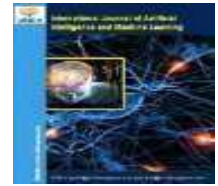




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Research Paper

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Green Management Practices and Their Influence on Environmental Sustainability in Small-Scale Industries: Evidence from Madurai District

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ABSTRACT

In the current scenario where environmental pollution, environmental scarcity, and pollution from industry are on the rise, environmental sustainability has come into focus for industries. The present study investigated influence of green management methods on environmental sustainability in small scale industries in Madurai. The paper emphasized on key green management elements like green manufacturing practices, waste management system, energy efficiency practices, green supply chain methods and environmental training and awareness. The method used in this study was quantitative research through the survey technique using a structured questionnaire to employees, supervisors and managers in small industries. Structural Equation Modelling (SEM) and SPSS techniques were utilised to examine the data. The results showed that green management practices (GMP's) have significant impacts on environmental sustainability and sustainable industrial performance. The most positive impacts on environmental sustainability were in the areas of green manufacturing practices, followed by waste management and green supply chain practices. The findings also showed that the impact of energy efficiency measures and employee environmental commitment on environmental performance and industrial sustainability is positive. The study also showed that environmentally responsible industrial practices lead to decreased pollution, better use of resources, increased operational efficiency, and better overall competitiveness of industries in the long-term. It was found that employee environment awareness and participation have important mediating roles in the successful implementation of a green management system. The results of the study indicate the need for implementing green management methods in SMEs in order to secure sustainable development of industry and ecological balance. The study builds on the current body of knowledge in the field of environmental management and provides practical suggestions for industrial managers and policy-makers on the need to encourage small-scale industries to adopt sustainable-oriented industrial practices.

Keywords: Green Management Practices, Environmental Sustainability, Small-Scale Industries, Green Manufacturing, Waste Management, Energy Efficiency, Green Supply Chain, Sustainable Industrial Performance, Environmental Performance, Madurai District.

Introduction

Rapid industrialization, environmental pollution, climate change, depletion of natural resources are making environmental sustainability one of the most important concerns of the world. Industry is also an important source of environmental degradation, due to its high energy consumption, waste production, emissions of greenhouse gases and the misuse of industrial wastes. Industries are increasingly expected to be environmentally responsible towards minimizing ecological damages and promoting sustainable development goals (United Nations Environment Programme, Siboni 2023). Thus, green management has been recognized as one of the critical strategies in the field of industries aiming at improving environmental performance and sustainability over the long term (Le, 2022). Green management practices (GMP's) are the environmentally responsible activities of the organisations which aim to reduce pollution, conserve natural resources, optimise energy use, reduce waste production and encourage sustainable production systems. Green manufacturing, waste management, recycling, green supply chain management (GSCM) and environmental training are also important ways to lower the environmental influences of industry. Zhu & Sarkis 2004 found that the green operational observes have a optimistic impact on environmental and organizational performance as they aim at enhancing the efficiency of resources and minimizing the operational wastes. Likewise, Porter and Van der Linde (1995) suggested that environmentally sustainable industrial practices can improve productivity, innovation and competitive advantage.

Small industries are important contributors to economic growth, industrial development and employment generation, especially in the developing economies like the India. The regions' economic activities are significantly affected by these industries because they are engaged in various manufacturing and engineering activities, food processing, textile industries, and other industrial activities (Ruzmetov et al., 2023). Many small-scale industries, however, have environmental problems because of their limited financial resources, inadequate technology, poor waste management system, and environmental awareness. Hart (1995) highlighted that environmentally responsible industrial practices enhance the competitiveness and utilization of resources over time. Hence, the implementation of Green Management in small-scale industrial operations is significant to maintain the

sustainability of the environment and sustainable industrial development. In recent years, however, with the increasing concern of the environment and eco-friendly practices, industries have been making efforts to become more eco-friendly (Shan & Ji, 2024) by implementing sustainable technology and practice. Pollution reduction, ecological degradation, operational efficiency, energy savings and corporate reputation are all outcomes of environmental sustainability. In the past, it has been found that industries with GMP's have better environmental performance, lower production costs and better trust from stakeholders (Shrivastava, 1995; Daily & Huang, 2001). The role of GMP's in sustainable performance of industrial operations is thus gaining more significance.

Madurai is one of the important industrial centres in Tamil Nadu state and has some small-scale industries involved in the textile, food, engineering and chemical industries. Even though environmental sustainability is the trendy topic, many industries in Madurai District are still not able to adopt green management system due to financial constraints, lack of technical expertise, and insufficient awareness of the environment (Ganesh et al., 2024). A few studies have investigated the GMP's in large manufacturing organizations, but none of the empirical studies has been devoted to the small-scale industries in the region of industrial sector like Madurai District.

So, the current work is to find out the effect of GMP's on environmental sustainability in small scale industries in Madurai District. The aim of the study is to assess the role of waste management, energy efficiency, green manufacturing and environmental awareness in sustainable performance of industry. The outcomes of this study are likely to help in the existing body of knowledge of environmental management and will give suggestions to industrial managers, policy makers and environmental agencies in establishing sustainable industrial development.

Review Of Literature

In recent years, there has been growing concern regarding the environment and pollution by industries and the challenges of sustainability. Environmental issues, industrial pollution and sustainability issues have become increasingly important in the recent years. Waste reduction, energy conservation, recycling, and green manufacturing are other environmentally responsible practices gaining traction in industries to enhance environmental performance and advance toward sustainable development. Organizations that adopt environmentally sustainable practices can gain a competitive edge in the long run by managing resources efficiently and ensuring that their operations are optimized (Hart, 1995). Likewise, Porter and Van der Linde (1995) noted that GMP's stimulate innovation, minimise the inefficiencies of operation and increase the competitiveness of industry. Green manufacturing practices are regarded as vital parts of the sustainable industrial management. They include environmentally friendly production methods, minimising hazardous emissions, utilising raw materials efficiently and minimising any industrial waste. Zhu and Sarkis (2004) found that green manufacturing and GSCM have a optimistic effect on ecological and economic performance in manufacturing industries. Rao and Holt (2005) also noted that industries that use green operational practices will be more successful in their sustainability efforts and boost organizational performance.

The role of waste management cannot be ignored in the context of environmental pollution and degradation because of the industries. Good waste segregation, recycling and disposal systems reduce environmental damage and enhance environmental compliance in industries. Financial and technological constraints are known to hinder the systematic waste management in small-scale industries in the past. Daily and Huang (2001) reported that the employee involvement and environmental awareness have a noteworthy optimistic influence on the environmental management of the organizations. Likewise, Sarkis (2012) emphasized that good sustainable waste management practices enhance environmental sustainability and industrial efficiency. Energy efficiency practices are also noteworthy part of green industrial management. Energy-efficient technologies, renewable energy use, and efficient production machinery have become more common in industries to cut energy use and carbon dioxide emissions. Shrivastava (1995) suggested that environmental technologies and green innovations not only enhance the sustainability of industry, but also lower environmental risks. The adoption of energy-efficient systems can help to reduce energy expenses, encourage sustainable industrial development, and contribute to environmental protection.

Employee awareness and training on the environment is a critical factor that affects the implementation of green management. Companies that implement EE or sustainability awareness among employees demonstrate its commitment to the environment and that they are in line with green operational practices. Jabbour (2013) concludes that GREEN HRM and employee environmental participation has a positive effect on organizational sustainability performance. Thus, employee commitment to environmental responsibility is an important factor in achieving sustainable industrial development. The association of GMP's with environmental sustainability in large manufacturing industries has been explored in several studies but there is limited empirical research investigating GMP's in small-scale industries in the regional industrial sectors (Pinto, 2020). Bioactive compounds from plants have antioxidant, anti-inflammatory, antiproliferative and pro-apoptotic properties, which play a vital role in cancer prevention and therapy.

The anticancer properties of neem are mainly due to its introduction of apoptosis, inhibition of cell production, restraint of angiogenesis and accent of intracellular motioning pathways (Nagini et al., 2024). Apoptosis (Programmed cell death) is a natural occurrence of cell life that removes damaged or abnormal cells and keeps homeostasis. Apoptosis is a normal process that may also remove abnormal and damaged cells from the body and help to regulate the number of cells. As the number of G0/G1 cells increased, S-phase and G2/M cells decreased, showing a decrease in DNA synthesis and movement through mitosis. The tested concentrations showed that the cell cycle arrest effect increased with the increase in concentration of neem extract. In recent years, especially with the growing concern for the environment and eco-friendly practices, industries have been taking steps towards adopting sustainable technology and practices, thus becoming more eco-friendly (Shan & Ji, 2024).

Small scale industries also have several issues in the form of inadequate approach to investment, poor infrastructure and lack of technical skills which are hampering the implementation of good environmental management systems (Hajam et al., 2025). To achieve these challenges, the implementation of green management is still essential for green environment and competitiveness of the industry.

Madurai is one of the important industrial centres of Tamil Nadu state, there are some small-scale industries in the city involved in manufacturing and production. But limited studies have focused on the influence of GMP's on ecological sustainability in these industries. Hence, the present study is an effort to fill the above gap in the research and to study the influence of GMP's towards attaining ecological sustainability in the small-scale industries in Madurai District.

Conceptual Framework and Hypothesis Development

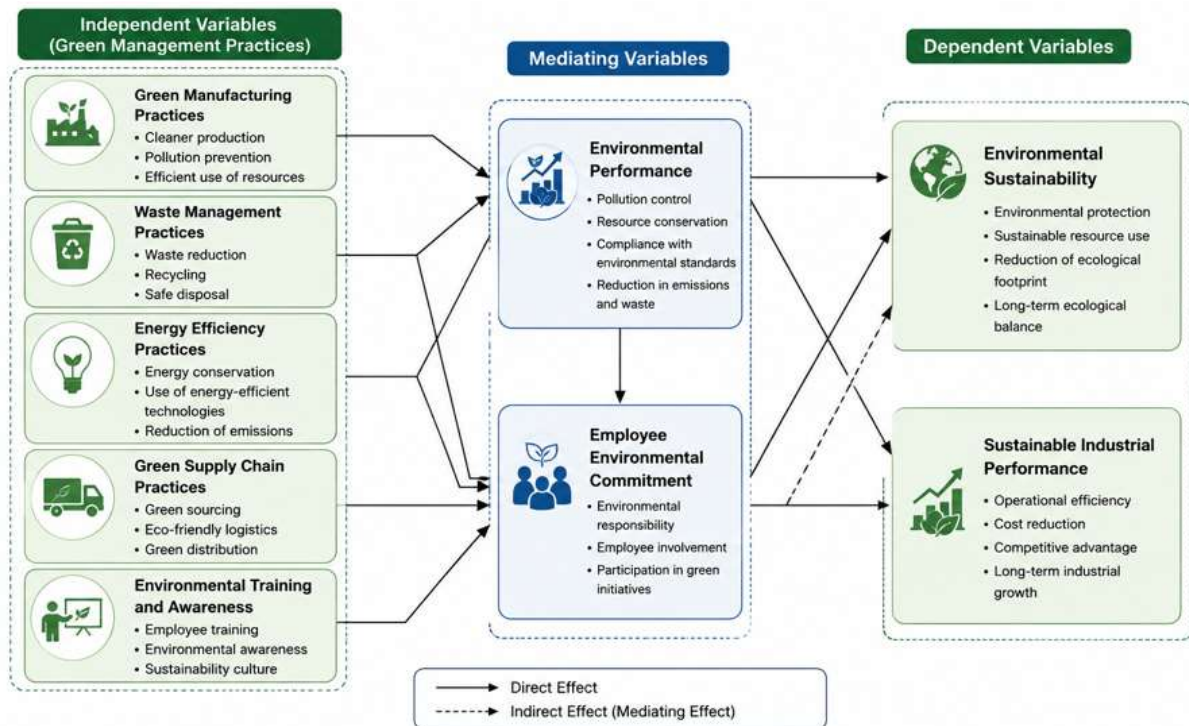
3.1 Conceptual Framework

GMP's are significant to enhance the sustainability of industries and environment. Green manufacturing, green waste management, energy conservation, green supply chain management and training on the environment are among the practices used to curb pollution in industries, save resources and enhance their operational efficiency. Zhu and Sarkis (2004) reported that green operational performs have positive impacts on the environmental and organizational routine, and Rao and Holt (2005) highlighted that green supply chain practices underwrite to the outcomes of sustainability and industrial competitive.

The present study suggests the conceptual framework for the study on Influence of GMP's on Environmental sustainability in small scale industry in Madurai. In this model, green manufacturing practices, waste management practices, energy efficiency practices, green supply chain practices and environmental training and awareness are regarded as independent variables. The environmental performance and the employee environmental commitment are used as a mediation variable, while the environmental sustainability and the sustainable industrial performance are the dependent variable.

Waste management practices are concerned with recycling and correct disposal of waste while the green manufacturing practices are concerned with ecofriendly pollution reduction practices of manufacturing systems. Energy efficiency practices are geared towards lowering the energy use and carbon emissions of industries. Green supply chain practices are aimed at supporting environmentally friendly supply chain sourcing and logistics practices. Educational programs in the workplace boost employee awareness and engagement in environmental initiatives, deepening their commitment to sustainability and resilience efforts. Workplace environmental training promotes employee awareness and involvement in environmental activities, enhancing organizational sustainability and environmental commitment.

Figure 1. Conceptual Framework Linking Green Management Practices and Environmental Sustainability



3.2 Hypothesis Development

Green manufacturing practices help to lower pollution and improve the sustainable production systems thus enhancing environmental sustainability (Porter & Van der Linde, 1995). It is therefore hypothesized that:

- **H1:** Green manufacturing practices have a positive impact on environmental sustainability.
- Efficient management of the wastes reduces the pollution into the environment and enhances the environmental performance of the industries (Daily & Huang, 2001). Therefore:
- **H2:** Environmentally friendly waste management practices positively impact on environmental performance.
- Energy efficiency Practices (EEPs) can lead to energy saving and sustainable industrial operation (Shrivastava, 1995). Thus:
- **H3:** Environmentally sustainable practices are positively impacted by energy efficiency practices.
- To create strong environmental responsible sourcing and logistics systems, green supply chain practices can be leveraged in order to achieve sustainable industrial performance (Rao & Holt, 2005). Hence:
- **H4:** Sustainable industrial performance can be improved through the positive impact of green supply chain performs. Green supply chain methods are positively related to sustainable industrial performance and improve it.

Environmental training and awareness programs enhance employees' environmental responsibility and organization sustainability (Jabbour 2013). Therefore:

- **H5:** GMP's, through their effect on employee environmental commitment, affect the environmental sustainability.
- Environmental performance creates a balance with ecology and long-term sustainability of industries (Hart, 1995). Thus:
- **H6:** Sustainable industrial performance is positively affected by Environmental performance.

Research Methodology

4.1 Research Design

The current work used a quantifiable research approach to study the influence of GMP's on Environmental Sustainability in small scale industries in Madurai. The connection amongst GMP's, environmental performance and reliable industrial production were analysed using descriptive and explanatory research design. The quantitative research design is popular for sustainability and industrial management research studies as it allows for organised measurement and statistical evaluation of the explore variables (Creswell et al, 2014).

4.2 Data Collection Method

The study used primary data collected with a structured questionnaire survey which was administered to employees, supervisors and managers in small-scale industries. The items of the questionnaire were associated with the green manufacturing practices, waste management, energy efficiency, green supply chain practices, environmental awareness, and environmental sustainability. The theoretical framework and literature review

were supplemented by secondary data that was gathered from research journals, government reports, sustainability publications and industrial reports.

4.3 Sampling Technique

A graded arbitrary random sample method was utilised to confirm that the respondents were representative of the various categories of small-scale industries like textile, engineering, food processing and manufacturing sector. Stratified sampling not only helps to improve the accuracy of the study results but also ensures reliability through the reduction of sampling bias (Sharma, 2017).

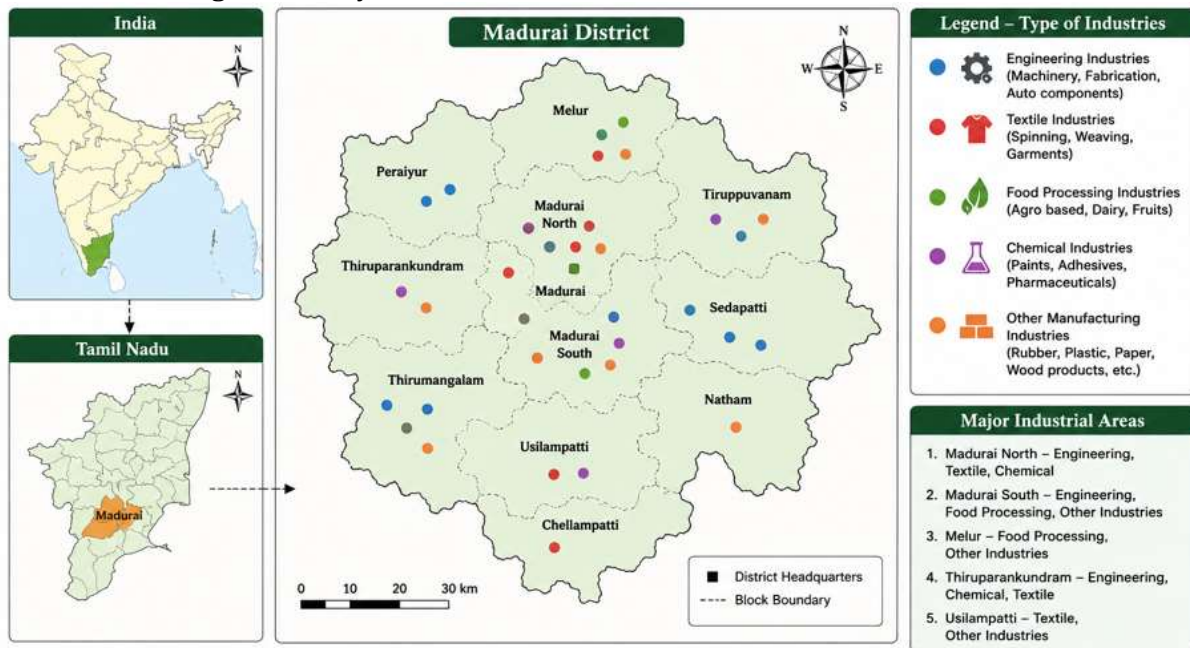
4.4 Sample Size

The study involved the study of nearly 300–400 respondents from selected small-scale industries in the Madurai District. The sample size was found to be sufficient in carrying out multivariate statistical analysis, reliability testing as well as Structural Equation Modelling (SEM).

4.5 Study Area

The analysis was involved in the industrial areas of Madurai with small scale industries. The area of Madurai District was chosen due to the industrial activities being undertaken in the district and the awareness of environmental sustainability practices among the industries active in the Madurai district.

Figure 2. Study Area and Industrial Distribution in Madurai District



4.6 Measurement Scale

The respondents' perceptions were measured using a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree) for measuring GMP's and environmental sustainability. Since the Likert scale is easy to fill out and reliable, it is often used in environmental management and organizational studies.

4.7 Variables and Measurement Items

The research variables and measurement dimensions were adapted from previous studies that are related to green management and environmental sustainability.

Table 1. Variables, Dimensions and Sources

Construct	Dimensions	Source
Green Manufacturing Practices	Cleaner production, pollution reduction	Zhu & Sarkis (2004)
Waste Management Practices	Recycling, waste disposal	Daily & Huang (2001)
Energy Efficiency Practices	Energy conservation, emission reduction	Shrivastava (1995)
Green Supply Chain Practices	Green sourcing, eco-logistics	Rao & Holt (2005)
Environmental Training and Awareness	Employee environmental education	Jabbour (2013)

Environmental Sustainability	Ecological balance, resource conservation	Hart (1995)
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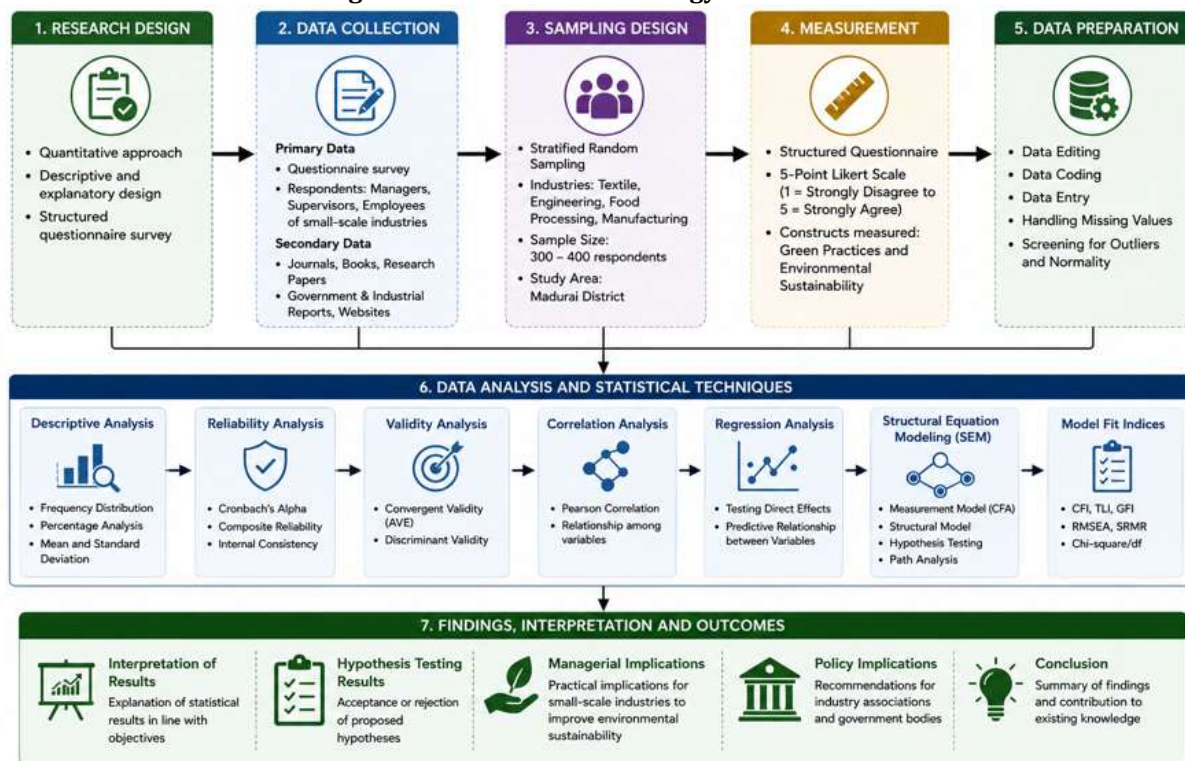
4.8 Reliability and Validity Analysis

The measurement scales were tested for consistency and accuracy of measurement by reliability and validity analyses. Internal consistency reliability was measured by Cronbach's Alpha and convergent validity was measured by CR and AVE. To ensure that the constructs of this study are unique, discriminant validity was measured.

4.9 Statistical Tools

The gathered data were analysed utilising the software: SPSS and AMOS/SmartPLS. The hypotheses proposed and the relationships between the study variables were tested by the descriptive statistics, correlation analysis, regression analysis, CFA and SEM.

Figure 3. Research Methodology Framework



4.10 Analytical Framework

The method for the study was analytical method with the following steps: Demographic analysis, reliability test, correlation test, regression test, CFA test, and path analysis using SEM approach. The statistical techniques enabled the direct and indirect correlation of the GMP's with environmental sustainability of small-scale industries.

Results and Discussion

5.1 Demographic Analysis

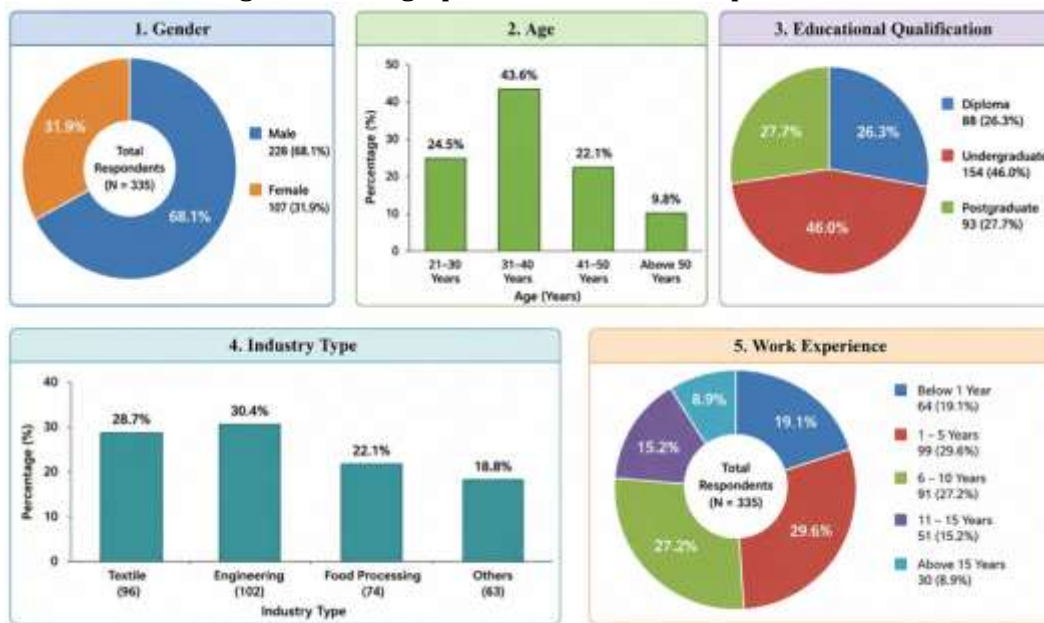
Demographic analysis was conducted with the aim of gaining insight into the background characteristics of the respondents who are employed in small industries in Madurai. The demographic analysis was done to understand the background characteristics of respondents working in small industries in Madurai. Employees, supervisors and managers from textile, engineering, food processing and manufacturing industries were the respondents. The following variables were analysed: gender, age, educational qualification, and work experience and industrial sector.

These findings revealed most of the respondents were male staff of manufacturing and engineering sectors. Major respondents were between 31- and 40-years age and had moderate industrial experience. The demographic results indicated that the respondents had sufficient experiences as sources of accurate information on GMP's and environment sustainability.

Table 2. Demographic Profile of Respondents

Demographic Variable	Category	Frequency	Percentage (%)
Gender	Male	228	68.1
	Female	107	31.9
Age (years)	>21 and <30	82	24.5
	>31 and <40	146	43.6
	>41 and <50	74	22.1
	> 50	33	9.8
Education	Diploma	88	26.3
	Undergraduate	154	46.0
	Postgraduate	93	27.7
Industry Type	Textile	96	28.7
	Engineering	102	30.4
	Food Processing	74	22.1
	Others	63	18.8

Figure 4. Demographic Distribution of Respondents



5.2 Reliability and Validity Results

Reliability and validity tests were done to value the reliability and validity of measures. Cronbach's Alpha reliability scores for all structures were above the suggested value of 0.70, which represents a satisfactory level of inter dependability. The CV of the constructs was also supported by CR and AVE values, which were more than 0.70 and 0.50, correspondingly.

Table 5. Reliability Statistics

Construct	Cronbach's Alpha
Green Manufacturing Practices	0.842
Waste Management Practices	0.816
Energy Efficiency Practices	0.801
Green Supply Chain Practices	0.833
Environmental Training and Awareness	0.852
Environmental Sustainability	0.871

Table 6. Convergent and Discriminant Validity

Construct	CR	AVE
Green Manufacturing Practices	0.881	0.598
Waste Management Practices	0.864	0.571
Energy Efficiency Practices	0.853	0.554
Green Supply Chain Practices	0.879	0.587
Environmental Sustainability	0.901	0.642

5.3 Correlation Analysis

The relationship between the variables of environmental sustainability and GMP's was investigated using the correlation inquiry. The findings displayed that the green manufacturing, waste management, energy efficiency, green supply chain management and environmental sustainability were statistically significant and positively correlated. The positive correlation with environmental sustainability was the highest for green manufacturing practices.

Table 7. Correlation Matrix of Study Variables

Variables	GMP	WMP	EEP	GSCP	ES
Green Manufacturing Practices (GMP)	1.000				
Waste Management Practices (WMP)	0.641**	1.000			
Energy Efficiency Practices (EEP)	0.588**	0.603**	1.000		
Green Supply Chain Practices (GSCP)	0.627**	0.592**	0.576**	1.000	
Environmental Sustainability (ES)	0.714**	0.668**	0.651**	0.689**	1.000

Note: $p < 0.01$

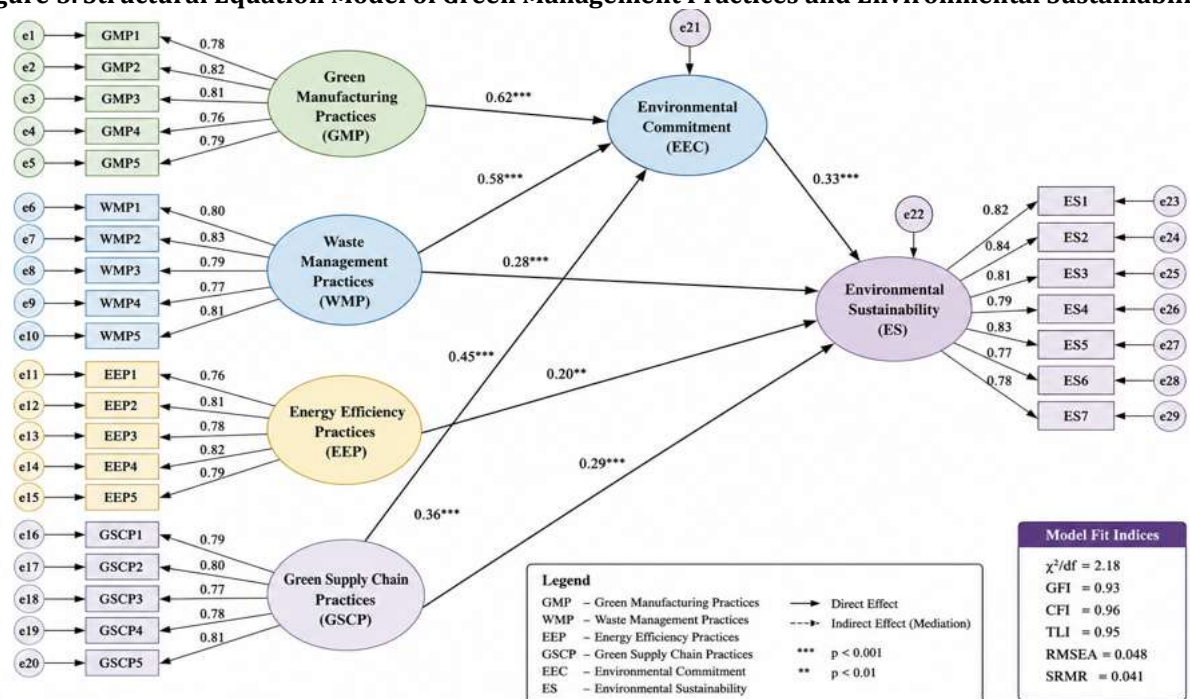
5.4 Structural Equation Modelling Results

The projected hypotheses were checked using the SEM analysis in AMOS/SmartPLS software with the aim of finding the influence of GMP's on environmental sustainability. The SEM results showed that the practices of green manufacturing, waste management, energy efficiency and green supply chain have a significant effect on environmental sustainability and sustainable industrial performance. The model fit indices were within the recommended ranges; thus, the model has good fit. The practices which had the greatest impact on environmental sustainability were green manufacturing practices, followed by waste administration and green supply chain practices.

Table 8. Hypothesis Testing Results

Hypothesis H	Relationship	Path Coefficient	p-value	Result
1	GMP → ES	0.742	0.000	Supported
2	WMP → EP	0.683	0.001	Supported
3	EEP → ES	0.651	0.002	Supported
4	GSCP → SIP	0.697	0.000	Supported
5	EEC mediates GMP → ES	0.612	0.003	Supported
6	EP → SIP	0.721	0.000	Supported

Figure 5. Structural Equation Model of Green Management Practices and Environmental Sustainability



5.5 Discussion of Findings

This study was found to be as follows: It was concluded that the GMP's has a significant effect on Environmental sustainability in small scale industries in Madurai. Green manufacturing practices were identified as a measure to

promote efficient utilization of industrial resources, reduce the pollution and minimize waste generation to enhance the sustainable industrial performance. The results confirm the results of Porter and Van der Linde (1995) who stated that environmentally sustainable industrial practices lead to better environmental and organizational performance. In a similar fashion, Zhu and Sarkis (2004) found that green operational benefits positively affect environmental efficiency and industrial sustainability.

The research also found that waste management and energy efficiency practices greatly impact environmental performance. Industries reduced environmental footprint and increased operational efficiency through recycling efforts, waste management practices, and energy efficiency measures. The findings corroborate the research findings of Daily and Huang (2001), and Shrivastava (1995) who highlighted the critical role of effective environmental management systems and green technologies in sustainable industrial development. The study also revealed that waste management and energy efficiency practices significantly contribute to environmental performance. Recycling activities, proper waste disposal systems, and energy conservation measures helped industries reduce environmental impact and improve operational efficiency. These findings support the studies of Daily and Huang (2001) and Shrivastava (1995), who emphasized that effective environmental management systems and green technologies are essential for sustainable industrial growth.

Moreover, the use of green supply chain practices had a optimistic impact on maintainable industrial performance based on the use of green supply chain performances like sourcing and an environmentally responsible logistics. Organizational environmental commitment was another key factor in bolstering organizational sustainability efforts, and also mediated to a large extent. According to Jabbour 2013, the employees' awareness and involvement perform a vital part in the implementation of GMP's.

The study suggests that proper implementation of green management can enhance environmental sustainability, operational efficiency and long-term industrial competitiveness in small industries in general.

Conclusion

The present work explored the impact of GMP's on environmental sustainability in Small Scale industries in Madurai. The results showed that green manufacturing practices, waste management system, energy efficiency measures and GCM substantially help to enhance the ecological performance and sustainable industrial development. Moreover, the work was able to confirm the positive influence of employee environmental commitment towards the linkage between GMP's and environmental sustainability. The findings show that the industries implementing environmentally responsible practices have better utilization of resources, lower pollution, higher operational efficiency, and better sustainability performance. GMP's are thus critical for the competitiveness and ecological balance of industries in the long-term. The study also considers the need for environmental awareness and environmental-friendly organizational culture, to enhance the environmental responsibility of small-scale industries.

The study has important implications for the existing literature on environmental management, and it offers both practical and policy implications for industrial managers and policymakers to encourage sustainable industrial practices. According to the study, the small-scale industries should invest more in green technologies, environmental training, waste management systems, and energy efficient industrial production processes to boost sustainable industrial growth and environmental sustainability. Future research could be extended to other industrial regions and the other sustainability factors for green industrial performance could be explored.

References

1. Creswell, J. D., Pacilio, L. E., Lindsay, E. K., & Brown, K. W. (2014). Brief mindfulness meditation training alters psychological and neuroendocrine responses to social evaluative stress. *Psych neuroendocrinology*, 44, 1-12.
2. Daily, B. F., & Huang, S. C. (2001). Achieving sustainability through attention to human resource factors in environmental management. *International Journal of operations & production management*, 21(12), 1539-1552.
3. Ganesh, S. V., Suresh, V., Barnabas, S. G., & Rajakarunakaran, S. (2024). Innovative solid waste management strategies for smart cities in Tamil Nadu: challenges, technological solutions, and sustainable prospects. *Discover Applied Sciences*, 6(12), 660.
4. Hajam, M. A., Kaur, H., Manzoor, J., & Nisar, A. (2025). Integrating Sustainability in Small Scale Industries: From Environmental Degradation to Cleaner Practices. *Environmental Claims Journal*, 1-42.
5. Hart, S. L. (1995). A natural-resource-based view of the firm. *Academy of management review*, 20(4), 986-1014.
6. Jabbour, C. J. C. (2013). Environmental training in organisations: From a literature review to a framework for future research. *Resources, Conservation and Recycling*, 74, 144-155.
7. Le, T. T. (2022). How do corporate social responsibility and green innovation transform corporate green strategy into sustainable firm performance?. *Journal of Cleaner Production*, 362, 132228.

8. Pinto, L. (2020). Green supply chain practices and company performance in Portuguese manufacturing sector. *Business Strategy and the Environment*, 29(5), 1832-1849.
9. Porter, M. E., & Linde, C. V. D. (1995). Toward a new conception of the environment-competitiveness relationship. *Journal of economic perspectives*, 9(4), 97-118.
10. Rao, P., & Holt, D. (2005). Do green supply chains lead to competitiveness and economic performance?. *International journal of operations & production management*, 25(9), 898-916.
11. Ruzmetov, B., Ruzmetov, S., Bakhtiyarov, S., Dzhumaeva, Z., & Juraev, K. (2023). Formation of supporting points for production growth based on diversification of the regional industry. In *E3S Web of Conferences* (Vol. 449, p. 01001). EDP Sciences.
12. Sarkis, J. (2012). A boundary and flows perspective of green supply chain management. *Supply chain management: an international journal*, 17(2), 202-216.
13. Sekaran, U. (2016). *Research methods for business: A skill building approach*.
14. Shan, C., & Ji, X. (2024). Environmental regulation and green technology innovation: an analysis of the government subsidy policy's role in driving corporate green transformation. *Industrial Engineering and Innovation Management*, 7(1), 39-46.
15. Sharma, G. (2017). Pros and cons of different sampling techniques. *International journal of applied research*, 3(7), 749-752.
16. Shrivastava, P. (1995). The role of corporations in achieving ecological sustainability. *Academy of management review*, 20(4), 936-960.
17. Siboni, B. (2023). United Nations Environment Program (UNEP). In *Encyclopedia of Sustainable Management* (pp. 3840-3843). Cham: Springer International Publishing.
18. Zhu, Q., & Sarkis, J. (2004). Relationships between operational practices and performance among early adopters of green supply chain management practices in Chinese manufacturing enterprises. *Journal of operations management*, 22(3), 265-289.