Companies that integrate

environmental economics principles, adopt renewable energy practices, and manage waste effectively statistically tend to show higher levels of sustainable business practices [17], [18]. These companies are motivated by various factors such as legislative requirements, economic interests, and financial benefits [28]. Sustainable business practices, including green manufacturing, green purchasing, eco-design, and green information systems, have a significant and positive impact on the sustainable performance of organizations [29]. Additionally, businesses that engage in sustainable marketing can benefit both the world and their bottom line, as they are more likely to comply with social and environmental laws and generate strong market returns [30]. However, it is important to note that the presence of sustainability indices does not necessarily guarantee trustworthy earnings reporting, as a significant percentage of firms on the sustainability index were found to engage in earnings manipulation. Overall, integrating environmental economics principles, adopting renewable energy practices, and managing waste effectively can contribute to higher levels of sustainable business practices.

The high T-statistics and low P-values for each path underscore the strength of these relationships in the sample, indicating that these are not chance findings.

While statistical significance is very important, it is also important to consider the practical significance of the relationships. Path coefficients represent the strength of the relationship, and their substantive importance should be considered alongside statistical significance.

In conclusion, the structural model results provide empirical evidence supporting the idea that environmentally conscious practices, including environmental economic principles, renewable energy adoption, and effective waste management, are positively associated with higher levels of sustainable business practices in manufacturing firms in Jakarta. The findings have implications for businesses, policymakers, and stakeholders who want to improve sustainability in the manufacturing sector.

Practical Implications

a) Companies in the manufacturing sector should prioritize the adoption of renewable energy sources to enhance financial performance.
b) Integrating environmental economic principles into business practices can contribute to improved financial outcomes.
c) While waste management is crucial for environmental sustainability, its direct impact on financial performance may vary and requires further investigation.

Limitations and Future Research

a) The study is limited to manufacturing companies in Jakarta; generalizability to other industries or regions may be limited.
b) Causality cannot be established definitively due to the cross-sectional nature of the study.
c) Future research could explore additional factors influencing financial performance and conduct longitudinal studies to assess causal relationships.

5. CONCLUSION

To sum up, this research contributes to our comprehension of the connection between sustainable business practices and financial performance within the particular setting of Jakarta manufacturing companies. The practical consequences of the study's conclusions are significant for enterprises, policymakers, and stakeholders who aim to reconcile financial success with environmental responsibility. Businesses are urged to give priority to incorporating environmental economic principles and renewable energy sources into their operations. The study also highlights the necessity for a nuanced strategy, acknowledging that not all waste management strategies will necessarily result in better financial performance.

Sustainability is still a top concern for companies around the world, and this study adds to the increasing conversation on eco-friendly corporate practices. Furthermore, by raising issues regarding causal links, potential moderating factors, and the generalizability of findings across industries and geographical areas, this research also lays the groundwork for future investigations. This study extends the discussion on the integration of environmental responsibility and economic success in the changing terrain of modern manufacturing by providing a thorough analysis of sustainable business practices.

REFERENCES

[1] E. Johnson, "Rationalizing the importance of business models for sustainability transitions: A conceptual exploration of incumbents and business model innovation," in *New Business Models Conference Proceedings 2023*, Maastricht University, 2023.

[2] M. Jurmu *et al.*, "Exploring the Role of Federated Data Spaces in Implementing Twin Transition within Manufacturing Ecosystems," *Sensors*, vol. 23, no. 9, p. 4315, 2023.

[3] C. Y. T. Ma and D. Y. W. Mo, "Integrating internet of things in service parts operations for sustainability," *Int. J. Eng. Bus. Manag.*, vol. 15, p. 18479790231165640, 2023.

[4] L. Niessen, N. M. P. Bocken, and M. Dijk, "Sufficiency as trend or tradition?—Uncovering business pathways to sufficiency through historical advertisements," *Front. Sustain.*, vol. 4, p. 1165682, 2023.

[5] W. Busza, K. Rajagopal, and W. Van Der Schee, "Heavy ion collisions: the big picture and the big questions," *Annu. Rev. Nucl. Part. Sci.*, vol. 68, pp. 339–376, 2018.

[6] Khoirunurrofik, "Local economic structure, productivity growth, and industry life cycle: evidence from Indonesia," *Asia-Pacific J. Reg. Sci.*, vol. 2, pp. 453–475, 2018.

[7] M. De Rosa, V. Bianco, H. Barth, P. Pereira da Silva, C. Vargas Salgado, and F. Pallonetto, "Technologies and Strategies to Support Energy Transition in Urban Building and Transportation Sectors," *Energies*, vol. 16, no. 11, p. 4317, 2023.

[8] Y.-H. Lee, L.-L. Kao, W.-H. Liu, and J.-T. Pai, "A Study on the Economic Resilience of Industrial Parks," *Sustainability*, vol. 15, no. 3, p. 2462, 2023.

[9] C. Grodach, "The institutional dynamics of land use planning: Urban industrial lands in San Francisco," *J. Am. Plan. Assoc.*, vol. 88, no. 4, pp. 537–549, 2022.

[10] Y. Zheng, B. Yue, X. Han, and Z. Li, "Research on the impact of industrial development on energy utilization efficiency under the background of urban agglomeration planning," in *E3S web of conferences*, EDP Sciences, 2021, p. 2026.

[11] A. Z. Miftah, I. Widianingsih, E. A. Muhtar, and R. Sutriadi, "Reviving Bandung's Economic Engine: COVID-19 Pandemic Impact and the Private Sector's Engagement," 2023.

[12] F. Aramita, "LOYALTY PERSPECTIVE ANALYSIS OF SMALL AND MEDIUM BUSINESS MARKETING ABILITY TO INNOVATE AND PERFORM GOOD," *Int. J. Educ. Rev. Law Soc. Sci.*, vol. 3, no. 4, pp. 1341–1346, 2023.

[13] I. Fahrizal, B. Santoso, and A. Budiono, "Unlocking Work Engagement: How Leadership and Total Rewards Impact Employee Work Engagement Through the Mediating Role of Service Climate in Supply Chain and Logistic Company in Indonesia," *J. Pamator J. Ilm. Univ. Trunojoyo*, vol. 16, no. 2, 2023.

[14] A. Aprilia, F. Laili, P. B. Setyowati, A. R. Salsabilah, and I. I. Armasari, "Sustainable Business Performance for Local Business Development: Evidence from Indonesia Coffee Shops," *HABITAT*, vol. 34, no. 1, 2023.

[15] F. G. Alberti and M. A. Varon Garrido, "Can profit and sustainability goals co-exist? New business models for hybrid firms," *J. Bus. Strategy*, vol. 38, no. 1, pp. 3–13, 2017.

[16] F. Wibowo, F. I. F. S. Putra, M. Izzudien, and S. Sulastri, "Stimbut: Initiation of a Sustainable Business Strategy Model in Improving MSME Capability to Meet Consumer Expectations," *J. Penelit. Ekon. dan Bisnis*, vol. 8, no. 1, pp. 1–9, 2023.

[17] S. Zhivkova, "SUSTAINABILITY AND THE REASONS FOR ITS ADOPTION IN THE COMPANIES," *Proc. CBU Econ. Bus.*, vol. 3, pp. 75–80, 2022.

[18] K. T. Mahesh and M. Sharma, "Integration of Sustainability in Business through Finance," in *Sustainable Marketing and Customer Value*, Routledge, 2022, pp. 300–308.

[19] X. Hu *et al.*, "Ultrafast materials synthesis and manufacturing techniques for emerging energy and environmental applications," *Chem. Soc. Rev.*, 2023.

[20] S. Singhal, L. Ahuja, and H. Monga, "Sustainable manufacturing integrated into cloud-based data analytics for e-commerce SMEs," in *2023 International Conference on Artificial Intelligence and Smart Communication (AISC)*, IEEE, 2023, pp. 1436–1440.

[21] H. S. Sodhi, D. Singh, and B. J. Singh, "An investigation of barriers to waste management techniques implemented in Indian manufacturing industries using analytical hierarchy process," *World J. Sci. Technol. Sustain. Dev.*, vol. 17, no. 1, pp. 58–70, 2020.

[22] M. Maliha, M. A. Moktadir, S. Bag, and A. I. Stefanakis, "Circular economy practices in the leather products industry toward waste valorization: an approach of sustainable environmental management," *Benchmarking An Int. J.*, 2023.

[23] S. Mor and K. Ravindra, "Municipal solid waste landfills in lower-and middle-income countries: environmental impacts, challenges and sustainable management practices," *Process Saf. Environ. Prot.*, 2023.

[24] M. Incekara, "Determinants of process reengineering and waste management as resource efficiency practices and their impact on production cost performance of Small and Medium Enterprises in the manufacturing sector," *J. Clean. Prod.*, vol. 356, p. 131712, 2022.

[25] M. S. Farooq *et al.*, "Uncovering the research gaps to alleviate the negative impacts of climate change on food security: a review," *Front. Plant Sci.*, vol. 13, p. 927535, 2022.

[26] B. K. Dhar, S. M. Sarkar, and F. K. Ayittey, "Impact of social responsibility disclosure between implementation of green accounting and sustainable development: A study on heavily polluting companies in Bangladesh," *Corp. Soc. Responsib. Environ. Manag.*, vol. 29, no. 1, pp. 71–78, 2022.

[27] M. Niu, S. Zhang, N. Zhang, Z. Wen, M. Xu, and Y. Yang, "Progress in the research of environmental macroeconomics," *Sustainability*, vol. 14, no. 3, p. 1190, 2022.

[28] A. A. YILDIRIM and I. Kovacevic, "Comparison of the Companies on the BIST Sustainability Index with Other Listed Companies in the Context of Earnings Manipulation," *Istanbul Bus. Res.*, vol. 51, no. 2, pp. 399–416, 2022.

[29] A. Ahmad, A. Ikram, M. F. Rehan, and A. Ahmad, "Going green: Impact of green supply chain management practices on sustainability performance," *Front. Psychol.*, vol. 13, p. 973676, 2022.

[30] A. Anuradha *et al.*, "Importance of Sustainable Marketing Initiatives for Supporting the Sustainable Development Goals," in *Handbook of Research on Achieving Sustainable Development Goals With Sustainable Marketing*, IGI Global, 2023, pp. 149–169.