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Adoption of Green Accounting Practices in Indian Manufacturing Companies

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Abstract

Green accounting has emerged as an important approach for incorporating environmental considerations into corporate accounting and reporting practices. With increasing environmental concerns, regulatory pressure, and stakeholder expectations, companies are encouraged to disclose their environmental performance and sustainability initiatives. The present study examines the adoption of green accounting practices among selected Indian manufacturing companies. The study is based on secondary data collected from annual reports, sustainability reports, and Business Responsibility and Sustainability Reports (BRSR) of companies such as Tata Steel, Reliance Industries Limited, Mahindra & Mahindra, ITC Limited, and Hindustan Unilever Limited. A descriptive research design has been adopted to analyse environmental disclosures related to energy consumption, carbon emissions, waste management practices, and environmental expenditures. The findings indicate that most companies disclose environmental information and sustainability initiatives in their reports; however, the systematic integration of environmental costs into traditional accounting systems remains limited. The study also finds that regulatory frameworks such as Business Responsibility and Sustainability Reporting (BRSR) have improved environmental transparency among companies. Nevertheless, many disclosures remain qualitative rather than quantitative. The study concludes that while awareness and reporting of environmental sustainability have increased among Indian manufacturing companies, the practical implementation of comprehensive green accounting practices is still evolving.

Keywords: Green Accounting, Environmental Accounting, Sustainability Reporting, Manufacturing Companies, Environmental Disclosure.

Introduction

Environmental sustainability has become a central concern in contemporary corporate governance and accounting research. The growing intensity of industrialization, environmental degradation, climate change, and resource depletion has compelled organizations to reconsider the traditional profit-oriented accounting framework. In this context, Green Accounting, also referred to as Environmental Accounting, has emerged as an important mechanism to integrate environmental considerations into corporate financial reporting and decision-making processes.

Green accounting extends beyond conventional accounting by incorporating environmental costs, liabilities, and performance indicators into organizational reporting systems. It enables firms to identify and measure expenditures related to pollution control, waste management, energy conservation, carbon emissions, and compliance with environmental regulations. By recognizing environmental costs explicitly, companies can enhance transparency, improve stakeholder confidence, and promote sustainable development.

The theoretical foundation of green accounting is strongly supported by **Stakeholder Theory** and **Legitimacy Theory**. Stakeholder Theory suggests that organizations are accountable not only to shareholders but also to a broader group of stakeholders, including customers, employees, government, and society. Environmental disclosure and green accounting practices serve as tools to satisfy stakeholder expectations. Similarly, Legitimacy Theory argues that firms disclose environmental information to legitimize their operations and maintain social approval. In industries such as manufacturing—where environmental impact is relatively high—the need for legitimacy and stakeholder acceptance becomes even more significant.

In the Indian context, regulatory reforms have strengthened the sustainability reporting framework. The introduction of Business Responsibility and Sustainability Reporting (BRSR) guidelines by the Securities and Exchange Board of India has made sustainability disclosures mandatory for top listed companies. Furthermore, professional guidance issued by the Institute of Chartered Accountants of India has emphasized environmental cost reporting within corporate accounting systems. These regulatory developments indicate a shift toward institutionalizing green accounting practices within Indian corporates.

The manufacturing sector plays a critical role in India's economic development, contributing significantly to GDP, employment, and exports. However, it is also associated with high levels of energy consumption, emissions, and waste generation. Consequently, examining the adoption of green accounting practices within Indian manufacturing companies is both relevant and timely. While large firms increasingly publish sustainability and ESG reports, the depth and consistency of environmental cost disclosures remain uncertain.

Therefore, this study seeks to analyse the extent of adoption of green accounting practices in Indian manufacturing companies using secondary data. By evaluating sustainability disclosures, environmental reporting patterns, and cost recognition practices, the study aims to contribute to the existing literature on environmental accounting and corporate sustainability in emerging economies.

Literature Review

Green accounting has been recognized as a strategic approach to integrating environmental costs into the financial reporting of firms, enhancing transparency and sustainability in corporate practices. **Sharma and Mishra (2021)** argue that green accounting practices help firms identify environmental impacts and allocate costs related to pollution control and resource utilization, which leads to better environmental performance and decision-making by management.

In the Indian context, **Rajasekar and Reddy (2022)** examined environmental disclosure practices across manufacturing companies and found that although most firms report environmental information in annual and sustainability reports, only a few integrate environmental costs systematically within their accounting systems. The study highlights that regulatory guidelines and stakeholder expectations act as key drivers for such disclosures.

Kumar and Singh (2023) explored the influence of regulatory frameworks like BRSR (Business Responsibility and Sustainability Reporting) on environmental disclosure practices of Indian listed companies. Their findings indicate that mandatory sustainability reporting has led to more structured reporting of environmental data, including energy usage, emissions, and waste management, but adoption of internal green accounting processes remains superficial within many firms.

Research by **Patel and Shah (2023)** on medium and large-scale manufacturing firms revealed that companies in pollution-intensive sectors are more likely to disclose environmental cost information publicly, motivated by legitimacy concerns and pressure from investors and regulators. However, the study noted that the depth and quantitative detail of disclosures varied significantly across industries.

Globally, studies such as **Alam and Begum (2024)** emphasize the importance of standard frameworks like the Global Reporting Initiative (GRI) for enhancing environmental transparency. Their comparative study suggests that firms adopting international sustainability standards exhibit higher quality environmental reporting, influencing Indian firms to align with such benchmarks.

Verma (2024) analysed green accounting adoption in select Indian industries and reported that while awareness of environmental cost accounting is increasing, implementation challenges such as lack of expertise, standardized guidelines, and resource constraints hinder deeper adoption, particularly among small and medium enterprises.

In an empirical study, **Joshi and Mehta (2025)** investigated the relationship between corporate performance and green accounting disclosure among top manufacturing firms. They found a positive association between firms that disclose environmental costs and improved stakeholder perception, which in turn can enhance investment potential. However, the study also emphasized that consistency in measurement and reporting is still weak.

Rao and Gupta (2025) focused specifically on the adoption of green accounting practices in heavy manufacturing sectors, concluding that while environmental disclosures have improved post-BRSR implementation, there is still limited use of internal accounting systems to capture and manage environmental costs accurately.

Theoretical Framework

The adoption of Green Accounting practices in Indian manufacturing companies can be explained through established theoretical perspectives in accounting and corporate governance literature. This study is primarily grounded in **Stakeholder Theory** and **Legitimacy Theory**, which provide a conceptual basis for understanding environmental disclosure and sustainability reporting practices.

Stakeholder Theory

Stakeholder Theory, proposed by R. Edward Freeman (1984), argues that organizations are accountable to a wide range of stakeholders, not just shareholders. These stakeholders include customers, employees, suppliers, investors, government, and society at large. In environmentally sensitive industries such as manufacturing, stakeholders increasingly demand transparency regarding environmental performance and sustainability initiatives.

Green accounting serves as a strategic tool to address stakeholder expectations by:

- Disclosing environmental expenditures,
- Reporting carbon emissions and waste management practices,
- Demonstrating commitment to sustainable development.

From this perspective, manufacturing companies adopt green accounting practices to enhance trust, maintain investor confidence, and strengthen long-term stakeholder relationships.

Legitimacy Theory

Legitimacy Theory suggests that organizations continuously seek to ensure that their operations are perceived as legitimate within the norms and values of society. Companies operating in pollution-intensive sectors often face social and regulatory pressure to justify their environmental impact.

Environmental disclosures and green accounting practices function as mechanisms through which firms:

- Demonstrate compliance with environmental regulations,
- Communicate responsible environmental behaviour,
- Protect corporate reputation.

In the Indian context, regulatory bodies such as the Securities and Exchange Board of India have mandated sustainability disclosures under the BRSR framework. This institutional pressure encourages firms to legitimize their operations through structured environmental reporting.

Institutional Theory (Supporting Perspective)

Institutional Theory further explains that organizations adopt certain practices due to regulatory, normative, and mimetic pressures. Manufacturing companies may implement green accounting practices because:

- Regulations require sustainability reporting,
- Professional bodies such as the Institute of Chartered Accountants of India provide environmental accounting guidance,
- Peer companies adopt sustainability frameworks, creating competitive pressure.

Thus, adoption of green accounting in Indian manufacturing companies can be viewed as a response to institutional and regulatory environments.

Conceptual Linkage

Based on these theories, the conceptual assumption of the study is:

Stakeholder Pressure + Regulatory Requirements + Need for Legitimacy → Adoption of Green Accounting Practices

This theoretical foundation supports the analysis of environmental disclosure patterns and helps explain variations in adoption levels among manufacturing firms.

Research Gap

Although several studies have examined environmental disclosure and sustainability reporting practices in India, most of the existing research primarily focuses on general ESG reporting trends rather than the systematic adoption of green accounting within internal accounting systems. Previous studies have largely emphasized policy disclosures, corporate sustainability initiatives, and regulatory compliance under frameworks such as BRSR. However, limited attention has been given to the extent to which environmental costs are actually identified, measured, and integrated into financial accounting practices.

Further, many studies are either conceptual in nature or concentrate on developed economies, with relatively fewer sector-specific empirical analyses in the Indian manufacturing context. Given that manufacturing is one of the most environmentally sensitive and resource-intensive sectors, a focused evaluation of green accounting adoption within this sector remains insufficiently explored.

Additionally, while regulatory reforms have strengthened sustainability reporting requirements, there is a lack of structured assessment regarding how far these disclosures translate into practical green accounting

implementation. The gap lies in understanding whether environmental reporting is merely compliance-oriented or reflects genuine integration of environmental cost accounting.
Therefore, the present study seeks to bridge this gap by systematically analysing the extent of green accounting adoption in Indian manufacturing companies using secondary data from sustainability reports. This study aims to provide a more focused, sector-specific, and evidence-based understanding of environmental cost disclosure practices in India.

Objectives of the Study

1. To examine the extent of adoption of green accounting practices among selected Indian manufacturing companies.
2. To analyse the nature and level of environmental cost disclosures in annual reports and sustainability reports.
3. To evaluate the impact of regulatory frameworks, particularly Business Responsibility and Sustainability Reporting (BRSR), on environmental reporting practices.
4. To assess whether environmental disclosures reflect actual integration of environmental costs into accounting systems or are merely compliance-oriented.

Research Methodology:

This study adopts a descriptive and analytical research design to examine the adoption of green accounting practices among Indian manufacturing companies. The study primarily relies on secondary data collected from publicly available sources.
Data Sources
The data for the study has been collected from:
- Annual reports of selected manufacturing companies
- Sustainability reports and ESG disclosures
- Business Responsibility and Sustainability Reports (BRSR)
- Company websites and official publications
- Research articles and academic journals

Sample Selection
For the purpose of the study, five major Indian manufacturing companies that actively publish sustainability or environmental reports were selected. These companies were chosen based on:
- Availability of sustainability disclosures
- Market presence and industrial significance
- Environmental reporting transparency

Period of Study
The study considers sustainability disclosures and environmental reporting for the recent reporting period of 2022–2024 to analyse the current trends in green accounting adoption.
Method of Analysis
The collected data has been analysed using content analysis and comparative analysis. Environmental disclosures were examined based on the following indicators:
- Environmental expenditure reporting
- Carbon emission disclosures
- Energy consumption reporting

- Waste management practices
- Environmental sustainability initiatives

The extent of green accounting adoption was evaluated by examining whether companies:

- Quantify environmental costs
- Integrate environmental expenditure in accounting reports
- Disclose sustainability-related financial information.

Data Analysis and Discussion

The analysis of sustainability reports and annual disclosures of selected manufacturing companies reveals varying levels of green accounting adoption.

Environmental Cost Disclosure

Most of the selected companies disclose information related to environmental initiatives such as pollution control measures, energy conservation, and waste management programs. However, only a few companies provide specific monetary values for environmental expenditures.

This indicates that while companies acknowledge environmental responsibilities, the integration of environmental costs into traditional accounting systems is still limited.

Energy Consumption and Emissions Reporting

The study found that most companies report:

- Total energy consumption
- Renewable energy usage
- Carbon emission reduction targets

These disclosures are generally presented in sustainability reports rather than financial statements. This suggests that environmental reporting is often treated as a separate sustainability activity rather than an integrated accounting practice.

Waste Management and Resource Utilization

Manufacturing companies frequently report initiatives related to:

- Recycling and waste reduction
- Water conservation programs
- Sustainable sourcing of raw materials

Such initiatives demonstrate environmental awareness, but detailed accounting treatment of environmental costs is rarely disclosed.

Influence of Regulatory Frameworks

The introduction of BRSR reporting requirements has significantly improved the transparency of environmental disclosures. Companies are increasingly reporting environmental performance indicators due to regulatory pressure and stakeholder expectations.

However, the study finds that many disclosures remain qualitative rather than quantitative, indicating that green accounting practices are still evolving.

Table 1: Environmental Cost Disclosure in Selected Manufacturing Companies

Company	Pollution Control Expenditure	Energy Conservation Initiatives	Waste Management Programs	Monetary Disclosure of Environmental Costs
Tata Steel	Yes	Yes	Yes	Partial

Reliance Industries Limited	Yes	Yes	Yes	Partial
Mahindra & Mahindra	Yes	Yes	Yes	Partial
ITC Limited	Yes	Yes	Yes	Yes
Hindustan Unilever Limited	Yes	Yes	Yes	Partial

Interpretation

The table indicates that major manufacturing companies disclose environmental initiatives such as pollution control, energy conservation, and waste management. However, only a few companies provide detailed monetary disclosures of environmental expenditures, suggesting that full integration of green accounting practices is still limited.

Table 2: Energy Consumption and Emission Reporting

Company	Total Energy Consumption Reported	Renewable Energy Usage Reported	Carbon Emission Disclosure	Emission Reduction Targets
Tata Steel	Yes	Yes	Yes	Yes
Reliance Industries Limited	Yes	Yes	Yes	Yes
Mahindra & Mahindra	Yes	Yes	Yes	Yes
ITC Limited	Yes	Yes	Yes	Yes
Hindustan Unilever Limited	Yes	Yes	Yes	Yes

Interpretation

The table shows that all selected companies report energy consumption and carbon emissions data, mainly through sustainability or BRSR reports. This indicates growing transparency in environmental reporting among Indian manufacturing companies.

Table 3: Waste Management and Resource Utilization Practices

Company	Recycling Initiatives	Waste Reduction Programs	Water Conservation Initiatives	Sustainable Raw Material Sourcing
Tata Steel	Yes	Yes	Yes	Yes
Reliance Industries Limited	Yes	Yes	Yes	Partial
Mahindra & Mahindra	Yes	Yes	Yes	Yes
ITC Limited	Yes	Yes	Yes	Yes

Hindustan Unilever Limited	Yes	Yes	Yes	Yes

Interpretation

The findings show that manufacturing companies are actively implementing sustainability initiatives such as recycling, waste reduction, and water conservation. However, these initiatives are mostly reported qualitatively rather than through detailed environmental cost accounting.

Table 4: Influence of BRSR on Environmental Reporting

Reporting Aspect	Number of Companies	Percentage
Environmental indicators disclosed	5	100%
Energy and emission data reported	5	100%
Environmental expenditure quantified	2	40%
Qualitative environmental disclosures	5	100%

Interpretation

The introduction of Business Responsibility and Sustainability Reporting (BRSR) has significantly improved environmental disclosures among Indian companies. However, quantitative environmental cost reporting remains limited.

Findings of the Study

Based on the analysis, the study identifies the following key findings:

1. Indian manufacturing companies increasingly disclose environmental information in sustainability reports.
2. Most companies report environmental initiatives such as energy conservation, emission reduction, and waste management.
3. However, systematic recognition of environmental costs in accounting records is still limited.
4. Environmental reporting is often presented separately from financial statements rather than integrated into accounting systems.
5. Regulatory frameworks such as BRSR have improved environmental transparency among listed companies.
6. Lack of standardized guidelines and technical expertise remains a challenge in implementing comprehensive green accounting practices.

Conclusion

Green accounting has emerged as an important tool for integrating environmental considerations into corporate decision-making and financial reporting. In the context of increasing environmental awareness and regulatory reforms, manufacturing companies are gradually adopting sustainability reporting practices.

The findings of this study indicate that Indian manufacturing firms have made progress in environmental disclosure and sustainability communication. Many companies publish detailed sustainability reports covering energy consumption, emissions, and environmental initiatives.

However, the actual integration of environmental costs into accounting systems remains relatively limited. Environmental disclosures are often qualitative and compliance-oriented rather than reflecting comprehensive green accounting practices.

For effective implementation, companies must move beyond basic sustainability reporting and adopt structured environmental cost accounting systems. Professional bodies, regulatory authorities, and policymakers should develop clear guidelines and standardized frameworks to support the adoption of green accounting practices.

Overall, the adoption of green accounting in Indian manufacturing companies is still in a developing stage, but increasing regulatory pressure and stakeholder expectations are likely to accelerate its future growth.

Limitations of the Study

The study has certain limitations:

- The analysis is based only on secondary data from published reports.
- The sample size of companies is limited.
- Environmental accounting practices may vary across industries and company sizes.

Future research may include primary data collection through surveys or interviews with corporate managers and accountants to obtain deeper insights into the implementation of green accounting practices.

Suggestions for Future Research

Future studies may focus on:

- Comparative analysis of green accounting practices across industries.
- The impact of green accounting on corporate financial performance.
- Adoption of environmental cost accounting among small and medium enterprises.
- The role of international sustainability standards such as GRI in improving environmental reporting.

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