

How Managerial Accounting Integrates ESG Metrics into Cost Frameworks: The Indian Context

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Abstract: When sustainability is a central theme of corporate strategy in India, as it is the case now, the managerial accounting has to integrate ESG (environmental, social, and governance) metrics as a "must, have" feature. These metrics that include carbon emissions, water consumption, and energy usage are becoming part of cost frameworks aimed at unlocking value, managing risks, and meeting the regulations. Such an integration is also important in view of the changes in Indian regulations like SEBI's Business Responsibility and Sustainability Reporting (BRSR), and the forthcoming Carbon Credit Trading Scheme (CCTS) (SEBI, 2021; MoEFCC, 2023). Gradually, managerial accounting functions are being transformed to include instruments such as Environmental Management Accounting (EMA), Material Flow Cost Accounting (MFCA), and internal carbon pricing. Nevertheless, still, a few problems such as data availability, standardization, and capacity of Indian industries remain. This paper delves into these events and puts forward a framework specially designed for Indian companies to incorporate ESG with the help of their cost accounting systems as a means of creating sustainable value.

Keywords: Managerial Accounting, ESG Metrics, Carbon Footprint, Water Usage, Sustainability Reporting.

1. Introduction

Since a few years, environmental and social issues have become an integral part of corporate strategy, not only at the global level but also in India. Corporations are increasingly required to comply with the standards set by the authorities, investors, consumers, and global partners. They are expected to implement sustainable practices and also be accountable. Environmental issues such as the scarcity of water, air pollution, climate, related risks, and policy initiatives, for example, the SEBI, mandated Business Responsibility and Sustainability Reporting (BRSR) and the proposed Carbon Credit Trading Scheme (SEBI, 2021; MoEFCC, 2023) are some of the factors that add to the level of urgency in India.

Historically, managerial accounting in Indian companies has primarily focused on financial performance, cost control, and the achievement of operational efficiency. But, with the rise of sustainability as a central theme in corporate discourse, the need to integrate ESG (Environmental, Social, and Governance) considerations such as carbon footprint, water consumption, and waste generation into the internal accounting and cost management systems has become imperative. The change over allows companies to re-evaluate the real cost of their operations, recognize the areas of activity that are not efficient and adapt their strategy to be consistent with the environmental objectives of the long term.

The objective of the paper is to get an idea of the ESG metrics integration in the Indian managerial accounting frameworks. It is an investigation into current practices, regulatory requirements, challenges, and tools for integration. In doing so, it seeks to provide a practical guide to Indian companies on how to drive their sustainability performance to the next level while still maintaining their cost, efficiency and competitiveness in a vastly changing regulatory and economic environment.

2. Literature Review

Incorporating ESG (Environmental, Social, and Governance) criteria into managerial accounting has got a lot of attention from the academic world in recent years. This transformation signifies a wider acceptance that conventional financial, focused accounting systems frequently miss the environmental and societal costs of business activities (Burritt & Schaltegger, 2010). As long, term business sustainability is becoming the norm, scholars call for a more inclusive accounting approach that reflects not only the economic results but also the environmental impact of the company such as carbon emissions, energy use, and water consumption (Frost et al., 2005; Gray, 2010).

One of the areas where there has been a major shift is the development of Environmental Management Accounting (EMA), which equips businesses with the means to find, follow, and divide environmental costs in their operations (Qian et al., 2011). EMA empowers organizations to diagnose the financial consequences of resource inefficiencies and environmental threats, therefore, they are raising the level of their decision, making to quite an extent. The use of EMA is justifiable in heavy resource, consuming industries like manufacturing, mining, and energy, fields that dominate India's economic landscape.

Similarly, the concept of Material Flow Cost Accounting (MFCA), has been implemented both in advanced and developing economies with the aim to cut wastage and improve process efficiency (Jasch, 2009). MFCA represents material losses in terms of money inviting companies to lower their resource inputs and emissions and at the same time reduce their expenses. The data from empirical research shows that companies, that utilize the MFCA method, are very likely to get better environmental results without undermining their profits (Schaltegger et al., 2012).

Just recently, internal carbon pricing is one of the suggested ways to bring climate, related risks into internal financial decisions (CDP, 2021). A few multinational companies that operate locally have started to use shadow prices for carbon as a tool to assess the profitability and the efficiency of a business, which enables them to be one step ahead of the possible regulations and carbon taxes.

In the Indian context, the introduction of SEBI's Business Responsibility and Sustainability Reporting (BRSR) framework has accelerated interest in ESG integration. BRSR mandates large listed companies to report on a wide range of ESG indicators, including emissions, energy and water usage, and waste generation (SEBI, 2021). These disclosures are increasingly being used by investors and other stakeholders to evaluate corporate sustainability performance, placing indirect pressure on internal accounting systems to align with ESG goals.

Even though there are a lot of positive points mentioned, literature also points to some stumbling blocks, especially in the case of developing countries like India. These difficulties include poor access to trustworthy environmental data, lack of trained staff in environmental accounting, and the notion that sustainability is expensive (Kumar & Rao, 2020). Besides this, the adoption of ESG into cost frameworks is typically more advanced in big corporations, while small and medium enterprises (SMEs) lag due to capacity and resource limitations (Gupta & Das, 2021).

As a whole, the literature underscores that the ESG metric integration into managerial accounting not only facilitates environmental and social accountability but also opens up possibilities for operational efficiency, adherence to regulations, and reputation enhancement. On the other hand, the extent of success in the adoption depends largely on institutional support, regulatory incentives, and in-house ESG measuring and reporting capabilities, all of which are still developing in the Indian corporate milieu.

3. Mechanisms / Tools for Integration

To integrate ESG (Environmental, Social, and Governance) metrics into managerial accounting, the company has to redesign its cost and decision, making frameworks both structurally and methodologically. Globally, numerous instruments have been created and customized, and they are now being utilized with different degrees of maturity in Indian companies. These tools facilitate the recognition, measurement, and inclusion of environmental and social issues in financial and operational management.

3.1. Environmental Management Accounting (EMA)

Environmental Management Accounting (EMA) is an instrument to detect the environmental costs that are related to the consumption of resources and the generation of waste, and also to allocate these costs to certain activities or departments. By turning under the company's control those "externalities" that were earlier beyond the firm's boundaries, EMA offers organizations a pool of data for achieving higher efficiency and making eco, friendly decisions.

EMA in India is being adopted to a great extent by the big businesses, particularly the ones that fall under the ambit of SEBI's BRSR criteria. A typical case can be various industrial units in the energy, manufacturing, and FMCG sectors which are employing EMA to find out their processes that consume immense quantities of energy and water and thereafter draw up reduction targets.

3.2. Material Flow Cost Accounting (MFCA)

MFCA is a method that follows the physical material flows within the production system and allocates costs to those parts of materials that are lost, used inefficiently, or discarded. It measures the money needed for the inputs that are lost to emissions, rejects, and resource wastage, thus enabling managers to make a dual use of the saved money for environmental improvements.

On the other hand, the use of MFCA in India is gradually getting established, mainly among the companies operating in the manufacturing and the heavy industry sectors. The National Productivity Council of India has facilitated MFCA through the implementation of pilot projects, thereby motivating the firms to locate the stages of their production processes that are resource, intensive.

3.3. Internal Carbon Pricing

Internal carbon pricing is the process of attributing a notional (or actual) monetary value to carbon emissions that can be incorporated into investment and operational decisions. This method enables businesses to project future carbon costs (e.g. taxes or cap, and, trade penalties) and makes them draw a carbon, efficient plan.

However, the Indian internal carbon pricing scene is still in its infancy. Yet the concept is spreading particularly to multinationals and large domestic companies who are candidates for carbon trading linked to the upcoming Carbon Credit Trading Scheme (CCTS). Moreover, it is progressively becoming an aspect of firms exporting to the markets that are susceptible to carbon emissions, such as the EU, where there are already some measures like CBAM (Carbon Border Adjustment Mechanism) implemented.

3.4. Life Cycle Costing and Life Cycle Assessment (LCC & LCA)

Life Cycle Assessment (LCA) and Life Cycle Costing (LCC) are methods to measure the ecological and monetary burdens of a product or service going through the whole cycle of life, that is from the extraction of raw material to the discard. Companies can utilize these instruments to uncover less expensive and more sustainable alternatives during the phase of design, procurement, and production planning.

These methods are taking hold in India in such areas as automobiles, electronics, and construction, influenced, in most cases, by the need to meet environmental standards set internationally or by the expectations of clients in foreign markets.

3.5. Key Performance Indicators (KPIs) and Balanced Scorecards

Presently, a considerable number of companies incorporate ESG, related Key Performance Indicators (KPI) into their management scorecards. Such indicators may reflect, for example, energy intensity, water consumption per unit of production, or the percentage of waste diverted. The use of ESG KPIs in budgeting and employee evaluation helps to make sustainability targets common practice across different organizational units.

Considering the Indian scenario, the BRSR model itself mandates companies to furnish such performance metrics on the basis of intensity (e. g., GHG emissions per crore rupees of revenue) which in turn, facilitates internal benchmarking and setting of targets.

3.6. ESG Budgeting and Variance Analysis

Incorporating ESG factors into the budgeting process not only helps companies align their resources towards sustainability projects but also projects like solar energy installation, water recycling through the use of reverse osmosis membrane, and waste management facilities through innovative technology. Variance analysis, as an integral tool in managerial accounting, can become a means for reconciling the favorable or adverse environmental impact and cost figures recorded (baselining).

As a case in point, an Indian firm could appropriately budget for a water conservation goal of 10 percent and then measure if the goal was achieved, utilizing both physical (kiloliters) and financial metrics to track the progress.

3.7. ESG Reporting Systems and Third, Party Assurance

The honest covering of the ESG variables needs strong data systems for the collection, monitoring, and verification of the data. A large number of Indian companies are funding software platforms, automated metrology, and data dashboards to guarantee reliable reporting under various frameworks such as BRSR. The third, party verification, which will probably become obligatory for some disclosures, is an additional element that gives a strong backing to the stated metrics.

4. Challenges in Integration

Though the incorporation of Environmental, Social, and Governance (ESG) metrics into managerial accounting systems could lead to a substantial positive impact in terms of sustainability and organization, obstacles are still present that prevent a broad and efficient implementation. This is particularly valid in countries with emerging markets such as India.

4.1. Inadequate Data Infrastructure and Measurement Systems

One of the core obstacles is the absence of reliable and stable data that depict the environmental and social performance. Several Indian companies, most of which belong to the group of small and medium enterprises (SME), are technologically ill, equipped, and they need tools like smart meters, emission tracking tools, and automated monitoring systems to be able to produce accurate ESG, related data. Besides that, data, if any, are usually separated by departments or even recorded in different formats, thereby making it almost impossible to use it for cost systems.

Kumar & Rao (2020) comment that ESG data collection in Indian firms is hampered by differences in systems and lack of uniform protocols.

4.2. Limited Technical Expertise and Awareness

It is noticed that the majority of managers and accountants working in Indian companies have not the concept of sustainability accounting or environmental cost analysis. The training given to Indian accountants is still focused on the financial aspects of the business over the environmental or social issues. This is upshot, professionals frequently do not have the needed skills to be able to carry out Environmental Management Accounting (EMA), Life Cycle Assessment (LCA), or Material Flow Cost Accounting (MFCA) activities.

Gupta & Das (2021) point out the necessity to provide ESG, related training to the Indian corporate sector, particularly the finance and operations areas.

4.3. Perception of High Implementation Costs

Most of the time, the incorporation of ESG metrics is seen as a mere extra load on the business rather than a process that adds value. A large number of Indian companies, in particular, small and medium enterprises, view the first step in the

implementation of sustainability instruments, installation of metering systems, purchasing ESG software, hiring third, party auditors, or organizing training, as an overly expensive process. Without having a clear financial payback in the short term, the firms are reluctant to engage in such actions on their own volition.

According to the World Bank (2018), among other reasons, the cost is the main factor which discourages the firms from practicing sustainability in emerging markets.

4.4. Ambiguity in Regulatory Requirements

Though India has gone a long way in terms of regulation by instituting the BRSR framework and the Carbon Credit Trading Scheme (CCTS), there still exist a large number of rules that are either voluntary, in effect for only a limited period, or vaguely defined. These result in the risk that enterprises may not know their obligations under the law and hence, be reluctant to allocate funds for ESG, related infrastructure. On top of that, due to these regulations still being under development, companies are often in a position where they have no idea if their current practices will be compliant a short time from now.

SEBI (2023) highlights that ESG reporting is a work in progress and the present requirement for more precise guidance on disclosures relating to the value chain and confirmation of the standards.

4.5. Supply Chain Complexity and Scope 3 Challenges

It is extremely hard to trace ESG metrics for the entire supply chain, for example, those outside of a company's direct operations (Scope 1 and 2) in India, where supply chains tend to be fragmented, unregulated, and only slightly digitized. Information gathering on upstream and downstream partners, particularly for small suppliers or distributors, is a very slow process and, in most cases, it is unfeasible. This issue gets more important with mandated value chain disclosures for the highest listed companies according to SEBI's new ESG guidelines from FY 2025, 26 onwards.

According to CDP India (2022), most companies in India find it extremely difficult to obtain a substantial amount of Scope 3 data due to the lack of transparency in the supply chain.

4.6. Sectoral and Regional Disparities

Environmental needs that include the use of water, consumption of energy or pollution have different values and ways of dealing them throughout the various Indian regions and industries. For instance, water scarcity is a big issue in states like Rajasthan or Maharashtra but not that much in Kerala. On the other hand, the emissions from the energy grid also differ depending on the type of local power sources. All these differences create a problem in trying to have a common environmental cost metric and also in benchmarking the performance of the firms.

According to TERI (2020), the Indian indicators for sustainable development need to be place, specific considering the country's varied economic and ecological landscapes.

4.7. Organizational Resistance and Cultural Barriers

On the same line, organizational resistance and the opposition to change hold back ESG integration as well. In numerous organizations, ESG is still considered something that should be done because the law requires it or as an activity that improves the image of the company, while it is actually a matter of strategy or finance. In the absence of the support from the top management, the initiatives for sustainability normally stay low, budget and they are quite isolated from the financial decision, making aspect.

According to Schaltegger & Zvezdov (2015), the impact of ESG on executives' decisions remains limited unless ESG is deeply rooted in the internal control systems.

4.8. Inconsistent Assurance and Risk of Greenwashing

Since there are only a few compulsory assurance standards and most ESG disclosures in India are not verified by a third party, the risk that companies will cherry, pick positive metrics and overlook their material impacts is quite high.

Consequently, ESG data lose both their trustworthiness and their usefulness to those who have a stake in the company's activities, i.e., the so, called internal and external stakeholders.

According to KPMG (2022), the extent of ESG assurance in India is gradually expanding; however, the majority of companies are still at the very beginning stages of their ESG external verification.

5. Best Practices and Emerging Trends

To meet rising regulatory requirements and stakeholder expectations, Indian corporate firms have embraced numerous best practices and future, driven trends that are getting ESG metrics incorporated into managerial accounting systems. Such measures signify not only worldwide sustainability norms but also home, grown adaptations of India's distinct business atmosphere.

5.1. Embedding ESG in Corporate Strategy

The top Indian companies are not distinguishing ESG as an isolated business requirement. They are going beyond the letter of the law and embedding ESG into strategic and operational decision, making. Organizations can create value by deploying the synergy between sustainability goals and fiscal objectives. The benefits extend beyond resource optimization to risk mitigation and enhanced durability of competitive advantage. The likes of Infosys and Tata Steel are among the trailblazers, charting a course to link ESG objectives with business KPIs and executive remuneration committees.

5.2. Digitalization and ESG Data Analytics

Just like other global firms, Indian companies are adopting the Internet of Things (IoT) sensors, ESG dashboards, and cloud, based analytics platforms for collecting, managing, and reporting sustainability data. With this technology, companies not only monitor emissions, energy, water, and waste usage but also use the data for their internal cost accounting models. A few firms, in addition, are using AI for ESG risks prediction and running the sustainability scenarios cost impact simulation.

5.3. Linking ESG Performance to Capital Allocation

One more leading practice that is gaining ground is the use of ESG numbers for budgeting and making decisions about capital investments. A case in point is the usage of internal carbon pricing by a few large Indian conglomerates to reflect the environmental costs in financial models. Such a procedure enables green investments and equips enterprises for coming regulations in the Indian Carbon Credit Trading Scheme (CCTS), which is still in the pipeline.

5.4. ESG Scorecards and Incentive Structures

There is a trend among certain organizations to integrate ESG, linked scorecards into employee performance evaluation and internal auditing processes. These scorecards feature various measures like energy productivity by output unit, decrease in water usage or waste redirected from the landfill. In leading companies, such indicators are linked not only to money rewards but also to career advancement, which means that ESG has become an integral part of both corporate culture and the company's financial discipline.

5.5. Supplier Engagement and Scope 3 Collaboration

One of the main reasons for Indian companies to involve their suppliers is the difficulty in monitoring indirect emissions and resource use (Scope 3). Several companies are giving their suppliers the necessary technological or monetary support to enable them to adopt ESG practices which, among others, are the high, impact sectors of textiles, automotive, and FMCG. Such cooperative efforts make it possible for companies to carry on ESG checks beyond their boundaries and also to have their supply chain ready for the upcoming ESG regulations.

5.6. Third, Party Assurance and Transparent Reporting

It is expected that as ESG disclosures become more detailed and compulsory, a considerable number of Indian enterprises will seek the support of an independent third party to validate their ESG data. A confirmation from outside sources is effective in increasing trust: it also makes organizations aware of possible deficiencies in their ESG reporting systems. This movement will probably gain more momentum with the new regulations from SEBI requiring the top 150 listed companies to have their BRSR Core disclosures from FY 2023, 24 onward assured.

5.7. Sector, Specific Frameworks and Industry Collaboration

Indian industry associations are creating ESG frameworks and measures that are tailored to individual sectors to help companies both externally benchmarking and internally managing accounting. For example, the cement, power, and textile industries have launched sustainability standards that address their respective environmental footprints. Such partnerships foster continuity and lower the chances of cost integration being spread across ESG initiatives.

6. Proposed Conceptual Framework

Embedding Environmental, Social, and Governance (ESG) aspects in managerial accounting systems in the Indian business environment requires a well, organized and flexible framework. The suggested theoretical model sketches out a method that allows entities to methodically depict, assess, and integrate ESG measures like a company's air emissions, water consumption, and social impact, into their internal cost and decision, making processes.

6.1. ESG Context Analysis and Strategic Alignment

First of all, the company's environmental and social footprint vis, a, vis industry standards, regulatory requirements (such as SEBI's BRSR), and stakeholder expectations is thoroughly evaluated as a start to the integration process. At this point, the whole idea of sustainability becomes aligned with the organization's business strategy and risk management policies.

Material ESG issues like water scarcity, emissions intensity, and supply chain vulnerabilities which are relevant to the operations and geographic context of the firms are suggested to be identified by Indian companies during this stage.

6.2. Identification and Selection of ESG Metrics

Following that, the process of picking suitable, ESG indicators that are measurable and relevant to the company sector, activities impact, and obligations to the disclosure is the next step. Typical environmental indicators include GHG emissions, energy use, waste, and water consumption, whereas social metrics can involve employee health & safety, diversity, and community engagement.

The metrics must be measurable, verifiable and in line with international and Indian reporting standards (such as GRI, BRSR Core, or SASB guidelines).

6.3. Data Collection and Integration into Accounting Systems

Firstly, an enterprise needs to define the key ESG metrics, and only then, they can set up the appropriate data collection mechanisms. These mechanisms might be digitally based with the use of IoT sensors for energy and water usage, ESG software, or even manual data recording in the case of less digitized operations. Data collected must be merged with the existing cost accounting system for ESG, related costs to be correctly allocated to products, processes, and departments.

The situation in India is such that this integration is usually limited by the lack of technological infrastructure, especially in small and medium, sized enterprises (SMEs), but it is slowly getting better with the help of digital adoption and policy support.

6.4. ESG Cost Allocation and Performance Measurement

This phase concentrates on the measurement of the impact of ESG metrics in financial terms. Tools such as Environmental Management Accounting (EMA) and Material Flow Cost Accounting (MFCA) enable companies to uncover the inefficiencies, assign the environmental and social costs to the respective activities, and follow the cost evolution over time.

Consider the water wastage or carbon emission costs that could be made part of departmental budgets so that resource planning becomes more sustainable. In India, companies implementing internal carbon pricing or setting energy efficiency targets are likely to go through this step to make their capital and operational budgeting decisions.

6.5. Reporting, Feedback, and Continuous Improvement

Once ESG information is collected and examined, companies have the responsibility to communicate the results to both their internal and external audiences. The process is also about using ESG indicators in management reports, sustainability disclosures (such as BRSR), and performance scorecards. Ideas generated from these reports can guide next budgeting rounds and strategy assessments, thus enabling the organization to have a continuous improvement cycle.

Moreover, in, between third, party verification and comparison with peers or sector averages contribute to the level of trust of such disclosures.

Key Features of the Framework

Element	Purpose	Relevance in India
Strategic ESG Alignment	Align sustainability goals with business strategy	Responds to BRSR and global investor demands
ESG Metric Selection	Choose sector-specific, material indicators	Supports meaningful performance benchmarking
Integrated Data Infrastructure	Link ESG data with accounting and costing systems	Increasing use of digital tools and cloud-based platforms
ESG Costing Techniques	Allocate environmental and social costs internally	Enables informed pricing, budgeting, and risk analysis
Reporting and Feedback Loops	Inform decisions and promote accountability	Drives compliance, stakeholder trust, and performance review

7. Implications & Benefits for Indian Firms

Indian companies have the potential to be deeply transformed by the integration of ESG metrics into managerial accounting frameworks. Such integration, as sustainability becomes a major performance driver, signifies going beyond mere compliance to becoming a source of competitive advantage, resilience, and long, term profitability for companies.

7.1. Enhanced Strategic Decision, Making

Indian businesses can use ESG factors like carbon emissions, energy consumption, and social performance as the basis for internal accounting systems that support them in making better strategic decisions. Quantifying environmental and social costs and including them in financial models facilitates evaluating the real cost of operations, discovering resource wastages, and prioritizing sustainability, focused investments.

Suppose the inclusion of prices for carbon or related water scarcity costs has converted the direction of capital towards cleaner technologies or more robust infrastructure. In that case, the firms would have mitigated their exposure over time to environmental risks.

7.2. Improved Regulatory Readiness

As SEBI's BRSR Core and CCTS become more stringent, ESG accounting systems integrated with metrics can allow companies situated in India to comply in a more transparent and efficient way. Having structured ESG data integrated within usual financial operations prepares companies well ahead of time for future audits or mandates such as value chain emissions reporting and avoids the last, minute panic during disclosures and audits.

7.3. Better Resource Efficiency and Cost Savings

Managerial accounting techniques like EMA and MFCA help businesses spot where they waste, do not use resources efficiently, or consume too much. In this way, enterprises not only have the opportunity to decrease their operational costs (e.g., through reducing energy usage, minimizing raw material loss, and improving water efficiency) but also make their environmental footprint smaller.

With time, such operational improvements become impactful for both the reduction of the firm's environmental impact and the company's financial performance especially in resource, intensive industries like textiles, chemicals, and manufacturing.

7.4. Strengthened Brand and Investor Confidence

Accurate internal data collection systems that support ESG performance disclosure enhance a firm's image amongst the investment community, regulatory authorities, and customers. Linguistically proactive sustainability anguish Indian firms often attract ESG investors, obtain access to green financing, and receive reputational benefits locally as well as in international markets.

For instance, the number of institutional investors and financial institutions actively seeking companies listed in ESG indices or having verified BRSR disclosures is on the rise, and they are the ones providing preferential lending options to such firms.

7.5. Competitive Advantage in Global Markets

As global markets implement more severe sustainability criteria, for instance, the EU's Carbon Border Adjustment Mechanism (CBAM), Indian exporters will increasingly be required to confirm that their production operations and supply chains are environmentally friendly. Organizations that have incorporated ESG cost information in their operations are more effective in attaining this kind of goal since they provide not only the tracking of but also the clarifying of emissions, resources used, and costs the firm has borne to be in compliance.

Not only does this guarantee the firm's ability to export to important foreign markets but it also creates goodwill with its international clientele and partners.

7.6. Informed Risk Management

Introducing ESG data into cost and risk prediction enables Indian firms to identify and handle new threats such as climate change disruption, regulatory fines, or supply chain instability before they become problematic. Such a proactive stance makes possible the implementation of preventive measures and the building of resiliency rather than the practice of reaction to disasters a while after they have taken place.

The practice of risk, informed decision, making, in such cases, becomes quite crucial in sectors highly sensitive to environmental upheavals like agriculture, energy, and infrastructure.

7.7. Cultural Shift Toward Sustainable Business Practices

Accounting for ESG has the effect of changing the culture of the entire organization. Because sustainability is no longer just a CSR issue or a compliance matter, it becomes a shared performance metric among the departments and consequently encourages collaboration between the finance, operations, procurement, and HR teams. Such transformation paves the way for a company's long, term organizational maturity and principled leadership.

Conclusion

Indian companies that use ESG metrics for managerial accounting have gone beyond mere technical or accounting upgrades. It represents them a whole new strategy, which helps them to achieve the triple bottom line, meet new regulatory requirements, and grow in a climate where business environmental and social accountability are key drivers.

8. Implications for Practice

Managerial accounting has been fundamentally transformed by the inclusion of ESG metrics, which has changed the Indian corporate landscape by influencing businesses to rethink their operations, strategy, and financial decisions. It represents a change to management systems that are more sustainable and responsible and that not only ensure better compliance but also provide greater value over time. In this scenario, the professional community, accountants, sustainability officers, operations managers, and executives, has to adapt to numerous new practical implications.

8.1. Evolving Role of Management Accountants

In India, management accountants are still relied upon for cost control and budgeting, but the expectation is growing that they should play a bigger role. Besides cost containment, they are now tasked with the identification, measurement, and disclosure of ESG, related costs, for example, energy consumption, emissions, and labor conditions. Upskilling in these areas is necessary for this transformation to happen (e.g., BRSR, GRI).

To build the required ESG, specific capabilities in accounting teams, organizations must make a commitment to capacity, building programs and professional training.

8.2. Need for Integrated Financial and Non, Financial Reporting

Over time, the distinction between financial and sustainability reporting has become less clear. The need for a complete portrayal of the company's performance has driven many organizations to combine ESG indicators with conventional financial metrics in their internal reports and dashboards. Such a combined use of the two enables the organization to use the information for the decision, making process of various functional units e.g. procurement and operations, budgeting and strategic planning.

It is advisable that companies set up proper internal systems that take ESG and financial data to create unified reporting structures that aid decision, making.

8.3. Realignment of Budgeting and Investment Processes

Since the introduction of ESG, the capital allocation industries in India have undergone a change in their budgeting processes to give importance to sustainable initiatives. As part of these changes, several organizations have started reserving money for clean technologies, waste management systems, the well, being of employees, and ESG, compliance upgrades. The companies are employing internal carbon pricing and lifecycle cost assessments to more broadly consider the investment choices provided with these methods.

The integration of ESG factors into capital budgeting, financial risk assessment, and return on investment (ROI) computations is essential for the finance and strategy departments.

8.4. Supply Chain Sustainability and Data Integration

In the context of India's intricate and largely unorganized supply chains, the ESG measurement and data gathering process must be more encompassing. To truly track Scope 3 emissions as well as ESG cost allocation, organizations have to interact with suppliers, perform sustainability audits and implement tools or rewards to sellers for delivering environmental and social data.

The purchasing and supply teams need to collaborate with the finance department to ensure that ESG metrics at the vendor level are reflected in the cost accounting system.

8.5. Enhanced Risk Management and Scenario Planning

Through the incorporation of ESG metrics into cost structures and projections, companies have the ability to evaluate risks over a longer period of time, for instance, they can thus avoid situations like facing regulatory penalties, experiencing shortages of resources, or suffering from climate changes, and also turn to the appropriate alleviation solutions. Consequently, ESG, related scenario planning becomes a source of stronger business models in unstable markets.

Without doubt, the orchestration of risk management should see the inclusion of ESG factors alongside enterprise risk management (ERM) and contingency planning.

8.6. Strengthening Transparency and Accountability

An efficiently designed ESG accounting framework and system facilitates openness and co agencies to comply the increased requirements raised by investors, regulators, and customers. With mandatory disclosures getting more granular (such as SEBI's BRSR Core), Indian companies will use the ESG data that is standardized across various internal management systems to help them embed their ESG data.

It is necessary that the organizations synchronize their internal data systems with the external reporting frameworks to be sure that they are consistent and ready for the audit.

9. Research Gaps & Directions for India

Though there has been phenomenal growth in the importance of ESG integration within accounting for managers, there is still a long way to go for research in the Indian context. A large portion of current literature either concentrates on corporate sustainability in general or highlights the company's external disclosures while not dealing with the question of internalizing ESG data into the cost and the management decisions.

9.1. Limited Studies on ESG Cost Allocation in Indian Firms

Globally, there is a plethora of environmental cost allocation and carbon accounting models; however, very few empirical studies concentrate on Indian companies, particularly on how ESG, related costs (water, emissions, or waste, etc.) have been changed by business units. As a result, the implementation of sector, specific best practices or the establishment of benchmarks that reflect India's industrial diversity remains constrained.

Such sectoral case studies of resource, intensive industries (for instance, cement, textiles, energy) have the potential to reveal how environmental and social costs have been integrated into Indian management accounting systems.

9.2. Inadequate Examination of ESG Integration in SMEs

Current scholarly work mostly focuses on large enterprises that are listed on stock exchanges, those companies that must follow SEBI's BRSR guidelines. While small and medium enterprises (SMEs) make up the majority of India's economy, they are usually under, resourced and technically unfit to apply ESG frameworks. Very few studies exist that look at how these companies understand ESG integration, what obstacles they encounter, and what user, friendly instruments can help them.

One way to close the divide would be to create ESG accounting models for SMEs that are scalable and affordable, which would then be a step towards wider sustainability transitions throughout the Indian business ecosystem.

9.3. Lack of Empirical Evaluation of ESG Impact on Financial Performance

While the logic of ESG incorporation is largely accepted, the extent to which ESG, based management accounting has a direct positive influence on the company's financial profile in India is still unclear. In other words, there is only limited empirical evidence available from India, which shows ESG, based managerial accounting to deliver outcomes like cost savings, risk reduction, or profitability. This shortage of proof may act as a barrier to the widespread use of ESG practices, especially in the case of cautious or low, cost firms.

Implications of ESG integration on financial results through quantitative research can be a powerful tool to demonstrate the business value of sustainable accounting and infuse more managerial engagement.

9.4. Underexplored Role of Technology in ESG Accounting

One can find a rising trend of using digital tools such as ESG analytics software, IoT sensors for real, time monitoring, and cloud, based sustainability dashboards. Academic research on the practical usage of these technologies by Indian companies for ESG cost integration is still scarce.

By exploring how ESG data digitalization could be more accurate, efficient, and integrated into managerial accounting, one could offer a roadmap for the implementation of ESG that is driven by the application of technology.

9.5. Minimal Exploration of ESG in Public Sector and Informal Economy

Additionally, the influence of the public sector businesses and the informal sector, two significant contributors to the country's environmental footprint, is a lesser, known fact that is scarcely referred to in ESG research. Namely, the questions of whether and how these organizations internally implement ESG, related practices remain largely unaddressed in the literature.

Such studies as ESG is integrated into public enterprises, and the ESG accounting is formalized in the unaccounted sector would profoundly impact the research landscape by providing more comprehensive coverage of this area.

9.6. Need for Interdisciplinary and Policy, Oriented Research

Presently, the majority of research concerning ESG and accounting are done within the boundaries of a particular discipline and are mainly limited to management or finance. Nevertheless, ESG issues are fundamentally interdisciplinary, which means they touch upon economics, environmental science, social development, and public policy. Besides, there are very few studies that evaluate how efficient India's changing regulatory frameworks are in leading the internal ESG integration.

Such collaborations between different academic areas, for example, sustainability science, accounting, and regulatory studies, could result in more comprehensive recommendations for policy and practice.

10. Conclusion

The use Environmental, Social, and Governance (ESG) data as key inputs to managerial accounting systems has evolved considerably over the last decade in India. As organisations are increasingly expected to respond not just with profits but also with environmental and social impacts, there is a growing demand that traditional accounting needs to reflect these shifts beyond financial results.

This study acknowledges that ESG relationships are not just the icing on the cake anymore but the strategic decision that a company should make to weather a number of scenarios like regulatory compliance, competition, and long, term sustainability. The setting in India has seen the coming of initiatives such as SEBI's Business Responsibility and Sustainability Reporting (BRSR) guideline and the Carbon Credit Trading Scheme (CCTS) which are pushing at a faster pace the transition to sustainability accounting. In fact, there is a new way of working with these regulations because

companies have to update their accounting systems to capture, measure, manage, and analyze ESG data such as carbon emissions, energy consumption, water usage, and social equity metrics and then tie them directly to costs, risks, and performance indicators.

Moreover, it reveals that top Indian corporations are endeavoring to imprint ESG values into their financial planning and budgeting procedures, besides integrating them with their operational and strategic activities. These methods include internal carbon pricing, ESG, linked investment appraisals, and sustainability, based performance scorecards, which have begun to transform firms from the point of view of how they internalize the costs related to environmental matters and build more sustainable cost structures. This transformation is enabled by digital technologies that have improved, investors who now require ESG practices from the businesses they finance, and the pressure of global sustainability standards.

The study also points to a number of challenges which include limited data, shortfalls in the capacity of the workforce, regional differences, and technological barriers that pertain mostly to small and medium enterprises (SMEs). Unsatisfactory ESG, integrated accounting adoption patterns in different industries and locations bring out the need for this sector to be supported by adequate policies, receive proper training that is sensitive to the capacity, and get customized industry frameworks that depict India's distinctive economic, environmental landscape.

Moreover, Indian firms can capitalize on the managerial accounting system benefits seamlessly as they transit to the ESG integration model. Successful implementation will improve strategic decision, making, operational efficiency, risk management, and stakeholder trust. Yet, the full range of benefits could only happen if there is an organizational transformation which retools finance and operations teams with fresh knowledge and skills and is guided by data, driven decisions and sustainability at the core of the company's value creation model.

Concluding, ESG, integrated managerial accounting marks a paradigm shift in how Indian businesses track, control, and communicate their results. It demands that the notion of costs be changed, not only those that are as monetary but also in environmental and social impact. Hence, the journey to the future will still be a long one, choosing when to apply these techniques effectively will no longer just be a question of compliance with the rules but also of sustainable growth, accomplishing international carbon goals, and cultivating an ecosystem of corporates that are responsible and resilient in India.

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