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Greening Accounting: An Inevitable Link to Help Firms Connect with Sustainability

Somnath Debnath

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Abstract

The last decade has seen developments challenging the abilities of managerial accounting theories in supporting firms with environmental conscious decision-making that are grounded in the expanded accountability of firms toward nature and society. Critical theorists have argued that the shortcomings of the accounting theories to interpret the impacts of business activities on nature have its origin in the missing accounting standards, under-defined contractual boundaries, and the absence of a valid numéraire (monetary equivalency). In this chapter, the author posits that these shortcomings are a legacy of the economic paradigm within which the accounting frameworks operate and would remain so, unless a paradigm change evolves to handle environmental-related considerations on its own, even if it means rewriting rules to generate accounting interpretations of business activities. Instead of offering a methodological solution, this chapter ideates how having “environment” as integral to the accounting paradigm would enable firms in evaluating, accounting, and reporting environmental performance transparently and improve flow of information to help management face sustainability-related challenges better.

Keywords: environmental accounting, ethical rights, externalities, accounting dimensions

1. Introduction

Managerial accounting has evolved over the years as a valuable aid for management to interpret accounting and other organizational inputs and generate information necessary to improve scientific temperament in the decision-making process. However, last two decades have also witnessed developments that challenged its abilities to support sustainability and environment-related issues and help businesses manage societal expectations better. These challenges, in all earnestness, have questioned the efficacy of firms

to act as economic agents of society and remain a conduit of continuing progress. The absence of suitable language to comprehensively describe the evolving decision considerations is one end of the problem; inability of current accounting language to satisfy information needs beyond economic viewpoint is proving to be another. Instead of proposing a comprehensive solution to this polyvocal problem, this chapter aims at going beyond the arguments of greening managerial accounting to understand how changes in the core accounting construct might help firms connect better with the sustainability-related issues and shape microlevel application of sustainability to emerge as inherent to the accounting sciences.

2. Sustainability and underlying philosophies: implications for business firms

Sustainability, in simple terms, embodies the eternal principles upholding well-being of mother earth to sustain and improve human and other life forms along with the nonliving world, and enrich natural environment over time. While scientific understanding of energy and matter and how it flows through the diverse activities in nature to support different life forms and abiotic world is inadequate to meaningfully explain its multidimensional nature and long-term ramifications of anthropocentric activities, the ensuing debate within academic disciplines to have largely remained fragmented along the respective epistemological boundaries has been less surprising [1]. Still, some convergence has been witnessed toward acknowledging the need of developing interdisciplinary and transdisciplinary studies to improve understanding of sustainability-related issues (see Abraham [2] in engineering, Bergmann [3] in fine arts, Bosselmann [4] and Mueller [5] in education, Gray [6] in accounting, Stegall [7] in design, Taylor and Theyel [8] in business education, and others). At the same time, critical theorists have argued how increasing materialistic lifestyle and drive to improve economic prosperity of societies have steadily increased the risks of continuing environmental exploits and ecological losses, including loss of biodiversity, global warming, and increasing levels of resource consumption that are seriously threatening intra- and intergenerational equity (supported by the last Millennium Ecosystem Assessment report [9] as well). Jones and Solomon [10] believe that the ecological losses of this era are of the worst type and perhaps can even eclipse previous natural disasters in terms of impact and magnitude, as the twin issues: (a) these being human-induced ones and (b) our inability to understand the impacts in entirety are pushing ecosystem toward a state that is least understood in terms of its life-supporting capabilities. Meanwhile, the inability of global organizations and governments of sovereign countries to push for formal mechanism to uphold accountability of industries toward the impending disaster that can drive significant changes in the behavior of the industries to act responsibly has been equally disturbing. Metcalf and Benn [11] have questioned the “fit for purpose” of corporate firms to continue as the social mechanism of development and changes needed for them to be responsive toward the interconnected, dynamic, economic, environmental, and social systems.

This brings us to the debate if ecological sustenance should be focal to agenda of economic growth and human progress, as ecocentric philosophy proposes, as compared to anthropocentricity that views sustainability as a key to further human existence on this planet. While ecocentric views integrate everything, including our collective knowledge, to improve understanding of our relationship with nature (biotic and abiotic world), anthropocentrism believes the purpose of nature, and its resources are to enrich human life and harness knowledge to serve human needs better [12]. Between these two extremes, the question—how (un)sustainability of human activities is to be viewed against the backdrop of everything else—remains unanswered. In normative terms, sustainability of a region is dependent on pursuing and practicing policies that would sustain ecological balance and natural wealth over time, but to redefine the role of business in effectively participating and supporting the cause, which has hardly been explored, has remained relatively under-defined in ascertaining “what” and “how much” of sustainability should be the responsibility of microlevel entities. This effectively creates a problem for the accounting theories to define “what” needs to be accounted for, even before deciding “how” this could be achieved. To define nature of information needed by firms and its stakeholders to be reflective about the current form of development and how that might be impacting sustainability is also relevant to this discussion. Within the prevailing diversity, how firms and managements could improve their accountabilities toward society and nature would need us to explore advancements in accounting theories and how this could be relevant in helping businesses live up to the challenges of our times (Section 3). This is followed by exploring how accounting sciences would need to rewrite rules to capture environmental impacts of firms and its activities (Section 4), before summarizing how this might change the accounting world for the better (Section 5).

3. Sustainability and critical accounting theories

Firms’ need to account for environmental duress due to its economic affairs has been philosophized under the aegis of social and environmental accounting (SEA), where different philosophical approaches have contributed to advance the arguments in favor of improving the nature and state of accounting sciences to support the cause. The context of discussion in this chapter is not to critically examine theoretical approaches that have contributed to advance arguments in favor of environmental accounting but to validate few important ideas that have shaped the need for the accounting theories to play a vital role in supporting sustainability. This includes *ethical approach*, where quasi-public nature of business has been considered as the underlying reason for the firms to partner with the larger issues that the societies are facing today. At the same time, experts have cited *ethical rights theory* to uphold stakeholders’ rights to be informed about how firms are handling environmental demands of the society, whereas *instrumentalist approach* of environmental accounting comprises of tools and techniques that can be of significance to translate environment-related risks as a new opportunity for the businesses to pursue and help them generate first mover’s opportunity

to drive a win-win situation. Here, “environmental accounting” has been referred to reflect the role of accounting and information system to support firms in keeping track of impacts that its activities cause on environment and generate information on the utilization of natural resources like materials, energies, water, and other resources to support information needs of internal and external stakeholders while preserving materiality, traceability, and relevance of such information (improvised from IFAC [13]). Accordingly, more than the empirical aspects of the subject, the following subsections reflect on the systemic ones, including examining how contemporary developments within accounting literature are connected to the issues of environmental sustainability.

3.1. Contemporary developments within the critical accounting theories to support sustainability

We start the discussion with the *ethical approach* that advocates firms to view their obligations toward nature and society as a primary concern and find ways to evolve uncompromising attitude of businesses to uphold this to be a central tenet of existence, simply because “this is the right things to do” (normative view). Even though this view might not always lead to a win-win situation for firms, especially when the outcome(s) of any strategy or opportunity is/are stacked against the economic ones that might have to be sacrificed to pursue environmentally oriented ones, still firms are expected to align their actions and decisions to maximize the overall well-being of everyone concerned [14]. Not only this is impractical from a pragmatic standpoint, such an ideology would have limited impact to bring in a calculative aspect that accounting in general is associated to. The approach closely corresponds to the deep green approach in SEA theories (care for nature in everything we do), which is somewhat contrary to the methods of economic organizations, where economic considerations generally outweigh every other option and even go against the progressive adaptation of environmental sensitivity that the light green approach supports [15]. To exemplify, inadequate methodological support of current knowledge based on evaluating the impacts of doing business and accounting for biodiversity-related losses, permanent loss of natural capital, reduction in inter- and intragenerational equity, and loss of ecological resources, is simply overwhelming. Still, the noticeable part of this approach is to leave the choices and their consequences to the firms, hoping for them to go beyond the disclosures of corporate social responsibility (CSR). Although scholars have supported the use of natural capital theory to understand the built environment and its sustenance in evaluating and accounting for contribution to natural and man-made wealth better [16], the absence of demarcated boundaries of causal relationships and ownership issues introduces the problems in accounting and accountability, where technical complexities to ascertain biodiversity-related losses are still to be resolved [10]. This goes along with the need to also have ecological and/or sustainability accounting standards [17–19].

Subsequent developments within the social and environmental accounting (SEA) theories eased some of the operational limitations of newly introduced approaches by extending its support for voluntary reporting mechanisms that can be used to disseminate information on how

firms are/would be contributing to the societal expectations (intent follows action), even when the uncertainty regarding the loci and contents of such broadcasts add to the unresolved questions of traceability and assurance of disseminated information. Further, voluntary reporting remains disconnected from the formal accounting and reporting processes, thereby lending credibility to the widening gap between the accountability of organizations toward environment and the efforts required to promote changes in the overall behavior of firms to incorporate ethical considerations as a part of normal business conduct [20, 21]. Moreover, this has also resulted in institutionalizing multiple reporting platforms like Global Reporting Initiative (GRI), Carbon Disclosure Project (CDP), United Nations Global Compact (UN COMPACT), and Greenhouse Gases (GHG) reporting, not to mention CSR bandwagon, giving way to establish plurality in standards and languages [17, 22, 23] that has overshadowed the need to have fact-based or assured information that Hazelton [24] argues is the information right of citizens, especially where common assets are involved. Without threading out issues like trust and belief that the firms need to address while disseminating information, voluntary reporting could hardly play the role of a catalyst to successfully mediate a meaningful dialogue between the firms and society and to ensue debate regarding firms' contributions to sustainability [15].

The argument here is that in the absence of a systemic integration of environmental *bads* within the voluntary reports, disseminated information rightfully contributes to information asymmetry. To substantiate and highlight the rights of society and stakeholders to be informed about how firms might be operating or contributing to environmental (un)sustainability, which has been a basic premise of the SEA theories, the author invokes the *theory of ethical rights*. As per the ethical rights theory, ethical negatives are not an implied outcome while dealing with the ethical positives, and, instead, it emerges as a response to the corresponding positive right (e.g., right to life can also be viewed as a negative right *not* to be killed) that cannot be considered as belonging to mutually exclusive domains, and instead, develops on the logic to counter each other. Applying this to business would mean for a firm to have a license to operate based on its perceived ability to add value to the society, but it is also to remain open to the scrutiny of society regarding the negative impacts that it might be contributing to, including bearing responsibility of informing stakeholders about the steps being taken to improve the situation. One-sided information, mostly the positive ones that the CSR and voluntary frameworks disseminate, limits the field of view of the users, especially in the absence of corresponding negatives, and contributes to information asymmetry. Unless the claim of positive actions are backed by information on negatives, for example, quantified information on waste, emissions, ethical violations, and the efforts of firms to counter these, and are made available to substantiate the claims, it might appear as a deliberate attempt on the part of the firms to promote certain specific or hidden agenda. SEA theories have remained less overt about the societal rights to be informed about the negative impacts that the businesses are contributing to, in favor of letting it to be an implied one. The contention here is that to be reflective about the *real* worth of a firm, both sets of information (ethical positives as well as negatives) are a necessity, including the feasibility of independently assessing current practices of firms. This will help the stakeholders to remove biasness and evaluate how firms are contributing to the overall well-being of the society and nature.

3.2. Methodological improvements: environmental management accounting (EMA) framework and other techniques

While the ethical approach of SEA theories (from previous subsection) depended on businesses to act in a righteous way so as to improve the overall welfare of the society, it seems wishful and contrary to the real behavior of firms, if learning from the industrial revolution and current state of earth's resources is anything to go by Millennium Ecosystem Assessment [9]. Moreover, in the absence of necessary legal framework to enforce firms to uphold their end of the ethical bargain, firms' motivation to behave ethically and (re)orient its conduct toward superior environmental performance, that the market and society in general would expect and reward, demands a mechanism that can easily be relied on to support internal and external information and decision-making needs of firms [17, 25]. To pursue the argument, this subsection has relied on the instrumental view and explored how the methodological advances from the recent past promoted under the umbrella term of environmental management accounting (EMA) has furthered environmentally conscious methodologies to support decision-making efforts of management, and has improvised the role of accounting in helping firms target costs that are related to generation and prevention of waste. The innovations are not an enactment of the ethical stand but aimed at offering methodological support to businesses in improving environmental risks and achieving win-win outcomes. Developments within EMA did not lead firms to break away from the current goals of business in favor of environmentally superior ones, instead leveraged the innovations to improve outcomes, as instrumentalist approach would expect.

Methodological improvements advanced under the umbrella term of EMA framework [13] have helped firms in dealing with the need of environmentally sensitive information. This included waste accounting and reporting methodology [26] that advocated firms to develop cost drivers to analyze already recorded overheads in the books of accounts and identify environmental-sensitive expenditures that are getting diverted from the value chain [27–29]. A number of case studies experimented with the advancements to support the claim that the firms can improve environmental impacts and bottom line by identifying causal relationship of costs with activities generating waste and effectively control costs as well as waste (lower waste and, hence, improve costs). Another line of development proposed material flow cost accounting (MFCA) and developed waste flows, where valuation of nonproduction outputs (waste) from the production cycles improved visibility around drained resources. Pathbreaking in treating waste equivalent to finished goods, MFCA allocated costs to waste by using the principle of mass balance to generate information on the equivalent economic value being diverted from the organizational value chain [30]. A good number of case studies from around the world experimented with these innovative ideas that culminated in MFCA getting institutionalized as an ISO standard (ISO/DIS 14051) [31].

During the same period, innovative methodologies like environmentally enhanced life cycle costing (E-LCC) and full cost accounting (FCA) breached organizational definition of cost by developing considerations for contingents and intangibles that are less definitive and have traditionally remained outside the formal accounting considerations. Changing

paradigm in business environment made these increasingly relevant to managerial decision-making (e.g., new projects, impact of future environmental laws, and others), helping firms to be cognizant of their actions beyond the economic boundary. Subsequent developments within EMA supported environmental costs to include “less tangible costs” that covered out-of-boundary and difficult-to-quantify external costs [13]. While the shifted focus of EMA supported accountability of firms toward externalized liabilities, subsequent studies have not always supported the view [32–34], where experimentation involving out-of-boundary costs in different decision-making situations reported usefulness of expanded views, for example, in evaluating environmental aspects as a physical asset of the firm or to deriving opportunity income by reducing emissions [35, 36]. The new ideas contributed to the growing arsenal of computational and algorithmic solutions that supported legitimacy claims of businesses while remaining disconnected from the epistemological roots of the underlying accounting theories, failing to provide for any foundation to unify environmental accounting as a part of existing management accounting system, as envisioned by Gray and Laughlin [15]. Readers interested in exploring EMA-related developments further can refer to Debnath et al. [37].

3.3. Developments in formal accounting standards to support environmental challenges

With the advent of International Financial Reporting Standards (IFRS) as the global generally accepted accounting principles (GAAP), there have been some advancements in literature in examining how IFRS can help firms handle changing societal expectations better. This subsection is more of a preemptive discussion to emphasize how moving away from country-specific GAAP to IFRS has not diverted the primary focus of financial accounting and reporting from the economic viewpoint that the market system supports. For example, Negash [25] offered a prescriptive treatment how the provisions of IAS 38 (impairments of emission rights), IAS 32 (financial instruments: presentation), and IFRS 7 (financial Instruments: disclosures) can support environmental imperatives that a firm might need to adhere to, where IAS 39 (new IFRS 9) could deal with the presentation, disclosure, recognition, and measurement of financial instruments from the perspectives of carbon trade. Similarly, IFRIC 1 and IFRIC 5 can be used to deal with the financial implications and related liabilities that arise due to decommissioning, rehabilitation, and restoration events of certain industries in certain countries, whereas, IAS 37 can be used to deal with the provisions and contingencies associated with these events. Similar assertions by Firoz and Ansari [38] explained how the aforesaid provisions of IFRS could be used to report material aspects of social and environmental accounting, including accounting and reporting environmental assets (environmental rights and associated values purchased/contracted, actuarial value of insurance or similar risks, and capitalized values in environment-related R&D expenses) and associated liabilities (physical data to quantify aspects toward rehabilitation and restoration of impacted sites and use).

Further reading of these standards reveals the need of a legal framework to reflect: (a) how firms might have chosen to deal with “certain” environmental areas that the law demands (e.g., environmental restoration funds and compliance-related regulations), (b) quantification and possible monetization of impacts resulting from legal compulsions instead of a proactive

declaration of externalized liabilities, and (c) how market-based initiatives (e.g., carbon trading and emission rights) would impact accounting, which is also related to disruptions due to initial carbon emission allowance and associated risks of recognizing these as asset in financial accounting [39–41]. Highlighting IFRS' confined boundary to support market mechanism, the author views this to be hardly at an arm's length from the existing financial reporting and of little help to firms and regions where legal support is inadequate, for example, developing and underdeveloped nations.

3.4. What are we missing?

To recapitulate, accounting innovations have supported the legitimacy claims of firms and pursued improvements to achieve lower waste levels and improve bottom lines. At the same time, methodological complexities and under-defined causality made FCA an unviable choice, and only a handful of companies could develop detailed account of extended costs. So, while shift in focus from “accounting” to “accountability” that SEA supported is a good beginning, accounting innovations failed to keep the momentum beyond rhetoric. No surprise, these innovations worked around the existing constraints, instead of challenging the core construct. This abstinence could be due to the perceived equivalence of accounting language with that of the framework itself where *financial accounting* emerges as the only form of accounting, while all other forms are perceived as its feasible extension. This gives rise to the age old dilemma if it is possible to review the theoretical and foundational problems of the accounting sciences by concentrating on specific and narrow area like financial accounting in isolation, without searching for an overall theory that might comprehend all areas of accounting and information system [42]. This chapter searches for a change in the fundamental design in accounting, hoping for improvement in the overall generalization of accounting theory. Next, segment revisits accounting paradigm to explore how environmental concerns can be a part of it.

4. Environment: a missing element of accounting paradigm

To begin with, although we perceive the accounting practices to be restrictive and less caring for environment and sustainability, and we believe that they are not living up to the contemporary challenges, we have to understand that the accounting frameworks are fundamentally designed *not* to be innovative, so as to allow practitioners (accountants) to interpret reality (business events) and offer data and information beyond what is prescribed by the relevant standard(s). Here, the author would like to add that the art and practice of accounting are grounded in its ability to uphold the norms of the framework within which it operates [43]. Accordingly, it is natural for the accountants *not* to interpret business activities to generate information beyond the norms or away from how the accounting frameworks have guided to interpret reality, for example, *not* to highlight if certain activities are or could be potentially discouraging for environment. If the freedom to interpret business events gets disconnected from the guiding principles of accounting, it would result in systematically introducing bias

to the entire accounting and reporting process, rendering information artifacts less reliable for decision-making or for any other organizational purposes. In essence, perseverance of an accounting framework in limiting its field of view to highlight accounting interpretations that is narrower than the overall impact of the underlying business event, is not a shortcoming in itself, but inherent to the accounting process that translates business activities into specific accounting information while suppressing noise around it. This brings us to question why the boundaries of the existing frameworks could not be stretched beyond the obvious. The rest of the section follows through on this discussion.

If we consider accounting to be the language to interpret business activities, its enactment is based on the norms and standards that are part of the chosen framework through which the business transactions are analyzed [44], where the theoretical underpinning of the framework provides the generalization of “what account is accounting.” In other words, if data and information generated by accounting processes could be considered as symbols, its utility lies in the usefulness that the contents generate within the broader social perspective. As sustainability-related information needs of firms and stakeholders are beyond the economic existence of firms, more so, because it involves environmental and social implications of doing business that brings in concepts like externalities, social costs, and constancy of natural and other types of capitals to the accounting theories, current economic viewpoint would fall short to incorporate these, as the mainstream economics has failed to incorporate externalities and market failure. So, the core viewpoint that an accounting framework supports cannot be reengineered beyond what could be seamlessly integrated within the belief system. Otherwise, the outcomes might result in disruptive changes, severely compromising cost and quality of information.

To substantiate the unidimensionality of accounting framework and its dependency on a core viewpoint that defines its operating boundary, the author would like to cite the origins of cost accounting as a source of valuable insights. Cost accounting evolved as a response to the constraints faced by the decision-makers in extracting information on organizational value creation process from the financial accounting [45]. Management’s need of information on the value creation process and actual flow of costs led to the development of cost accounting and its techniques, which grew (mostly) outside the formal structure of financial accounting. By leveraging double-entry principle, cost accounting legitimized materials and resources accounting and satisfied accountability, control, and decision-making needs of management (e.g., financial well-being vs. overhead cost analysis) [46]. Although in due course, the two frameworks merged to form integrated accounting, and represented abstraction of the nominal form of accounting, it is beyond doubt that this commonality is more on account of common measurement scheme (monetary valuation) that they share, as against the purposes they continue to serve. So, it would be unfair to expect the accounting practices to interpret transactions and develop, support, or forecast the (un)sustainability-savvy behavior of firms, especially when this has been neither the intent of the underlying frameworks nor the lingua franca of the mechanism through which the business events are being interpreted. Accordingly, environmental viewpoint would remain a challenge for the existing frameworks to adjust to and natural for them as well to ignore the needs. In

order to understand the environmental implications of doing business, accounting theory would have to first conceive environmental viewpoint as a part of its core belief system so as to lay foundations to support corresponding information needs (Figure 1).

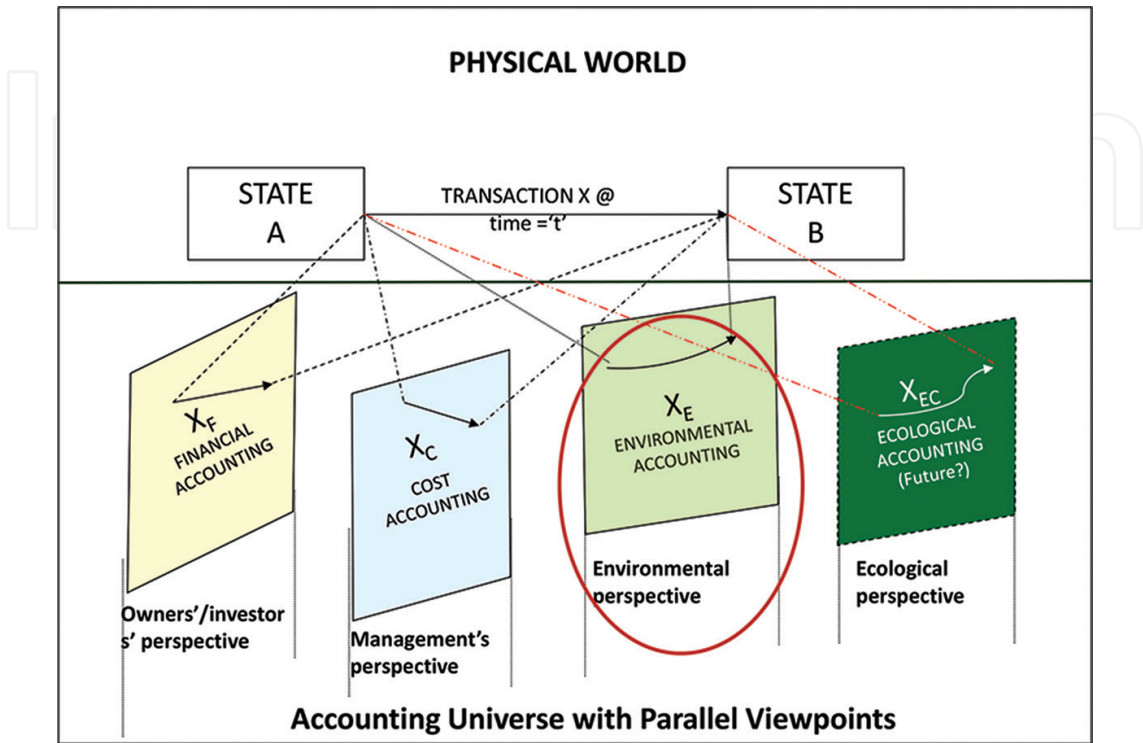


Figure 1. Accounting implications of a transaction within parallel accounting worlds (source: developed by author).

Figure 1 is a schematic representation to reflect that an accounting framework (say X_F) is a mechanism to translate a business transactions (transaction X in time t) in accordance to the norms and principles of the framework (financial accounting in this case) using accounting language that is grounded in the core viewpoint that it supports (owner/shareholder perspective), which would generate information to satisfy the relevant interests of the stakeholders, for example, by evaluating how the entity has been performing within the chosen dimension. We have to understand that the transactional information captured by an accounting system is not the whole truth about it, but a partial view or projection of the transaction on to the respective accounting plane. Accordingly, bookkeeping process would ignore other aspects of the transaction and save for the contextual elements that are relevant in evaluating the implications of the transaction within the chosen framework. Selective acuteness of the accounting paradigm heightens the focus around the intended objective(s), which could be perceived myopic at first, but is a basic necessity for the process to remain aligned to achieve the intended objective. This results in “environment” being a missing element of the prevailing paradigm that needs to be incorporated first (may be within a new framework), where calibrating environment well-being is held central or core to the framework, so as to enable the accounting language and necessary measurement scheme to interpret firm—environment exchange. At this juncture, it would be

pertinent to clarify that accounting viewpoint or dimension used interchangeably throughout the chapter reflects isolated boundaries of information needs, conceived to map transactional elements and satisfy information demands, and in no way reflects dimensionality proposed by Ijiri [47].

While the loci to capture environmental impacts of business activities have not been defined for the accounting theories to pursue (Section 2), ethical rights theory can be leveraged (Section 3) by the proposed framework to define how firm-environment exchange might result in ethical negatives that the business activities would generate or subsume, for example, how environmental assets (aspects like waste and emission) impact nature and society (e.g., social and health impacts). Moreover, this can be related to quantify ethical positives to reflect how firms have chosen to deal with them (e.g., improved product design, waste disposal system, and end-of-life product return policy). Using provisional, social, and externalized costs, it is theoretically possible to record externalized liabilities to bring those in within the firm's boundary and integrate within the social contracting process, as theorized [48]. To illustrate, Appendix 1 has tabulated transactions from a case study conducted by the author previously [49] to exemplify how business transactions can be analyzed and evaluated in terms of environmental aspects and impacts and could be used to develop an environmental accounting framework (Figure 2). Figure 2 details a four-step

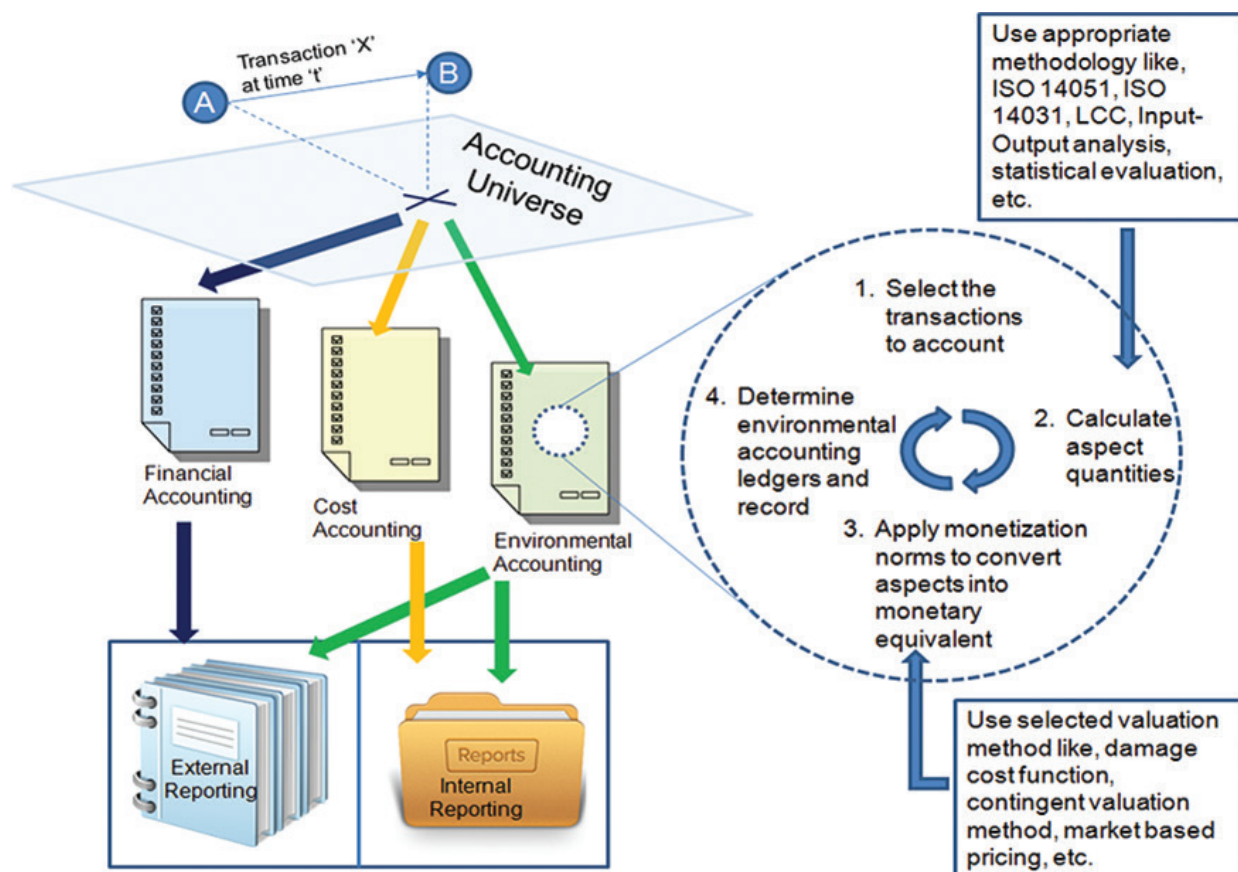


Figure 2. Environmental accounting framework (source: developed by author).

accounting process where suitable environmental technique can be used for quantification of aspects (e.g., ISO 14031, ISO 14051, input-output analysis, life cycle analysis) and suitable monetary conversion (e.g., at cost, at replacement cost, market determined rates, contingent valuation method, cost avoidance method, or any other combinatorial proxy) could be employed to translate these into equivalent externalized costs. The use of multiple methods for quantification and monetization can also be experimented with to improve visibility to the organizational activities.

Although it is natural for us to be critical of the risks associated with the exploratory nature of the framework and under-defined rules, standardization of environmental accounting can be taken up at national or supranational level or could be left for firms to experiment with. This would expand the boundaries of accounting by absolving it from being subservient to the economic interests alone, as also to reduce dependency on monetary unit as the *only* numéraire. Theoretically, this would support in producing ethical-environmental balance sheet in the long run to reflect collective relationship of the company with nature, where instead of measuring profits (economic measure), the question of subsidizing externalities can be raised to define the real profit and sketch future relationships [50, 51].

5. Concluding remarks

For the firms to care for nature and society would require them to manage externalities better (proactive), instead of waiting on the policy enforcements and acting responsibly (reactive). However, proposed methodological improvements from the last decade did not go beyond fulfilling the internal decision-making needs of firms (business as usual) in improving the overall accountability (long-term objectives). In this chapter, the author has argued that the current developments within accounting literature owe its origin to the economic paradigm within which the accounting frameworks operate and serve to satisfy corresponding information needs. Accordingly, pushing the prevailing frameworks to account for the environmental impacts might force the existing frameworks to reengineer beyond what could be seamlessly integrated, resulting in contributing to distorted views and misinformation. To be able to capture the experiences of environmental interactions of firms and support ecological choices of firms, accounting theories would need to evolve *environmental well-being* as one of its core concerns. Considering the limitations of the accounting language to validate transactions using a close-ended approach, this would be fundamental to *account for environment*, where its suitable enactment is expected to institutionalize meanings of the words like “environment” and “externalities” within the accounting process. In an ever complex world, the overall performance of an organization would seldom be judged in the near future by its financial performance alone. Expansion of accounting viewpoints to integrate environment would offer a mechanism to bring calculative aspects of accounting to other dimensions of organizational existence within the equation and support firms to follow sustainability as a natural corollary of accounting.

Appendix 1

Business transaction	Analysis of environmental concerns	Aspects	Impacts
1. Receives 100 MT of raw material say lye against purchase order number PO # 131	Emissions from transportation of the materials	Secondary emissions due to transportation of goods	Eq. environmental load of GHG
2. Dispatch of 1000 MT of banana puree from Mumbai to Rotterdam via ship by Coffee Inc.	Emissions due to the shipment of products	Same as 1	Same as 1
3. Ripening of mangoes in the ripening chamber	Emissions due to the use of electricity purchased from grid	Secondary emission due to shipment of goods	Same as 1
4. Steam used in production generated by briquette boiler	No emission due to the use of biomass fuel	None	None
5. Production of 1000 tons of mango pulp/puree and concentrate	a. Energy consumption	Secondary emissions due to energy consumption	Same as 1
	b. Water	Water drained and not recycled	Social liabilities of not treating wastewater
	c. Solid waste generated	Solid waste transferred to municipality	Social liabilities toward municipal waste management
6. Availing 400 hours of consultancy services toward system development by IT Services Ltd.	a. Energy consumption in software, server, etc.	Same as 5(a)	Same as 5(a)
	b. Traveling of consultants (tCO ₂)	Secondary emissions due to traveling	Same as 1
7. Disposal of 100 MT of solid waste through contracted services	Environmental aspect of waste disposal depending on the disposal option	Same as 3(c)	Same as 3(c)
8. Salary and wage disbursement to the employees	Not relevant	No impact	No impact
9. Facility services availed toward cleaning and housekeeping	Environmental aspects of services like water, energy, and emissions are accounted against it	Same as 5(a–c).	Same as 5(a–c)
10. Jobs subcontracted to the service providers	Environmental aspects produced in subcon jobs inventorized	Same as 5(a)	Same as 5(a)
11. Funds invited for investments in new schemes	No impact	None	None

Environmental viewpoint of business transactions from a case study [49].

Author details

Somnath Debnath

Address all correspondence to: sndebnath@yahoo.co.in

Institute of Cost Accountants of India, Kolkata, India

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