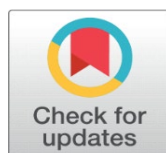
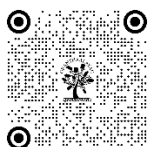


EXPLORING THE LINK BETWEEN GREEN FINANCE AND ENVIRONMENTAL IMPROVEMENTS IN COIMBATORE'S MANUFACTURING SECTOR

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ABSTRACT

This study examines the adoption of green financing initiatives and their impact on sustainable practices and environmental outcomes in manufacturing companies in Coimbatore District. Green financing, encompassing instruments such as green bonds and sustainability-linked loans, has emerged as a critical tool for funding eco-friendly projects. Despite Tamil Nadu's strong industrial presence and policy emphasis on sustainability, barriers such as limited awareness and technical expertise hinder the effective implementation of green financing in the region. The research adopts a descriptive design, employing a purposive sampling technique to target senior-level employees in the manufacturing sector. A sample size of 137 respondents was selected, and primary data were collected through structured questionnaires. Analytical tools including descriptive statistics, ANOVA, correlation analysis, and multiple regression were used to evaluate relationships between company characteristics, green financing initiatives, sustainable practices, and environmental outcomes. Findings reveal that medium-sized companies (50–250 employees) and organizations operating for less than five years are most represented. ANOVA results demonstrate significant relationships between company characteristics and sustainability dimensions. Correlation analysis highlights a strong positive relationship between sustainable practices and environmental outcomes ($r = 0.610$, $p = 0.000$). Regression analysis confirms that 39.3% of the variance in environmental impact is explained by green financing and sustainable practices, with the latter having a stronger influence. Suggestions include enhancing internal mechanisms such as employee training and strategic alignment, prioritizing renewable energy and sustainable supply chains, and pursuing eco-certifications. The study concludes that integrating green financing with operational strategies can drive sustainability and improve environmental performance, aligning Coimbatore's industrial growth with global sustainability goals.

Keywords: Green Financing, Sustainable Practices, Environmental Impact, Manufacturing Sector, Coimbatore Industries, Sustainable Development

1. INTRODUCTION

The escalating environmental challenges and the imperative for sustainable development have propelled the adoption of green financing in India's manufacturing sector. Green financing refers to the allocation of capital toward projects that yield environmental benefits, thereby fostering sustainable industrial practices (International Finance Corporation, 2022). In the Coimbatore district of Tamil Nadu, a prominent manufacturing hub, the integration of green financing is increasingly recognized as a catalyst for environmental stewardship and economic resilience. Tamil Nadu stands as a significant contributor to India's industrial output, housing over 70 Fortune 500 companies and a diverse array of manufacturing enterprises (Government of Tamil Nadu, 2021). This industrial proliferation, while economically beneficial, has led to heightened greenhouse gas (GHG) emissions and environmental degradation. The state's industrial sector is a major energy consumer, contributing substantially to GHG emissions (Climate Action Charter Report, 2023).

In response, there is a growing emphasis on adopting green financing mechanisms to mitigate environmental impacts and promote sustainable industrial growth.

Green financing encompasses various instruments, including green bonds, sustainability-linked loans, and investments in eco-friendly technologies. These financial tools are designed to support projects that aim to reduce carbon footprints, enhance energy efficiency, and implement sustainable resource management practices (Hariharan et al., 2024). For instance, UltraTech Cement, a leading Indian company, recently secured \$500 million through a sustainability-linked loan to advance its environmental, social, and governance (ESG) initiatives, such as reducing emissions and increasing the share of green energy (Reuters, 2024). In Coimbatore, the adoption of green supply chain management (GSCM) practices among small and medium-sized enterprises (SMEs), particularly in the motor and pump manufacturing sectors, has gained momentum. A study analyzing GSCM in Coimbatore's SMEs highlighted that regulatory pressures and the pursuit of environmental sustainability are key drivers for implementing green practices (Hariharan et al., 2024). The integration of GSCM has led to improved environmental performance and operational efficiencies, underscoring the role of green financing in facilitating these initiatives.

The Indian government's policy framework further bolsters the adoption of green financing. The Tamil Nadu Industrial Policy 2021 emphasizes sustainable industrial development and encourages investments in green technologies (Government of Tamil Nadu, 2021). Additionally, national-level initiatives, such as the issuance of green bonds and incentives for renewable energy projects, provide financial avenues for manufacturers to transition toward sustainability. Despite these advancements, challenges persist in the widespread adoption of green financing in Coimbatore's manufacturing sector. Barriers include limited awareness of green financial instruments, perceived high costs of implementation, and a lack of technical expertise (Climate Action Charter Report, 2023). Addressing these challenges necessitates collaborative efforts among financial institutions, government agencies, and industry stakeholders to promote awareness, provide technical support, and develop tailored financial products that meet the specific needs of manufacturers.

The integration of green financing in Coimbatore's manufacturing sector presents a viable pathway to achieving environmental sustainability and economic growth. By leveraging financial instruments that support eco-friendly initiatives, manufacturers can reduce their environmental impact, comply with regulatory standards, and enhance their competitive advantage. The ongoing efforts in policy support, industry engagement, and financial innovation are pivotal in overcoming existing barriers and fostering a sustainable industrial ecosystem in Coimbatore.

1.1. STATEMENT OF THE PROBLEM

The manufacturing sector plays a pivotal role in economic development, yet it is also a significant contributor to environmental degradation. Rising energy consumption, greenhouse gas emissions, and industrial waste generation are creating immense challenges for achieving sustainability. In response, green financing has emerged as a critical tool to support companies in transitioning towards eco-friendly operations by funding sustainable practices and environmentally conscious projects. However, despite the growing emphasis on green financing, its adoption within the manufacturing sector remains inconsistent, raising concerns about its role in fostering long-term sustainability. There is a pressing need to examine how green financing initiatives are perceived, adopted, and integrated into the operational frameworks of manufacturing companies, particularly in industrial hubs like Coimbatore District.

While external factors such as government incentives and institutional support have made green financing more accessible, internal organizational factors often hinder its effective implementation. Limited awareness among employees, insufficient strategic alignment, and inadequate stakeholder collaboration are some of the barriers to fully utilizing green financing. Furthermore, the potential of green financing to drive sustainable practices within organizations often remains untapped due to a lack of understanding of its long-term benefits. An in-depth study is required to uncover the interplay between green financing initiatives and their role in promoting sustainable practices within manufacturing companies.

Simultaneously, the implementation of sustainable practices within the sector presents its own set of challenges. While certain measures, such as energy efficiency and waste management, have gained traction, areas like renewable energy adoption and sustainable supply chain management are yet to be fully realized. The environmental impact of these practices also varies significantly depending on their scale and effectiveness. It becomes imperative to assess the extent to which sustainable practices contribute to measurable environmental outcomes and to identify areas requiring

further intervention. A comprehensive analysis of these factors will provide valuable insights for enhancing sustainability efforts and mitigating the environmental footprint of manufacturing activities in Coimbatore District.

1.2. OBJECTIVES OF THE STUDY

- 1) To analyze the adoption of green financing initiatives and their role in promoting sustainable practices in manufacturing companies of Coimbatore District.
- 2) To evaluate the implementation of sustainable practices and their impact on environmental outcomes within the manufacturing sector.

2. REVIEW OF LITERATURE

The escalating environmental concerns globally have underscored the importance of sustainable practices in the manufacturing and financial sectors. Over the years, Green Supply Chain Management (GSCM) and green financing have emerged as pivotal frameworks for addressing environmental challenges. Dr. T. Balamurugan et al. (2024) emphasized the growing adoption of GSCM across industries, particularly in small and medium enterprises (SMEs). Despite these developments, their study revealed significant gaps in the adoption of GSCM practices among SMEs in the motor and pump manufacturing sectors, a critical segment of Coimbatore's industrial ecosystem. The study noted barriers such as high operational costs, inadequate energy management systems, and limited supplier collaboration, which hinder the seamless implementation of green practices. Soundarrajan and Vivek (2016) further highlighted the role of green financing in fostering low-carbon growth by bridging environmental and economic goals. Their research showcased the potential of financial instruments such as green bonds and sustainability-linked loans in mitigating ecological degradation. However, they also noted persistent challenges, including lack of awareness, insufficient technological infrastructure, and regulatory inconsistencies, which stymie the widespread adoption of green financing in emerging economies like India. In the context of banking, Dr. K. Mekala (2019) outlined the significance of green banking initiatives, emphasizing their role in promoting eco-friendly financial products and services. While highlighting successful green banking practices like digital transactions and paperless banking, the study revealed that a significant portion of customers in Coimbatore remains unaware of these practices. This knowledge gap underscores the need for intensified awareness campaigns and customer education initiatives to accelerate green banking adoption.

Similarly, Rafia Gulzar et al. (2024) examined the influence of green banking activities on the environmental performance of Indian banks. Their findings indicated that operational practices such as paper reduction and green loans positively impact banks' environmental performance. However, the study identified gaps in employee training and customer awareness, limiting the broader impact of green banking initiatives. These findings align with Zhang et al. (2022), who observed that green financing mediates the relationship between green banking activities and environmental outcomes. They highlighted that the absence of skilled personnel to appraise green projects and the complexity of assessing environmental risks remain major obstacles in implementing green financing strategies. The relevance of producer companies in advancing sustainability goals was discussed by V. Jagadeesh Pandian and Madhavi Ganesan (2018). Their case study on Vellingiri Uzhavan Producer Company Ltd. in Coimbatore demonstrated how collective action and organic farming practices contribute to both economic and environmental sustainability. However, the authors pointed out that most producer companies focus primarily on economic gains, with limited integration of environmental objectives, creating a gap that needs to be addressed for holistic sustainability.

From a broader perspective, Rani (2019) explored sustainable manufacturing practices in micro, small, and medium enterprises (MSMEs). Her findings revealed that while cleaner production and eco-efficiency are gaining traction, significant gaps persist in supplier engagement, employee relations, and adherence to environmental regulations. The study also highlighted the positive impact of sustainable practices on financial performance, thereby making a strong case for integrating sustainability into the core strategies of MSMEs. Building on this, Suresh M. (2024) focused on the banking sector's role in driving sustainable economic development. The study identified green finance as a critical enabler for environmental sustainability, emphasizing its potential to fund eco-friendly projects and reduce carbon footprints. However, it also noted challenges such as high operational costs and reputational risks associated with green banking, necessitating robust regulatory frameworks and technological investments. Zhang et al. (2022) further elucidated the importance of green financing as a mediator between green banking activities and environmental performance. Their structural equation modeling approach demonstrated the positive impact of green banking practices

on financing eco-friendly projects, highlighting the need for enhanced technical expertise and policy support to overcome implementation challenges. Lastly, the role of GSCM in balancing economic and environmental sustainability was examined by Gulzar et al. (2024), who highlighted the pressures faced by manufacturing companies in southern India to adopt sustainable practices. The study identified internal awareness and regulatory compliance as key drivers for GSCM adoption while pointing out gaps in reverse logistics and market development for recycled materials.

2.1. RESEARCH GAP

The synthesis of these studies reveals critical gaps in the integration of green financing and sustainable practices within the manufacturing and financial sectors. While the importance of GSCM and green financing is well-documented, their adoption remains inconsistent across industries, particularly in SMEs. Key barriers include limited awareness, inadequate technical expertise, high operational costs, and fragmented regulatory frameworks. Furthermore, the interplay between green financing initiatives and their environmental impact in industrial hubs like Coimbatore remains underexplored. Existing literature often overlooks the specific challenges faced by SMEs in adopting green supply chain practices and the role of financial instruments in mitigating these challenges. This research aims to address these gaps by analyzing the adoption of green financing initiatives and evaluating their role in promoting sustainable practices in manufacturing companies in Coimbatore.

3. RESEARCH METHODOLOGY

The research methodology for this study is structured to examine the adoption of green financing initiatives and their impact on environmental outcomes in manufacturing companies in Coimbatore District. The study specifically focuses on senior-level employees who are involved in decision-making processes related to sustainability and green financing. The methodology ensures a comprehensive understanding of the factors influencing the adoption of green financing and its role in promoting sustainable practices within the manufacturing sector.

3.1. RESEARCH DESIGN

This study adopts a Descriptive Research Design, suitable for exploring and explaining the relationships between green financing initiatives, sustainable practices, and environmental impact. By focusing on current practices and their outcomes, this design allows for an accurate analysis of how various factors, such as company size, years of operation, and industry type, influence sustainability initiatives in manufacturing companies.

3.2. SAMPLING DESIGN AND TECHNIQUE

The research employs a Non-Probability Sampling method, specifically Purposive Sampling, to target senior-level employees working in manufacturing companies in Coimbatore District. These individuals are selected because of their direct involvement in strategic decisions related to green financing and sustainability practices. This approach ensures that the data collected is highly relevant to the objectives of the study.

3.3. SAMPLE SIZE

The study includes 137 senior-level employees from diverse manufacturing companies, including textile, automobile, and engineering sectors. This sample size is sufficient to draw meaningful conclusions about the adoption of green financing initiatives and the implementation of sustainable practices in the district's manufacturing sector.

3.4. TOOLS USED

The analysis is conducted using statistical tools such as Simple Percentage Analysis, Descriptive Statistics, ANOVA (Analysis of Variance), Correlation Analysis, and Multiple Linear Regression Analysis. These tools facilitate a detailed evaluation of the relationships between organizational dimensions, sustainable practices, and environmental impact, providing actionable insights into the effectiveness of green financing initiatives.

3.5. DATA COLLECTION

Primary data is collected through structured questionnaires, distributed to senior-level employees in manufacturing companies across Coimbatore District. The questionnaire is designed to gather insights on the adoption of green financing, the implementation of sustainable practices, and their environmental outcomes. This method ensures that the responses reflect the strategic perspectives of decision-makers, offering a clear understanding of the factors driving or hindering green financing and sustainability.

4. ANALYSIS AND INTERPRETATION

Table 1 Demographic Profile of the respondents

Demographic Factor	Options	No. of respondents	Percent	Total Percent
Type of Manufacturing Industry	Upto 25 years	39	27.3	100.0
	Textile Industry	37	27.0	
	Automobile Industry	46	33.6	
	Engineering and Machinery	30	21.9	
Company Size	Small (Less than 50 employees)	38	27.7	100.0
	Medium (50-250 employees)	57	41.6	
	Large (More than 250 employees)Others	42	30.7	
Years of Operation	Less than 5 years	54	39.4	100.0
	5-10 years	34	24.8	
	11-20 years	30	21.9	
	More than 20 years	19	13.9	

Source Computed from Primary data

INTERPRETATION: Table No. 1 provides an overview of the demographic characteristics of the respondents from manufacturing companies in Coimbatore District. Among the types of manufacturing industries, the Automobile Industry has the highest representation (33.6%), followed by the Textile Industry (27.0%) and the Engineering and Machinery Industry (21.9%). With respect to company size, the majority of respondents are from medium-sized companies with 50–250 employees (41.6%). This is followed by large companies with more than 250 employees (30.7%) and small companies with fewer than 50 employees (27.7%). In terms of years of operation, most respondents are from organizations operating for less than 5 years (39.4%), while 24.8% represent companies with 5–10 years of operation, 21.9% are from those with 11–20 years, and only 13.9% are from companies operating for more than 20 years.

Table 2 Adoption of Green Financing Initiatives

Adoption of Green Financing Initiatives	Mean	Std. Deviation
Awareness programs on green financing are adequately organized in our company	3.453	1.272
Access to green financing options is hassle-free and well-supported by financial institutions	3.241	1.369
Employees are well-informed about the importance and benefits of adopting green financing	2.964	1.442
Organizational policies actively encourage adopting green financing methods	3.161	1.341
Government subsidies and incentives motivate the adoption of green financing in our organization	3.175	1.439
The availability of eco-friendly financing options impacts our decision-making processes	2.971	1.414
Green financing is considered an integral part of our organizational growth strategy	2.934	1.451
Financial institutions offer suitable interest rates and repayment terms for green financing initiatives	3.109	1.359
The leadership team is committed to implementing green financing practices	3.073	1.428
Adoption of green financing has improved our organization's environmental compliance levels	3.022	1.396
Green financing awareness among stakeholders has increased significantly in recent years	3.000	1.404
Collaboration with government and non-government organizations supports green financing initiatives	2.964	1.437
Employee training programs include components related to green financing benefits and processes	2.956	1.480
There is a positive perception of green financing's long-term economic and environmental benefits	2.920	1.399
Peer companies' adoption of green financing practices influences our decision to implement the same	2.993	1.417

Source Computed from Primary data

INFERENCE: Table No. 2 highlights the ranking of factors influencing the adoption of green financing initiatives in manufacturing companies of Coimbatore District. 'Awareness programs on green financing are adequately organized in

our company' ranks first with the highest mean score of 3.453, followed by 'Access to green financing options is hassle-free and well-supported by financial institutions' (mean: 3.241) and 'Government subsidies and incentives motivate the adoption of green financing in our organization' (mean: 3.175). 'Organizational policies actively encourage adopting green financing methods' (mean: 3.161) and 'Financial institutions offer suitable interest rates and repayment terms for green financing initiatives' (mean: 3.109) rank fourth and fifth, respectively. Leadership commitment and environmental compliance rank sixth and seventh with mean scores of 3.073 and 3.022, respectively. Stakeholder awareness (mean: 3.000) and peer influence (mean: 2.993) rank eighth and ninth, followed by the impact of eco-friendly financing on decision-making (mean: 2.971) at tenth. Employee awareness, collaboration with organizations, and training programs share similar rankings (mean: 2.964 and 2.956). Lastly, 'Green financing as part of organizational growth strategy' (mean: 2.934) and 'Positive perception of long-term benefits of green financing' (mean: 2.920) rank thirteenth and fourteenth, reflecting the need for improved strategic integration and awareness of long-term benefits. The results indicate that while awareness and institutional support for green financing are strong, internal factors such as training, strategic alignment, and employee involvement require further enhancement.

Table 3 Implementation of Sustainable Practices

Implementation of Sustainable Practices	Mean	Std. Deviation
Our organization has adopted energy-efficient technologies in production processes	3.569	1.276
Sustainable practices are integrated into all levels of organizational operations	3.620	1.237
Resource optimization and waste reduction measures are regularly monitored	3.555	1.266
The company prioritizes the usage of renewable energy sources wherever feasible	3.438	1.317
Eco-friendly practices are a key factor in decision-making and strategy development	3.577	1.223
Sustainable supply chain management is actively encouraged and implemented	3.467	1.295
Employees are regularly trained on sustainable practices and their importance	3.569	1.276
There is a systematic approach to reducing carbon emissions from organizational activities	3.547	1.248
Partnerships with local environmental organizations enhance sustainable practice implementation	3.467	1.266
Adoption of sustainable practices has resulted in noticeable financial benefits for the organization	3.577	1.235
Investments in sustainability-related infrastructure are a priority for the organization	3.540	1.289
Sustainable practices are effectively communicated to employees, customers, and other stakeholders	3.511	1.278
The organization actively monitors compliance with sustainability-related laws and regulations	3.496	1.312
Incentives are provided to employees to encourage eco-friendly behavior and innovation	3.482	1.272
The organization's commitment to sustainability is publicly acknowledged and recognized	3.504	1.290

Source Computed from Primary data

INFERENCE: Table No. 3 ranks the factors influencing the implementation of sustainable practices in manufacturing companies of Coimbatore District. 'Sustainable practices are integrated into all levels of organizational operations' ranked first with the highest mean score of 3.620, followed by 'Eco-friendly practices are a key factor in decision-making and strategy development' and 'Adoption of sustainable practices has resulted in noticeable financial benefits for the organization' (mean: 3.577 each). 'Employees are regularly trained on sustainable practices and their importance' and 'Our organization has adopted energy-efficient technologies in production processes' share the third rank (mean: 3.569), while 'Resource optimization and waste reduction measures are regularly monitored' ranks fourth (mean: 3.555). 'There is a systematic approach to reducing carbon emissions from organizational activities' stands fifth with a mean score of 3.547. Other notable factors include 'Investments in sustainability-related infrastructure are a priority for the organization' (mean: 3.540), 'Sustainable practices are effectively communicated to employees, customers, and other stakeholders' (mean: 3.511), and 'The organization's commitment to sustainability is publicly acknowledged and recognized' (mean: 3.504). Lower-ranked factors include 'The organization actively monitors compliance with sustainability-related laws and regulations' (mean: 3.496), 'Incentives are provided to employees to encourage eco-friendly behavior and innovation' (mean: 3.482), 'Sustainable supply chain management is actively encouraged and implemented' and 'Partnerships with local environmental organizations enhance sustainable practice implementation' (mean: 3.467 each). Finally, 'The company prioritizes the usage of renewable energy sources wherever feasible' ranks last with a mean score of 3.438. The results indicate strong integration of sustainability in operations and strategy, while areas like renewable energy usage and supply chain management require more focus.

Table 4 Environmental Impact

Environmental Impact	Mean	Std. Deviation
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Energy consumption levels have decreased significantly due to recent environmental measures.	3.606	1.209
The organization has achieved a measurable reduction in greenhouse gas emissions.	3.606	1.197
Implementation of eco-friendly technologies has improved environmental outcomes.	3.577	1.235
Adoption of green practices has significantly reduced industrial waste generation.	3.591	1.210
The organization has made notable progress in minimizing its water usage.	3.489	1.284
Environmental sustainability initiatives have enhanced our company's corporate social responsibility.	3.547	1.272
Air pollution levels associated with the company's activities have decreased over time.	3.474	1.301
The use of biodegradable materials has significantly increased within the organization.	3.467	1.301
Collaboration with local communities has positively impacted our environmental initiatives.	3.555	1.266
Environmental monitoring systems have helped achieve set sustainability goals.	3.577	1.235
Efforts to protect biodiversity are an integral part of organizational practices.	3.504	1.284
Customers and stakeholders perceive the organization as environmentally responsible.	3.526	1.261
Waste recycling programs have shown tangible improvements in resource utilization.	3.606	1.245
Eco-friendly certifications and recognitions have positively impacted the organization's brand image.	3.431	1.288
Organizational initiatives have aligned with national and global environmental goals.	3.474	1.278

Source Computed from Primary data

INFERENCE Table No. 4 ranks the factors influencing the environmental impact of manufacturing companies in Coimbatore District. 'Energy consumption levels have decreased significantly due to recent environmental measures,' 'The organization has achieved a measurable reduction in greenhouse gas emissions,' and 'Waste recycling programs have shown tangible improvements in resource utilization' share the top rank with the highest mean score of 3.606. 'Adoption of green practices has significantly reduced industrial waste generation' ranks second (mean: 3.591), followed by 'Implementation of eco-friendly technologies has improved environmental outcomes' and 'Environmental monitoring systems have helped achieve set sustainability goals' at third (mean: 3.577). 'Collaboration with local communities has positively impacted our environmental initiatives' ranks fourth (mean: 3.555), while 'Environmental sustainability initiatives have enhanced our company's corporate social responsibility' stands fifth (mean: 3.547). Other notable factors include 'Customers and stakeholders perceive the organization as environmentally responsible' at sixth (mean: 3.526) and 'Efforts to protect biodiversity are an integral part of organizational practices' at seventh (mean: 3.504). Lower-ranked factors include 'Minimizing water usage' (mean: 3.489), 'Reducing air pollution levels' and 'Alignment with national and global environmental goals' (mean: 3.474 each), and 'Increased use of biodegradable materials' (mean: 3.467). Finally, 'Eco-friendly certifications and recognitions positively impacting the brand image' ranks last (mean: 3.431). The findings highlight significant achievements in reducing energy consumption, emissions, and waste, while areas like biodegradable material usage and eco-certifications require greater focus.

Hypothesis No.: 1

Null Hypothesis (H₀): There is no significant association between the Type of Manufacturing Industry and the dimensions of Sustainability and Green Financing Practices

Alternative Hypothesis (H_a): There is a significant association between the Type of Manufacturing Industry and the dimensions of Sustainability and Green Financing Practices

Table 5 ANOVA analysis between the Type of Manufacturing Industry and the dimensions of Sustainability and Green Financing Practices

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
Adoption of Green Financing Initiatives	Between Groups	250.256	3	83.419	2.799	.043
	Within Groups	3964.153	133	29.806		
	Total	4214.409	136			
Implementation of Sustainable Practices	Between Groups	890.187	3	296.729	4.600	.004
	Within Groups	8579.930	133	64.511		
	Total	9470.117	136			

Environmental Impact	Between Groups	947.413	3	315.804	4.381	.006
	Within Groups	9586.471	133	72.079		
	Total	10533.883	136			

Source Computed from Primary data

INFERENCE: Table No. 5 presents the ANOVA analysis results, indicating a significant association between the Type of Manufacturing Industry and all three dimensions of Sustainability and Green Financing Practices. For Adoption of Green Financing Initiatives, the F-value is 2.799 with a p-value of .043, indicating a significant relationship. Similarly, Implementation of Sustainable Practices shows a stronger association with an F-value of 4.600 and a p-value of .004. Environmental Impact also exhibits a significant association, with an F-value of 4.381 and a p-value of .006. As all p-values are less than 0.05, the Null Hypothesis (H₀) is rejected, confirming that the type of manufacturing industry significantly influences the adoption of green financing initiatives, implementation of sustainable practices, and environmental impact.

Hypothesis No.: 2

Null Hypothesis (H₀): There is no significant association between the Company Size and the dimensions of Sustainability and Green Financing Practices

Alternative Hypothesis (H_a): There is a significant association between the Company Size and the dimensions of Sustainability and Green Financing Practices

Table 6 ANOVA analysis between the Company Size and the dimensions of Sustainability and Green Financing Practices

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
Adoption of Green Financing Initiatives	Between Groups	221.465	2	110.733	3.716	.027
	Within Groups	3992.944	134	29.798		
	Total	4214.409	136			
Implementation of Sustainable Practices	Between Groups	718.924	2	359.462	5.504	.005
	Within Groups	8751.193	134	65.307		
	Total	9470.117	136			
Environmental Impact	Between Groups	669.155	2	334.578	4.545	.012
	Within Groups	9864.728	134	73.617		
	Total	10533.883	136			

Source Computed from Primary data

INFERENCE: Table No. 6 presents the ANOVA analysis results, indicating a significant association between Company Size and all three dimensions of Sustainability and Green Financing Practices. For Adoption of Green Financing Initiatives, the F-value is 3.716 with a p-value of .027, showing a significant relationship. Implementation of Sustainable Practices exhibits an even stronger association, with an F-value of 5.504 and a p-value of .005. Similarly, Environmental Impact shows a significant relationship, with an F-value of 4.545 and a p-value of .012. Since all p-values are below 0.05, the Null Hypothesis (H₀) is rejected, confirming that the Company Size significantly influences the adoption of green financing initiatives, the implementation of sustainable practices, and their environmental impact.

Hypothesis No.: 3

Null Hypothesis (H₀): There is no significant association between the Years of Operation and the dimensions of Sustainability and Green Financing Practices

Alternative Hypothesis (Ha): There is a significant association between the Years of Operation and the dimensions of Sustainability and Green Financing Practices

Table 7 ANOVA analysis between the Years of Operation and the dimensions of Sustainability and Green Financing Practices

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
Adoption of Green Financing Initiatives	Between Groups	349.528	3	116.509	4.009	.009
	Within Groups	3864.881	133	29.059		
	Total	4214.409	136			
Implementation of Sustainable Practices	Between Groups	1348.778	3	449.593	7.363	.000
	Within Groups	8121.339	133	61.063		
	Total	9470.117	136			
Environmental Impact	Between Groups	1610.825	3	536.942	8.003	.000
	Within Groups	8923.059	133	67.091		
	Total	10533.883	136			

Source Computed from Primary data

INFERENCE: Table No. 7 presents the ANOVA analysis results, showing a significant association between Years of Operation and all three dimensions of Sustainability and Green Financing Practices.

For Adoption of Green Financing Initiatives, the F-value is 4.009 with a p-value of .009, indicating a significant relationship. Implementation of Sustainable Practices shows an even stronger association, with an F-value of 7.363 and a p-value of .000. Similarly, Environmental Impact exhibits a highly significant relationship, with an F-value of 8.003 and a p-value of .000. As all p-values are below 0.05, the Null Hypothesis (H₀) is rejected, confirming that the Years of Operation significantly influence the adoption of green financing initiatives, implementation of sustainable practices, and their environmental impact.

Hypothesis No.: 4

Null Hypothesis (H₀): There is no significant correlation between the dimensions of Sustainability and Green Financing Practices

Alternative Hypothesis (Ha): There is a significant correlation between the dimensions of Sustainability and Green Financing Practices

Table 8 Correlation analysis between the dimensions of Sustainability and Green Financing Practices

Correlations				
		Adoption of Green Financing Initiatives	Implementation of Sustainable Practices	Environmental Impact
Adoption of Green Financing Initiatives	Pearson Correlation	1	.357**	.354**
	Sig. (2-tailed)		.000	.000
	N	137	137	137
Implementation of Sustainable Practices	Pearson Correlation	.357**	1	.610**
	Sig. (2-tailed)	.000		.000
	N	137	137	137

Environmental Impact	Pearson Correlation	.354**	.610**	1
	Sig. (2-tailed)	.000	.000	
	N	137	137	137

Correlation is significant at the 0.01 level (2-tailed).

Source Computed from Primary data

INFERENCE: Table No. 8 presents the correlation analysis, revealing significant positive correlations between the dimensions of Sustainability and Green Financing Practices, supporting the Alternative Hypothesis. The Pearson correlation between Adoption of Green Financing Initiatives and Implementation of Sustainable Practices is .357, indicating a moderate positive correlation, significant at the 0.01 level. Similarly, the correlation between Adoption of Green Financing Initiatives and Environmental Impact is .354, also moderately positive and significant at the same level. The strongest correlation is observed between Implementation of Sustainable Practices and Environmental Impact, with a Pearson correlation of .610, signifying a strong positive relationship, significant at the 0.01 level.

Hypothesis No.: 5

Null Hypothesis (H₀): There is no significant linear relationship between the Implementation of Sustainable Practices, Adoption of Green Financing Initiatives, and Environmental Impact

Alternative Hypothesis (H_a): There is a significant linear relationship between the Implementation of Sustainable Practices, Adoption of Green Financing Initiatives, and Environmental Impact

Table 9 Model Summary and ANOVA analysis between the Implementation of Sustainable Practices, Adoption of Green Financing Initiatives, and Environmental Impact

Model Summary ^b											
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson	
					R Square Change	F Change	df1	df2	Sig. F Change		
1	.627 ^a	.393	.384	6.90547	.393	43.451	2	134	.000	1.768	
a. Predictors: (Constant), Implementation of Sustainable Practices, Adoption of Green Financing Initiatives											
b. Dependent Variable: Environmental Impact											
ANOVA ^a											
Model		Sum of Squares		df		Mean Square		F	Sig.		
1	Regression		4144.017		2		2072.009		43.451	.000 ^b	
	Residual		6389.866		134		47.686				
	Total		10533.883		136						
a. Dependent Variable: Environmental Impact											
b. Predictors: (Constant), Implementation of Sustainable Practices, Adoption of Green Financing Initiatives											

Source Computed from Primary data

INFERENCE: Table No. 9 highlights the results of the regression analysis, showing a significant linear relationship between Implementation of Sustainable Practices, Adoption of Green Financing Initiatives, and Environmental Impact, supporting the Alternative Hypothesis (H_a). The model summary reports an R Square of .393, indicating that 39.3% of the variance in Environmental Impact is explained by the predictors: Implementation of Sustainable Practices and Adoption of Green Financing Initiatives. The Adjusted R Square of .384 suggests a strong fit of the model. The ANOVA

analysis further supports the significance of the model, with an F-value of 43.451 and a p-value of .000, confirming that the relationship is statistically significant.

Table 10 Coefficients between the Implementation of Sustainable Practices, Adoption of Green Financing Initiatives, and Environmental Impact

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	10.766	5.371		2.004	.047
	Adoption of Green Financing Initiatives	.247	.114	.156	2.165	.032
	Implementation of Sustainable Practices	.585	.076	.554	7.695	.000
a. Dependent Variable: Environmental Impact						

Source Computed from Primary data

INFERENCE: Table No. 10 highlights the regression coefficients, demonstrating that both Adoption of Green Financing Initiatives and Implementation of Sustainable Practices significantly contribute to Environmental Impact. The coefficient for Adoption of Green Financing Initiatives is 0.247 with a t-value of 2.165 and a p-value of 0.032, indicating a positive and statistically significant contribution. Similarly, Implementation of Sustainable Practices shows a stronger contribution, with a coefficient of 0.585, a t-value of 7.695, and a highly significant p-value of 0.000. The results confirm that both factors play a critical role in enhancing Environmental Impact, with Implementation of Sustainable Practices having a more substantial influence compared to Adoption of Green Financing Initiatives.

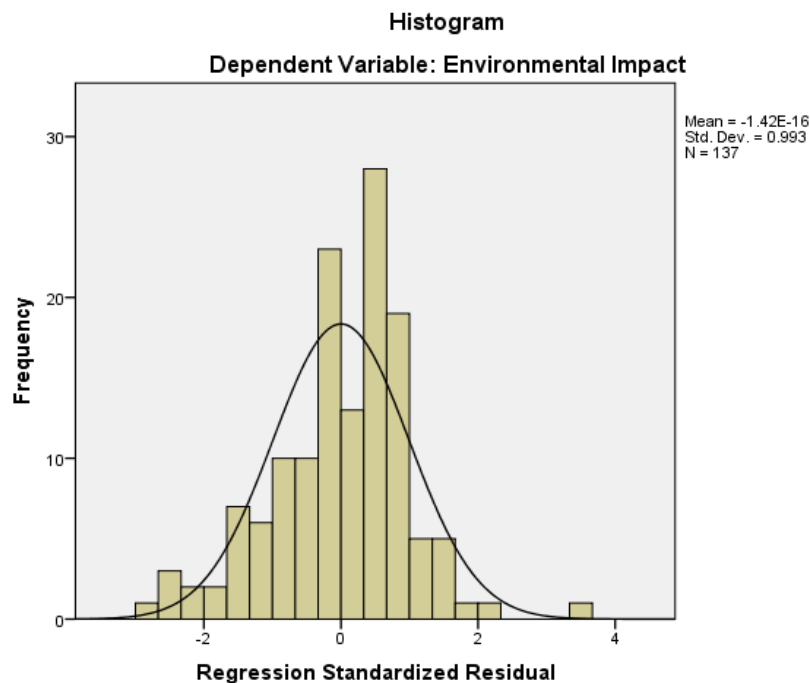
Table 11 Residuals Statistics between the Implementation of Sustainable Practices, Adoption of Green Financing Initiatives, and Environmental Impact

Residuals Statistics ^a					
	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	41.1812	64.8203	53.0292	5.52003	137
Residual	-19.84580	23.81876	.00000	6.85451	137
Std. Predicted Value	-2.146	2.136	.000	1.000	137
Std. Residual	-2.874	3.449	.000	.993	137
a. Dependent Variable: Environmental Impact					

Source Computed from Primary data

INFERENCE: Table No. 11 presents the residuals statistics, indicating that the predicted values of Environmental Impact range from 41.18 to 64.82, with a mean of 53.03 and a standard deviation of 5.52, reflecting consistent predictions across the dataset. The residuals, representing the differences between the observed and predicted values, range from -19.85 to 23.82, with a mean of 0.00 and a standard deviation of 6.85, indicating that the residuals are well-distributed around zero. The standardized predicted values and residuals are within acceptable ranges, with no significant systematic errors observed. These results confirm that the model provides a good fit for predicting Environmental Impact based on Implementation of Sustainable Practices and Adoption of Green Financing Initiatives.

Chart No.1 Histogram between the Implementation of Sustainable Practices, Adoption of Green Financing Initiatives, and Environmental Impact



5. FINDINGS OF THE STUDY

The demographic analysis (Table No. 1) reveals a diverse representation of manufacturing industries in Coimbatore District. The Automobile Industry constitutes the largest share (33.6%), followed by the Textile Industry (27.0%) and Engineering and Machinery Industry (21.9%). Medium-sized companies with 50–250 employees dominate (41.6%), while most respondents are from organizations operating for less than five years (39.4%). Statistical analyses (Tables No. 5–10) provide robust evidence of significant relationships between company characteristics and sustainability dimensions. ANOVA results confirm that industry type, company size, and years of operation significantly influence the adoption of green financing initiatives, implementation of sustainable practices, and environmental impact, with all p-values below 0.05.

Correlation analysis (Table No. 8) highlights strong interdependence between the dimensions, with the strongest positive correlation observed between implementation of sustainable practices and environmental impact ($r = 0.610$, $p = 0.000$). Regression analysis (Tables No. 9 and 10) shows that 39.3% of the variance in environmental impact is explained by sustainable practices and green financing initiatives, with sustainable practices having the most substantial impact (coefficient = 0.585, $p = 0.000$). Residual statistics (Table No. 11) confirm the model's reliability, with predictions consistent and free from significant errors. Table No. 4 highlights the top factors influencing environmental impact, including reductions in energy consumption, greenhouse gas emissions, and waste recycling improvements (mean: 3.606). Other notable contributions include collaboration with local communities (mean: 3.555) and corporate social responsibility initiatives (mean: 3.547). However, lower emphasis on biodegradable materials (mean: 3.467) and eco-friendly certifications (mean: 3.431) suggests areas for improvement.

5.1. SUGGESTIONS

To strengthen the adoption of green financing initiatives, manufacturing companies should focus on improving internal mechanisms such as employee training, strategic alignment, and stakeholder collaboration. Awareness programs and financial incentives should be complemented by comprehensive training modules to enhance employees' understanding of the long-term benefits of green financing. Furthermore, partnerships with financial institutions and government bodies should be expanded to simplify access to green financing and maximize the utilization of available subsidies and incentives.

The implementation of sustainable practices can be further enhanced by addressing weaker areas such as renewable energy adoption, supply chain management, and biodegradable material usage. Companies should invest in renewable energy infrastructure and prioritize sustainable supply chain practices to reduce environmental footprints. Collaborations with local environmental organizations can provide additional support in implementing sustainable practices. Eco-certifications and recognitions should also be actively pursued to enhance the organization's brand image and compliance with global sustainability standards.

Efforts to improve environmental impact should focus on reinforcing energy efficiency, waste recycling, and greenhouse gas emission reduction initiatives. Regular monitoring systems should be implemented to track progress and ensure the alignment of environmental practices with organizational and national goals. Companies should also encourage community participation in sustainability initiatives and allocate resources to biodiversity conservation, water usage optimization, and air quality improvement. These measures will contribute to creating a sustainable and environmentally responsible manufacturing ecosystem.

6. CONCLUSION

The study concludes that green financing initiatives play a vital role in promoting sustainable practices in manufacturing companies. While awareness programs and institutional support for green financing are commendable, the findings highlight the need for improved strategic integration and greater involvement of employees and stakeholders. Strengthening these internal factors will enable companies to fully leverage the benefits of green financing and align it with their growth strategies. Sustainable practices significantly contribute to achieving positive environmental outcomes. Companies with strong sustainable practices have shown measurable improvements in energy consumption, waste reduction, and greenhouse gas emissions. However, the findings emphasize the importance of addressing gaps in renewable energy adoption, supply chain sustainability, and biodegradable material usage to ensure comprehensive and long-term environmental benefits.

The study successfully evaluating the role of green financing and sustainable practices in influencing environmental impact. The strong interdependence between these dimensions underscores the importance of an integrated approach. Manufacturing companies that align their financial and operational strategies with sustainability principles can enhance their environmental performance, achieve regulatory compliance, and strengthen their competitive advantage in the global market.

CONFLICT OF INTERESTS

None.

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