

“Green decisions: The role of environmental strategies and proactivity in India’s manufacturing micro enterprises”

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GREEN DECISIONS: THE ROLE OF ENVIRONMENTAL STRATEGIES AND PROACTIVITY IN INDIA'S MANUFACTURING MICRO ENTERPRISES

Abstract

This study investigates the implication of environmental strategies and environmental management accounting (EMA) on the environmental performance of manufacturing micro companies in India. It also assesses the mediating influence of EMA and the moderating impact of environmental proactivity. This paper employs the natural resource-based view theory to evaluate the domination of environmental strategies and EMA on environmental effectiveness. Even though MSMEs play a significant role in the Indian economy, their environmental impact is considerable due to less stringent adherence to environmental standards and practices. The data were gathered via a survey administered to managers of MSMEs. In the analysis, 107 reliable responses were included. Partial least square structural equation modeling is employed for the analysis of the dataset. The results show that environmental strategies positively influence environmental performance and EMA. EMA operates as a mediator for environmental strategies and environmental outcomes. Moreover, environmental proactivity moderates the association between environmental strategies and environmental performance. Hypotheses testing results conclude that manufacturing micro companies that emphasize environmental strategies and factors have improved environmental performance. Companies that proactively deal with environmental issues develop strategies to achieve sustainability.

Keywords

environmental proactivity, environmental strategies,
environmental management accounting, environmental
performance, manufacturing micro companies

JEL Classification

Q01, Q56, M14, L25

INTRODUCTION

The industrial sector plays a vital role in the national economic and social progress. Micro, small, and medium-sized enterprises (MSMEs) acquire the major part of the Indian manufacturing industry (Veena, 2020). Despite that, the manufacturing industry contributes to environmental degradation through the emission of pollutants (D'Souza & Peretiakko, 2002; Sengupta et al., 2019). The critical need to achieve sustainability in the manufacturing industry is increasing, thereby minimizing environmental impacts and ensuring economic viability (Shankar et al., 2017).

The RBV (resource-based view) theory affirms integrating sustainability in business activities and environmental strategy, and environmental management accounting (EMA) plays a crucial role (Amir & Chaudhry, 2019; Bresciani et al., 2023). According to this theory, companies with unique resources and capabilities gain a distinctive edge in the market (Riva et al., 2021). As such, environmental strategy refers to the creation and execution of policies and procedures that

reduce environmental damage and the use of environmental resources as competitive strategic assets (Christine et al., 2019). Nevertheless, environmental management accounting involves tracking and analyzing environmental costs and efficiency. Primarily, an organization performs management accounting to find costs and the efficiency benefits of superior environmental management (van der Poll, 2022). Notably, researchers and managers increasingly agree that adopting these practices is vital to improving environmental performance. This term implies an organization's attainment of its environmental goals and regulations (Le et al., 2019). To the extreme, good processes and strategies enhance market positioning for organizations. Thus, organizations can enhance their market positioning and attain better resource use and environmental sustainability by adopting good management accounting and proactive environmental strategy (Ali et al., 2023).

Since MSMEs make a huge contribution to the economy of India, and given the potential environmental impact, it is vital to have profound research dedicated to how micro businesses can adeptly implement certain environmental strategies and management practices to achieve improved environmental performance. Additionally, no research supports the idea that environmental proactivity moderates the association between environmental strategy and performance (Appannan et al., 2023).

1. LITERATURE REVIEW AND HYPOTHESES

The resource-based view (RBV) is a management paradigm that most companies use to analyze and improve resources to secure a competitive edge. The RBV classifies resources into organizational, physical, and human (Appannan et al., 2023). One of the disadvantages of the RBV theory is that it does not consider the ecological system (Hart, 1995). Therefore, the natural resource-based view (NRBV) compensates for the RBV theory's shortcomings (Hart, 1995; Klassen & McLaughlin, 1996; Russo & Fouts, 1997). According to Klassen and McLaughlin (1996), environmental performance depends on the environmental strategy.

NRBV involves considerations of sustainable development. It evaluates a company's success not just in regard to its financial performance but also in terms of its environmental performance (Solovida & Latan, 2021). NRBV and its three related strategies are an effective method of comprehension of the environmental obstacles that companies face when it comes to their environmental strategy (Appannan et al., 2023). It is divided into three related strategies: pollution abatement focused on reducing residues, discharges, and outflows to improve effectiveness and reduce costs; product stewardship focused on reducing overall product price across the value chain and broadening the impact of pollution prevention; the third strategy described in NRBV is clean technology,

which is a subset of sustainable development (Hart & Dowell, 2011). NRBV may direct corporate environmental strategy toward embracing EMA, thereby impacting environmental performance.

Environmental strategy is defined as a suite of actions taken within a company to decrease the environmental effects of its goods, procedures, and company policies (Gunarathne et al., 2021; Ormazabal et al., 2017). Therefore, it presents a set of tactics devised to integrate commercial activities with the surrounding environment. Appannan et al. (2023) and Graham and Potter (2015) evaluated environmental strategy by analyzing pollution prevention and process stewardship. Their results show a strong connection between these strategies and environmental and economic performance. Liu and Zhang (2022) explained the term and systematically tested the association between green personnel administration, environmental legitimacy, and environmental performance. Gunarathne et al. (2021) also researched the relationship between commercial activities and firm performance. Nevertheless, limited focus has been placed on how the implementation of environmental activities affects business performance in India.

The implementation of an environmental strategy can cause considerable effectiveness of EMA practices in companies (Kong et al., 2022). When proactive environmental policies, such as cleaner production or setting up aggressive environmental

goals, are chosen, a more advanced EMA system might have to be put in place to track and evaluate environmental performance (van der Poll, 2022). Similarly, the integration of environmental problems with the corporate planning system can result in the creation of EMA tools, thus improving the organization's capability of successfully managing its environmental footprint (Appannan et al., 2023).

EMA seems to be a convenient basis for profound sustainability, high-end financial results, and their universal applicability and possibility to be put into practice (Appannan et al., 2023). EMA refers to identifying, collecting, and examining two classes of data (physical and monetary) to aid with internal decision-making (IFAC, 2005). In addition, EMA is also a modern decision accounting tool that signifies the wide range of well-established methods and practices seeking to improve the efficiency of ecological stewardship (Ferreira et al., 2010).

EMA is necessary to understand how ecological and financial success in businesses are connected. Explicitly, EMA implementation makes its decisions more accurate and gives efficient results. It also improves the environmental performance of an organization (Chaudhry & Amir, 2020; Le et al., 2019; Zandi & Lee, 2019). The EMA adoption aids in integrating environmental concerns in financial management and supporting the decision-making process of internal business factors that ensures better environmental and financial results (Phan et al., 2018). Institutional pressures are the major factor affecting the efficiency of EMA implementation (Elhossade et al., 2021; Wang et al., 2019); specifically, stakeholders and regulatory changes affect environmental strategies of companies. EMA is the significant mediator between environmental strategy and environmental performance (Solovida & Latan, 2017). The understanding of these correlations is necessary for efficient environmental management (Christine et al., 2019). EMA is a comprehensive framework of concepts and methods for developing and managing environmental policies (Christ & Burrirt, 2013). The explanation of the nature of EMA as the mediator in the paper is provided in the context of revealing the role that the latter performs. Modern EMA activities in low-developed nations are compounded by weak or absent means of regulation. The present study relies largely on the aforementioned relationships to be described to alleviate the situation.

As stated by Barba-Sánchez and Atienza-Sahuquillo (2016), environmental proactivity refers to the proactive measures taken by firms to properly address environmental issues and improve their environmental effectiveness. Namely, it means "anticipating environmental threats and executing plans to reduce adverse effects for the environment" (Jermsittiparsert et al., 2020). This construct is far beyond just complying with legislation. A firm can be environmentally proactive in so many ways, e.g., implementing measures to avoid polluting the environment, adopting environmentally sustainable actions, and directing resources to alternative sources of energy to involve all stakeholders in environmental endeavors (Chaudhry & Amir, 2020). Environmental proactivity improves the reputation of firms and provides considerable contributions to the environment, resulting in financial benefits (Ali et al., 2023).

The proactive approach toward environmental issues has a substantial impression on both the environmental and economic success of industrial enterprises. Companies can achieve environmental performance by performing an environmentally proactive approach that entails utilizing less resources, producing less waste, and emitting less hazardous emissions (Jermsittiparsert et al., 2020). This proactive approach can lead to cost minimization by bringing down the cost of compliance demanded by regulations (Barba-Sánchez & Atienza-Sahuquillo, 2016). The concept of environmental proactivity acts as a moderating tool between environmental efforts and outcomes (Ali et al., 2023). It is noteworthy that there is limited literature discussing the moderating role of environmental proactivity in the link between environmental strategy and environmental performance. The mechanism through which environmental proactivity moderates the relationship has not been discussed in the studies.

The current body of work on the subject of environmental strategy and EMA has already explored a broad spectrum of issues relating to relocation. Implementing environmental tactics or strategies can have a beneficial result on company efficiency (Kong et al., 2022). In other words, turning to action to solve environmental problems can help reduce costs, enhance effectiveness, and gain competitive benefits (Le et al., 2019). It has also

been duly noted that EMA has the potential to be highly beneficial, provides useful information for decision-makers, and ensures that opportunities to minimize effects on the environment and cost are properly realized (Phan et al., 2018). Elhossade et al. (2021) discussed the impacts of institutional pressures on EMA practices. The existing research additionally analyzes the effects of institutional and other factors on environmental performance, with the mediating role of EMA (Gunarathne et al., 2021; Kong et al., 2022). There are available studies on environmental proactivity and its impacts on environmental and economic performance (Barba-Sánchez & Atienza-Sahuquillo, 2016), as well as moderating effects on institutional pressure and environmental performance (Chaudhry & Amir, 2020).

NRBV substantially emphasizes the role of environmental strategy, which encompasses strategies like pollution control, product stewardship, and sustainable development in meeting environmental and financial performance-related objectives. This framework is significantly influenced by EMA, which serves as a mediating construct between environmental strategy and environmental performance. EMA also significantly affects the uptake and effectiveness of environmental strategy within the corporation. Environmental proactivity has a moderating influence on augmenting the impact of environmental strategy on the environment. This implies that environmental proactivity significantly empowers the execution of proactive environmental management practices to achieve meaningful business outcomes.

In order to test this relationship, the objective of the present study is to analyze the influence of environmental strategies, environmental management accounting, and environmental proactivity on the environmental performance of manufacturing micro companies in India. The following study hypotheses are derived from the established theoretical and empirical connections between the variables:

H1: Environmental strategy significantly positively influences EMA.

H2: Environmental strategy significantly positively influences environmental performance.

H3: EMA significantly positively influences environmental performance.

H4: EMA significantly mediates the relationship between environmental strategy and environmental performance.

H5: Environmental proactivity significantly moderates the relationship between environmental strategy and environmental performance.

2. METHOD

Data were accumulated from managers of manufacturing micro companies in India, namely those with investments in plant and machinery of not more than one crore and an annual turnover of not more than five crore Indian rupees. Managers

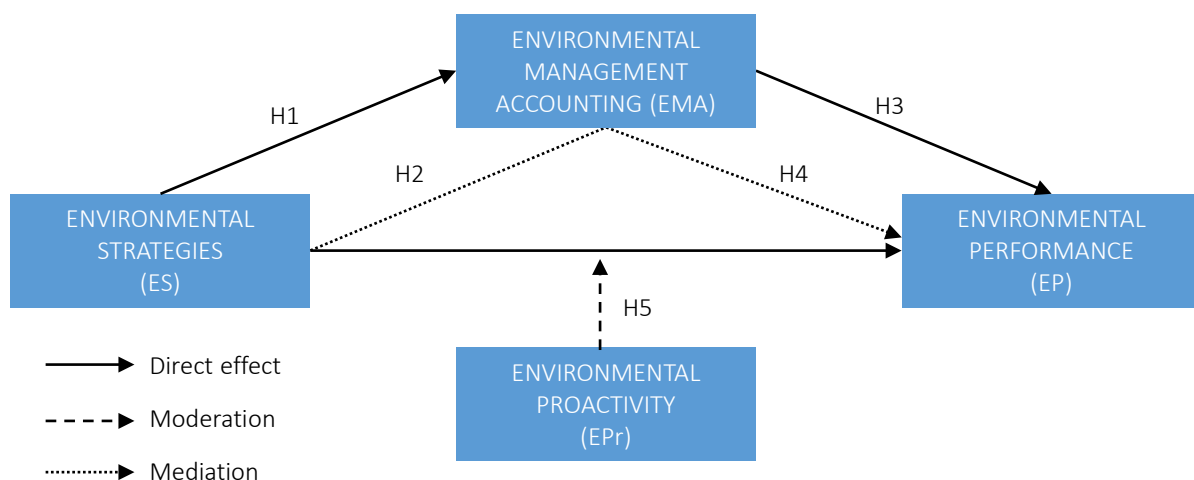


Figure 1. Research model

are the primary leaders in organizations and possess a deep understanding of crucial company information. The manufacturing sector was selected as the focal point of this study due to its widely recognized status as a prominent catalyst for economic growth. The list of MSMEs was collected from the district industrial center to obtain pertinent information. The manufacturing companies were selected through a screening process. MSMEs in India provide a significant contribution to the country's economic production, development of the export manufacturing industry, and creation of jobs. These enterprises are crucial in promoting industrial development and nurturing entrepreneurial activities (Uma & Anbuselvi, 2023).

An online survey questionnaire (Appendix A) was employed in accordance with a quantitative methodology. After making initial contact, a questionnaire was distributed to managers and line managers. In addition, the study used snowball sampling techniques to enhance the quantity of responses. The respondents completed the questionnaires in the time span of August 2023 to January 2024. In total, 1,150 questionnaires were distributed, and 107 valid survey responses were retrieved, leading to a response ratio of 9.30%. To maintain ethics, voluntary involvement and the right to withdraw were clearly explained. All participants' identities and job details were anonymized to maintain anonymity about their answers. The study's objective was made clear to the respondents to reduce anxiety and unease responding.

The manufacturing enterprises included in this analysis were established between the years 1994 and 2015. The questionnaire was tailored explicitly for MSMEs. The differentiation was based on two key factors: investment in plant and machinery and yearly turnover based on the Ministry of MSMEs in India statistics. However, most of the responses were from micro enterprises, with only seven responses from small companies. Therefore, only responses from micro enterprises were taken into consideration. According to the government's yearly records, 99% of MSMEs are classified as micro-size firms. In relation to the credentials of the participants, 29.4% possessed under graduation, 63.8% held post-graduation, and 3.7% held a Ph.D. Additionally, 3.1% of the participants possessed professional certificates.

The constructs and relationships in Figure 1 are derived from the theoretical foundation outlined earlier. The constructs are assessed using scales that had been previously developed. The items were assessed using a seven-point Likert scale, extending from (1) Do not agree at all to (7) Fully agree.

Environmental strategy is measured by the items of Gunarathne et al. (2021), Kong et al. (2022), Latan et al. (2018), Le et al. (2019), Solovida and Latan (2017), and Wijethilake (2017). Example items are "Reducing emissions into the air, water and ground" and "Using environmental management systems." The assessment of EMA is based on Elhossade et al. (2021), Ferreira et al. (2010), and Gunarathne et al. (2021). "Identifying of environment-related costs" and "Assigning of environment-related costs to production processes" are two examples of such items. Items employed in earlier studies to evaluate environmental performance are used (Bansal, 2005; Bresciani et al., 2023; Gunarathne et al., 2021; Paulraj, 2011). "Used waste as inputs for own processes" and "Reduced waste (water and/or solid) by streamlining operations" are two examples. Items for environmental proactivity were taken from Brulhart et al. (2019) and Chaudhry and Amir (2020). One example is "One of our company's missions is to protect the natural environment."

PLS-SEM is a technique employed to evaluate and validate hypotheses. It is preferred due to the primary aim of the research being an assessment of relationships (Hair et al., 2019). Simultaneously, the use of PLS-SEM is beneficial because it helps analyze many constructs simultaneously and is strongly advised for analyzing mediating connections (Hair et al., 2019). Generally, the PLS-SEM has two sorts of tests, namely measurement and structural model tests (Anderson & Gerbing, 1988). For the first one, the constructs are tested by examining the factor loadings, convergent and discriminant validity, and Cronbach's alpha and composite reliabilities of the constructs. As for the second test, the analysis of the hypotheses is discussed.

3. RESULTS

The measurement model was evaluated using item loadings, reliability, and construct validity, as well as convergent and discriminant validity. Table 1

demonstrates that all item loadings of the scales surpass the minimum criterion of 0.60, which shows a significant contribution to their respective constructs (Hair et al., 2019). The current investigation established convergent validity by the examination of the average variance extracted (AVE). Table 1 presents a reasonable level of convergent validity for each construct. The required threshold of composite reliability (CR) and Cronbach's alpha (CA) is above 0.70, and for AVE is 0.50.

Table 1. Item loadings, reliability, and AVE

Constructs	Items	Item loadings	CA	CR	AVE
Environmental Management Accounting	EMA1	0.87	0.929	0.929	0.701
	EMA2	0.869			
	EMA3	0.834			
	EMA4	0.839			
	EMA5	0.822			
	EMA6	0.795			
	EMA7	0.829			
Environmental Performance	EP1	0.829	0.928	0.930	0.740
	EP2	0.826			
	EP3	0.828			
	EP4	0.867			
	EP5	0.897			
	EP6	0.911			
Environmental Proactivity	EPr1	0.873	0.845	0.856	0.858
	EPr2	0.963			
	EPr3	0.93			
	EPr4	0.935			
Environmental Strategy	ES1	0.615	0.890	0.893	0.653
	ES2	0.828			
	ES3	0.843			
	ES4	0.816			
	ES5	0.831			
	ES6	0.886			

For discriminant validity assessment, the study calculated the HTMT ratio (Henseler et al., 2015). The results clearly indicate that every HTMT value is under the designated standard of 0.90 (Hair et al., 2019) represented in Table 2. Hence, discriminant validity was successfully achieved during the study.

Table 2. HTMT ratio – Discriminant validity

Constructs	EMA	EP	EPr
EP	0.568		
EPr	0.142	0.088	
ES	0.606	0.613	0.218

Note: EP = environmental performance; ES = environmental strategy; EPr = environmental proactivity; EMA = environmental management accounting.

Because the data have been taken from the single survey and the respondents belonged to one country, there was a need to consider the evaluation of the CMB. In order to reduce the likelihood of CMB, the study considered a technique or statistical methodology used by Podsakoff et al. (2003). In regard to the procedural approach, the participants were anonymous and their confidentiality was guaranteed. Moreover, the randomization technique was used to rearrange all variables and statements presented to the respondents in the questionnaire to eliminate the possibility of the subject to infer the causal link between the ideas. The statistical approach has taken into consideration the examination of the variance inflation factors (VIF). According to Kock (2015), such VIF must be lower than 3.3, which would indicate no existence of collinearity or CMB. At the same time, VIFs greater than 3.3 are sufficient evidence of collinearity, indicating the existence of CMB. The results of the conducted research show that VIFs range from 1.067 to 1.537. This means that the presence of CMB is not a serious issue. At the same time, there is no evidence of multi-collinearity in the present study.

The paper further checked the structural model and tested hypotheses. Typically, the structural model can be evaluated using coefficient of determination (R^2), effect size (f^2), and Stone-Geisser's predictive relevance (Q^2) (Hair et al., 2019). R^2 measures the amount of the variance that can be accounted for by the constructs. An R^2 value over 0.10 is deemed sufficient (Falk & Miller, 1992). Table 3 indicates that the explained variance for EMA (R^2 value was 0.305, while for environmental performance, it was 0.396. Concerning effect size, the findings in Table 3 indicate that f^2 beyond the suggested threshold of 0.02 is required (Cohen, 1988). Furthermore, the Q^2 value was computed concerning the predicted variable constructed and its inclusion in the model in order to ascertain the prediction accuracy of the model. Moreover, an observed Q^2 value exceeding zero indicates predictive importance by definition (Hair et al., 2019). The observed values of EMA and environmental performance were 0.300 and 0.333, respectively. These findings show that the model has strong predictive validity.

Table 3. f-square results

Constructs	EMA	EP
EMA		0.085
EPr		0.001
ES	0.439	0.149

Note: EP = environmental performance; ES = environmental strategy; EPr = environmental proactivity; EMA = environmental management accounting.

Having conducted a comprehensive examination, the hypotheses were examined by means of bootstrapping, which was performed on 5,000 resamples. The results imply a favorable and statistically significant connection between environmental strategy and EMA. Therefore, H1 is supported. In favor of H2, the result shows a meaningful and significant relationship between environmental strategy and environmental performance ($\beta = 0.370, t = 8.513, p = 0.000$). EMA influences environmental performance

directly ($\beta = 0.370, t = 8.513, p = 0.000$), confirming H3. Regarding H4, the results indicate that EMA mediated the environmental strategy and environmental performance ($\beta = 0.156, t = 5.114, p = 0.000$) supporting H4. Complementary partial mediation exists between environmental strategy and environmental performance mediated by EMA, as there is a significant direct effect. Regarding H5, the results indicate the relationship between environmental strategies and environmental performance moderated by environmental proactivity ($\beta = 0.111, t = 3.244, p = 0.001$); H5 was supported (See Table 4 for path coefficient results).

The findings pertaining to moderation can be further elucidated by means of moderation graphs of slope analysis. Figure 2 demonstrates a notable moderation effect of environmental proactiv-

Table 4. Hypotheses results – Path coefficients

Hypotheses	Hypothesized relationship among constructs	β -Path coefficients	t-value	p-value	Result
Direct effects					
H1	Environmental strategies > Environmental management accounting	0.553	14.52	0.000	Supported
H2	Environmental strategies > Environmental performance	0.370	8.513	0.000	Supported
H3	Environmental management accounting > Environmental performance	0.282	5.983	0.000	Supported
Indirect effects					
H4	Environmental strategies > Environmental management accounting > Environmental performance	0.156	5.114	0.000	Supported
H5	Environmental proactivity X Environmental strategy > Environmental performance	0.111	3.244	0.001	Supported

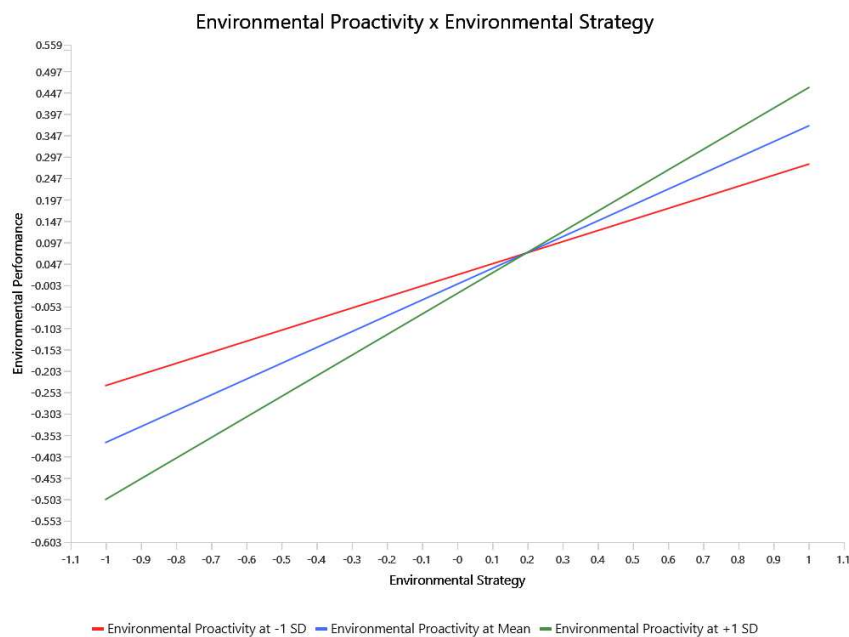


Figure 2. Moderation graph of environmental proactivity

ity on environmental strategy and environmental performance. This is evident from the non-parallel lines on the graph, indicating that the outcome of environmental proactivity on the association of environmental strategy and environmental performance is substantial. The presence of environmental proactivity leads to an increase in the significance of strategies on the environmental performance of manufacturing micro companies.

4. DISCUSSION

The findings present an accretion piece of information in the supplication of the marked hypothesis that environmental strategy has a substantial and favorable influence on EMA (H1) (Appannan et al., 2023; Gunarathne et al., 2021; Kong et al., 2022; Le et al., 2019; Solovida & Latan, 2017). It is found that the realization of the environmental strategy, such as the decrease in emissions and the usage of systems for environmental management by manufacturing micro companies, leads to a positive association with EMA practices implementation. This finding can be mirrored by other scientific researchers who indicate that using proactive environmental strategies requires the application of highly sophisticated EMA systems. Suitable monitoring can be done and the evaluation of the effectiveness of environmental performance management can occur (Kong et al., 2022; van der Poll, 2022). The conducted investigation attests the fact that the implementation of environmental strategy results in a favorable influence on environmental performance (H2) (Liu & Zhang, 2022; Gunarathne et al., 2021). Adopting environmental strategy can lead to enhanced environmental performance benefits. This finding is backed by other works because the promotion of proactive policy toward the environment is always associated with favorable consequences for firm performance (Gunarathne et al., 2021; Solovida & Latan, 2017).

The study provides supporting evidence to H3; EMA has a substantial effect on environmental performance (Asiaei et al., 2022; Bresciani et al., 2023; Solovida & Latan, 2021; Zandi & Lee, 2019). Following Chaudhry and Amir (2020) and Phan et al. (2018), EMA has a profound impact on the environmental performance among manufacturing micro companies. Moreover, EMA allows identifying areas in which not only environmental but also financial outcomes may be optimized and improved (Konstantinou et al., 2020). The results also show that the connection of environmental strategy and environmental performance is mediated by EMA (H4). Gunarathne et al. (2021) and Solovida and Latan (2017) supported this observation. Thus, the finding corroborates that EMA has a vital function in helping organizations develop and implement their environmental strategy in a way that will enhance environmental performance. The outcomes of the present study align with the prior studies that also indicated that EMA is beneficial in terms of allowing the monitoring and enhancing of the environmental performance of companies (Christine et al., 2019).

This study supplies concrete verification that environmental proactivity has a moderating impact on the connection between environmental strategy and environmental performance (H5). Considering proactive environmental behavior, environmental strategy is more successful in improving environmental performance (Nguyen & Adomako, 2021). According to the findings, proactive environmental management strategies are required to achieve sustainable business results (Kitsis & Chen, 2023). The results align with Ali et al. (2023), who found that environmental proactivity has a favorable influence on both environmental and economic performance.

CONCLUSION

The purpose of this study was to investigate the impact of environmental strategies and environmental management accounting on the environmental performance of manufacturing micro companies. Moreover, it delved into the moderating function of environmental proactivity. The results demonstrated that environmental management accounting had a significant and positive impact on environmental performance. It also is a mediator between the connection of environmental strategies and environmental performance. The results indicate that environmental proactivity

influences the relationship as a moderator of environmental strategy and environmental performance. This suggests that implementing environmental strategies improves environmental performance. By identifying possibilities to reduce environmental impacts and providing information in decision-making process, environmental management accounting ensures better environmental outcomes.

The outcomes revealed a positive effect of environmental strategies, such as reduced emissions and implementation of systems for management and accounting practices related to the environment. This indicates that proactive environmental policies require the incorporation of modern systems for managing environmental accounting practices to efficiently monitor and assess environmental performance. Furthermore, the study gives importance to proactive environmental management strategies to achieve long-term commercial benefits. The effectiveness of environmental strategies in improving environmental performance is especially noticeable when proactive measures are adopted to address environmental challenges. This emphasizes the need to employ proactive environmental management measures to improve environmental performance while also achieving long-term business results.

The focus of the study was manufacturing micro businesses in India, hence limiting its relevance to other industries and geographical areas. To validate the results, subsequent investigations may widen the scope to include SMEs as well as other industries. The cross-sectional characteristic of the data collection restricts the ability to develop causal relationships. Longitudinal studies can offer a more complete comprehension of time-related changes in strategies and accounting practices related to environment and performance.

This study demonstrates that manufacturing micro businesses can enhance environmental performance by adopting environmental policies and implementing EMA. Managers need to understand that environmental factors are considered in strategic planning and decision-making. This is demonstrated by the relationship between EMA and environmental performance, highlighting that companies must allocate resources to EMA systems for effective monitoring and controlling of their environmental footprints. Firms that adopt a proactive approach to environmental issues are likely to achieve significant advantages from their environmental strategy by incorporating environmental concerns as a moderating factor. Managers should encourage a proactive environmental culture in their organizations to maximize the impact of their environmental activities.

AUTHOR CONTRIBUTIONS

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Formal analysis: Chetanraj D. B., Senthil Kumar J. P., Velagapudi ManiKrishna, Velaga Sri Sai.

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Supervision: Senthil Kumar J. P.

Validation: Chetanraj D. B., Senthil Kumar J. P., Velagapudi ManiKrishna, Velaga Sri Sai.

Visualization: Chetanraj D. B., Senthil Kumar J. P., Velagapudi ManiKrishna, Velaga Sri Sai.

Writing – original draft: Chetanraj D. B., Senthil Kumar J. P., Velagapudi ManiKrishna, Velaga Sri Sai.

Writing – review & editing: Chetanraj D. B., Senthil Kumar J. P., Velagapudi ManiKrishna, Velaga Sri Sai.

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APPENDIX A. Questionnaire

Dear Sir/Madam,

We are conducting a research study to assess the impact of environmental strategies, environmental management accounting and environmental proactivity on environmental performance. We have designed this questionnaire to obtain data from our respondents. Your worthy input will be kept highly confidential. Please accept our gratitude in advance for your eagerness and honest feedback. Your individual responses will be treated as highly confidential. Your participation is highly regarded and appreciated.

Thanks in advance for your cooperation.

SECTION A

1. Does your company take measures on its environmental performance?

Yes No

2. Does your company consider environmental strategies and environmental management accounting in its operations or manufacturing process?

Yes No

(Please don't continue if your answer is No)

If Yes,

3. Year of establishment of your company _____

4. Type of your MSME

- a) Micro
- b) Small
- c) Medium

4. Investment in plant and machinery or equipment and annual turnover

- a) Investment in plant and machinery or equipment not more than Rs. 1 crore and annual turnover not more than Rs. 5 crore.
- b) Investment in plant and machinery or equipment not more than Rs. 10 crore and annual turnover not more than Rs. 50 crore.
- c) Investment in plant and machinery or equipment not more than Rs. 50 crore and annual turnover not more than Rs. 250 crore.

4. Qualification of the respondent

- a) Under graduation
- b) Post-graduation
- c) Ph.D.
- d) Professional Certification

SECTION B

Please indicate the extent of your agreement with all the following statements on a 7-point scale

		1	2	3	4	5	6	7
		Do not agree at all	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Fully agree
S. No.	Statement	Response						
Environmental strategy		1	2	3	4	5	6	7
1	Promoting sustainable resources management (e.g., renewable energy)							
2	Reducing emissions into the air, water, and ground							
3	Minimizing the environmental consequences of products and services							
4	Using environmental management systems							
5	Long-term commitment to the environment							
6	Investment in research and development environments							
Environmental management accounting		1	2	3	4	5	6	7
7	Identification of environment-related costs							
8	Classification of environment-related costs							
9	Allocation of environment-related costs to production processes							
10	Estimation of environment-related contingent liabilities*							
11	Allocation of environment-related costs to products							
12	Introduction or improvement to environment-related cost management							
13	Creation and use of environment-related cost accounts							
14	Development and use of environment-related key performance indicators							
Environmental performance		1	2	3	4	5	6	7
15	Used waste as inputs for own processes							
16	Disposed waste responsibly							
17	Reduced consumption of hazardous/harmful/toxic materials							
18	Reduced waste (water and/or solid) by streamlining operations							
19	Reduced air emission							
20	Reduced environmental impacts of operations or eliminated environmentally damaging operations*							
21	Increased energy savings due to conservation and efficiency improvements							
Environmental proactivity		1	2	3	4	5	6	7
22	Preserving the natural environment is one of our corporate missions							
23	Environmental sustainability is a great business opportunity to develop our firm							
24	Our firm always goes beyond what the environmental sustainability regulations recommend							
25	Our firm is engaged in environmental sustainability issues because our top management wants to be a driving force behind sustainability							
26	Our firm ought to be an example of good citizenship*							

Note: * Three statements were dropped from the analysis after the measurement model assessment. The statements were dropped from the analysis because they did not meet the threshold of indicator loading.