SHODH SAMAGAM

ISSN : 2581-6918 (Online), 2582-1792 (PRINT)

Green Accounting Benefits and Organizational Use: A Multi-Disciplinary Analysis

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ORIGINAL ARTICLE

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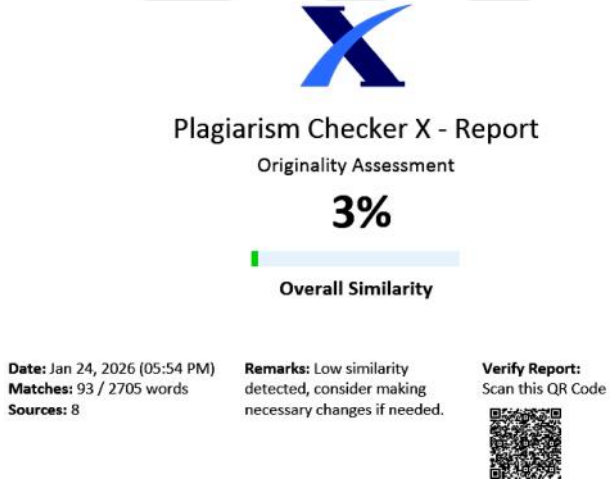
Received on : 21/11/2025
Revised on : 23/01/2026
Accepted on : 01/02/2026
Overall Similarity : 03% on 24/01/2026



ABSTRACT

Green accounting, also known as environmental or sustainability accounting, has evolved from an academic novelty to a critical corporate and national mandate. This broad field incorporates environmental principles into traditional financial accounting frameworks to determine the true economic impact of organizational and national investments. Green accounting, which quantifies and values natural resource depletion, pollution costs and ecological benefits, is a more accurate representation of long-term economic performance than traditional metrics such as GDP. Green accounting is a dynamic management tool that aims to capture the long-term sustainability of economic activities by accounting for environmental externalities that are frequently overlooked in traditional accounting. Its primary goal is to broaden the scope of performance measurement, ensuring that nature's "hidden" costs such as air and water pollution, soil erosion, and biodiversity loss are reflected in financial reports. It is increasingly seen as a pillar of the "3 P's": People, Profitability, and the planet. Green accounting still has a lot of obstacles to overcome. Inconsistent reporting across various industries and nations is frequently caused by the absence of standardized global frameworks. Clean air and aesthetically pleasing natural beauty are examples of non-market goods that are difficult and subjective to value. A lack of specialized knowledge and high implementation costs may discourage small and medium-sized businesses (SMEs) from adopting. Green accounting serves as the bridge between economic growth and environmental stewardship.

KEY WORDS

Green Accounting, Environment, Obstacles, Adopting, Economic Growth.

INTRODUCTION

The pressing challenges of environmental degradation and climate change have catalyzed a fundamental rethinking of how organizations manage, account for, and report their environmental impacts. In response, the paradigm of green accounting-also known as environmental accounting-has emerged, seeking to integrate environmental costs and benefits into traditional financial frameworks. Beyond compliance and reporting, green accounting is increasingly recognized as a driver of organisational innovation, efficiency, and value creation. Organisations across sectors utilize green accounting not merely for sustainability disclosures, but also as a strategic tool to align resources, processes, and capabilities with environmental objectives.

This research paper provides a comprehensive analysis of the benefits of green accounting and examines how different organizations operationalise these benefits. It synthesizes insights from contemporary research on enterprise architecture, process model quality, innovation mechanisms, and the adoption of advanced technological frameworks. By drawing on empirical and theoretical findings, the paper elucidates the mechanisms by which green accounting contributes to organizational transformation, process innovation, and sustainable value delivery.

Conceptual Foundations of Green Accounting

Green accounting refers to the systematic identification, measurement, and reporting of the environmental costs and benefits associated with organisational activities. Traditionally, financial accounting has focused on economic transactions, often externalizing environmental impacts. Green ac-counting challenges this paradigm by internalizing environmental externalities, enabling organizations to make more informed decisions that balance profitability with ecological stewardship.

Green accounting's conceptual foundation aligns with the firm's resource-based view and dynamic capabilities view, which contend that an organization's distinct resources and capabilities are what give it a sustainable competitive advantage. In the context of green accounting, this refers to using environmental data to innovate products, reorganize procedures, and match organizational strategies with sustainability requirements.

Types of Green Accounting

Environment Management Accounting

EMA incorporates the environmental and economic information by identifying resource usage and the cost of the organization's economic impact on the environment.

Environmental Financial Accounting

EFA is concerned with accounting for environment transactions that have an impact on the financial performance of the company.

Environmental National Accounting

ENA involves national-level accounting with a focus on natural resource and green costs.

Organizational Benefits of Green Accounting

Strategic Alignment and Business Transformation

One of the primary benefits of green accounting is its role in fostering strategic alignment between environmental objectives and core business processes. By systematically accounting for environmental impacts, organizations can better align their operational strategies with broader sustainability goals. This alignment facilitates business transformation, enabling firms to anticipate and respond to regulatory, market, and technological shifts.

Process Innovation and Operational Efficiency

Green accounting helps organizations identify inefficiencies and environmental hotspots in their operations. Quantifying resource consumption, emissions, and waste provides organizations with actionable insights that drive process innovation. For example, using process model quality frameworks enables businesses to systematically assess and improve the environmental quality of their processes. High-quality process models help to identify opportunities for waste reduction, energy efficiency, and resource optimization. Also organizations can make data-driven decisions that improve both financial and environmental performance thanks to automation, which also lowers operating costs and improves the timeliness and accuracy of environmental information.

Enhanced Stakeholder Engagement and Reputation

In an era of heightened stakeholder awareness, transparent environmental reporting is increasingly seen as a prerequisite for legitimacy and trust. Green accounting provides a robust basis for communicating environmental performance to regulators, investors, customers, and the public. Organizations that excel in green accounting are better positioned to demonstrate compliance, secure investment, and differentiate themselves in Employee engagement, well-being, and organizational reputation can all be improved by organizational initiatives that prioritize sustainability and are backed by transparent accounting. These programs promote a culture of creativity and accountability, enhancing the advantages of green accounting.

Management and Compliance

Integrating environmental considerations into accounting systems enables organizations to proactively manage regulatory risks and ensure compliance with evolving standards. By internalizing environmental liabilities, organizations can anticipate potential exposures, allocate resources for mitigation, and avoid costly penalties. The systematic documentation and analysis of environmental impacts also facilitate continuous improvement and adaptation to new regulatory requirements.

Organisational Learning and Capability Development

Green accounting promotes organizational learning by incorporating environmental factors into decision-making processes. The creation and refinement of environmental metrics, models, and reporting systems help to gain a better understanding of the interactions between organizational activities and environmental outcomes. This learning process is aided by the use of comprehensive frameworks such as the Comprehensive Process Model Quality Framework, which incorporates quality dimensions, metrics, and drivers relevant to environmental performance.

Mechanisms of Green Accounting Use Accross Organizations

Integration with Enterprise Architecture

Organizations can systematically align environmental goals with business processes, information systems, and technology infrastructures by integrating green accounting into enterprise architecture frameworks. Organizations can continuously monitor environmental impacts, prioritize sustainability initiatives, and reconfigure resources to achieve strategic and environmental goals by dynamic enterprise architecture capabilities, which include sensing, mobilizing, and transforming.

Enterprise architecture capabilities allow businesses to recognize new environmental risks and opportunities, and the assessment, selection, and application of green solutions are made easier by enterprise architecture's mobilizing and transforming capabilities. Empirical data indicates that companies with strong dynamic enterprise architecture capabilities attain higher levels of business-IT alignment and process innovation, both of which act as mediators in the relationship between organizational benefits and green accounting.

Process Model Quality Management

The use of process modeling frameworks, such as the Comprehensive Process Model Quality Framework, enables organizations to assess, design, and improve the environmental quality of their processes. Organizations can identify environmental bottlenecks, simulate the effects of process changes, and prioritize

interventions that result in the highest environmental and financial returns by incorporating green accounting metrics into process models.

The Comprehensive Process Model Quality Framework includes a wide range of quality dimensions, metrics, drivers, and implementation initiatives that are specifically relevant to green accounting. This structured approach helps both researchers and practitioners strike a balance between completeness and relevance in environmental process modeling. The explicit linkage between process model quality and organizational benefits such as operational efficiency, compliance, and stakeholder satisfaction emphasizes the importance of incorporating green accounting into process management practices.

Leveraging Technological Innovation

Innovation in technology is essential to the successful application of green accounting. For example, companies can automate environmental data collection, validation, and analysis by implementing ML DevOps frameworks. The creation and application of machine learning models by development operations (DevOps) teams is known as machine learning operations (MLOps). It is a collection of techniques that assist engineering and data science teams in overseeing every step of the machine learning process, from gathering data and training models to implementing and keeping an eye on them in actual systems. MLOps can be viewed as the link between everyday operations and machine learning.

Organizations that invest in automation, real-time monitoring, and upskilling initiatives achieve faster deployment cycles, lower error rates, and better collaboration between data science and operations teams, according to an empirical analysis of ML DevOps adoption. In the context of green accounting, where timely and accurate environmental data are crucial for efficient reporting and decision-making, these advantages are directly applicable.

Innovation Mechanisms and Organizational Culture

Green accounting initiatives can be developed and implemented more quickly through innovative organizational mechanisms such as hackathons. Hackathons provide cross-functional teams with a controlled yet adaptable environment in which to test new environmental management concepts, instruments, and methods. Such initiatives have several advantages, including increased employee engagement, skill development, and quick green solution prototyping.

However, research does highlight issues such as a potential mismatch between personal and organizational objectives, increased stress, and difficulty maintaining momentum following an event. To maximize the benefits of innovation mechanisms, organizations must ensure that green accounting goals are well-defined, supported by leadership, and integrated into larger strategic frameworks.

Sectoral Perspectives on Green Accounting Use

Corporate Enterprises

The integration of green accounting with digital transformation initiatives like ML DevOps improves the scalability, efficiency, and responsiveness of large corporations' sustainability, risk management, and innovation strategies. By deploying dynamic enterprise architecture capabilities, these organizations can incorporate environmental considerations into their strategic planning, resource allocation, and process redesign.

Corporate hackathons and innovation programs provide additional mechanisms for engaging employees, testing new green accounting tools, and fostering a culture of sustainability-driven innovation, all of which contribute to the development of organizational capabilities necessary for adapting to rapidly changing environmental and market conditions.

Public Sector and Government Agencies

Green accounting promotes regulatory compliance, policy development, and the open distribution of public funds in the public sector. To assess how public programs, infrastructure projects, and service delivery affect the environment, Government organizations use process modeling frameworks and quality management

systems. Adopting green accounting techniques promotes evidence-based policymaking, increases accountability, and makes engagement easier.

Small and Medium-Sized Businesses (SMEs)

SMEs encounter particular difficulties when putting green accounting into practice, such as a lack of resources, knowledge, and access to cutting-edge technologies. However, SMEs can gradually implement green accounting practices thanks to the scalability and modularity of frameworks like ML DevOps and CPMQF. By giving SMEs access to new resources, networks, and expertise, participation in cooperative innovation events like sectoral hackathons can hasten the adoption of green accounting.

Non-Governmental Organizations (NGOs) and Non-Profits

NGOs and non-profit organizations use green accounting to monitor and report on the environmental impacts of their programs and advocacy efforts. The use of transparent and standardized accounting practices enhances credibility, supports fundraising, and enables effective collabo-ration with partners and stakeholders. NGOs may also play a catalytic role in promoting the adoption of green accounting standards and practices across sectors.

Green Accounting in India

Due to the nation's increasing awareness of environmental degradation and the need for sustainable development, green accounting has received a lot of attention in India in recent years. For social well-being, the Government has realized how critical it is to value natural resources and take their economic worth into account when making decisions.

The System of Environmental-Economic Accounting (SEEA) is one of India's major green accounting initiatives. The United Nations created the SEEA framework, which offers recommendations for combining economic and environmental data. India has been making a concerted effort to integrate SEEA into its national accounting systems.

The Securities and Exchange Board of India (SEBI) has mandated ESG disclosures for the top 1,000 listed companies by market capitalization. This phased mandate, which includes value chain disclosures and third-party assurance, seeks to improve transparency and accountability in corporate environmental reporting.

A growing number of Indian companies, particularly large ones such as Bharat Petroleum (BPCL), Oil and Natural Gas Limited (ONGC), the Tata Group, and Wipro, are adopting green accounting practices and voluntarily reporting on their environmental performance as part of their Corporate Social Responsibility (CSR).

Challenges and Limitations in Implementing Green Accounting

While the benefits of green accounting are substantial, organizations encounter significant challenges in implementation. These include:

- **Fragmented Toolsets and Lack of Standardization:** Integration issues may arise due to the variety of green accounting frameworks and tools, especially in companies with intricate legacy systems.
- **Data Management Complexities:** Collecting, validating, and analyz-ing environmental data requires significant investments in technology and expertise.
- **Skill Gaps:** Effective green accounting requires multidisciplinary skills spanning accounting, environmental science, information systems, and data analytics.
- **Organizational Resistance:** Change management challenges, such as resistance to new processes and technologies, can hinder the adoption of green accounting practices.
- **Measurement and Valuation Difficulties:** Assigning accurate financial values to environmental impacts remains a methodological challenge, affecting the comparability and reliability of green accounting data.

In order to overcome these challenges, a comprehensive strategy that incorporates investment in capability development, process redesign, technology, and cultural transformation. According to the empirical literature,

companies that take proactive measures to overcome these obstacles are better positioned to realize the expected organizational benefits and receive higher returns on investment in green accounting.

Future Directions and Recommendations

To advance the adoption and effectiveness of green accounting, organiza-tions and researchers should consider the following recommendations:

- **Standardization and Framework Development:** Standardized green accounting frameworks that are flexible across industries and organizational sizes must be developed and distributed.
- **Integration with Digital Transformation:** Organizations should leverage digital transformation initiatives-such as ML DevOps and enterprise architecture modernization to automate and enhance green accounting processes.
- **Capability Development:** Investments in training, upskilling, and cross functional collaboration are essential for building the multidisciplinary capabilities required for effective green accounting.
- **Innovation and Experimentation:** To test new green accounting tools, encourage employee engagement, and speed organizational learning, mechanisms like corporate hackathons and innovation labs should be used.
- **Continuous Improvement and Learning:** Green accounting should be embedded into organizational learning cycles, with regular evalu-ation, feedback, and adaptation to emerging best practices and tech-nologies.
- **Stakeholder Engagement:** Transparent and inclusive reporting prac-tices enhance stakeholder trust and support the co-creation of sustainable value.

CONCLUSION

Green accounting represents a transformative approach to integrating environmental considerations into organizational decision-making, strategy, and operations. The synthesis of empirical and theoretical research underscores the multifaceted benefits of green accounting, including strategic alignment, process innovation, stakeholder engagement, risk management, and organizational learning. Organizations operationalize. These benefits through the integration of green accounting with enterprise architecture, process modeling, technological innovation, and cultural initiatives.

Despite the challenges of fragmented tools, data complexities, and skill gaps, the evidence indicates that organizations that invest in dynamic capabilities, technological infrastructure, and innovation mechanisms are well-positioned to realize the full potential of green accounting. As environmental imperatives continue to shape the global business landscape, green accounting will remain a critical lever for sustainable value creation, competitive advantage, and societal well-being.

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