

Environmental management accounting with an emphasis on it cost

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Abstract: Although environmental costs are only one of the many costs incurred by businesses, they deserve management's attention. For companies in the service sector with office environments, better insight into environmental costs can lead to them being reduced while environmental performance is improved with costs being offset through the recycling or sale of waste and improved costing of services. It will also help with the justification of environmental improvement initiatives, and support of a company's environmental policy, management system or data collection for public reporting. Environmental management accounting can be used as a tool to reap these benefits, and refers to "the process of identifying, collecting and analyzing information about the environmental costs and performance to help an organization's decision making."

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1. INTRODUCTION

Environmental issues along with the related costs, revenues and benefits are of increasing concern to many countries around the world. But there is a growing consensus that conventional accounting practices simply do not provide adequate information for environmental management purposes. To fill in the gap, the emerging field of Environmental Management Accounting (EMA) has been receiving increasing attention. In recent years, environmental management accounting has been attracting increasing attention throughout the world. Environmental accounting is an inclusive field of accounting. It provides reports for both internal use, generating environmental information to help make management decisions on pricing, controlling overhead and capital budgeting, and external use, disclosing environmental information of interest to the public and to the financial community. Internal use is better termed environmental management accounting [1]. For the purpose of this research, both internal and external uses are considered. The contribution of multiple disciplines provides a base for determination of environmental impacts and related costs. Specific details of that determination serve one or both of the uses. Impact of business activity on the environment is found in several forms.

2. ENVIRONMENTAL MANAGEMENT ACCOUNTING

Environmental management accounting is viewed as an extension of conventional management accounting. Management accounting is defined as measuring and reporting 'financial and non-financial information that helps managers make decisions to fulfil the goals of an organization' [16]. Birkin indicates that 'EMA is a straightforward development

of management accountancy' [6]. Bennett and James (1997) explain that EMA can be seen as 'environment-related management accounting', but does not have a bias towards financial information [4]. According to the United Nations Division for Sustainable Development EMA is 'simply a better and more comprehensive approach to management accounting' [23]. The UNDSO states:

The general use of environmental management accounting information is for internal organizational calculations and decision making. EMA (environmental management accounting) procedures for internal decision making include both physical procedures for material and energy consumption, flows and final disposal, and monetarized procedures for costs, savings and revenues related to activities with potential environmental impact. The International Federation of Accountants (IFAC) defines EMA as [17]. The management of environmental and economic performance through the development and implementation of appropriate environment-related accounting systems and practices. While this may include reporting and auditing in some companies, environmental management accounting typically involves life-cycle costing, full-cost accounting, benefits assessment, and strategic planning for environmental management.

The two definitions reveal that the development of EMA is set within an environmental management context. Management accounting has an important role to play in managing environment related issues. For example, management accountants have the expertise and skills to improve the quality of environment-related information, which can be applied to assist in decision-making in relation to

investment appraisal, capital budgeting and strategic management [11][18]. As EMA is a flexible tool, there are many other definitions existing in the literature differing in the scope or boundary of application. An important feature of EMA as reflected in some definitions is the focus of EMA on both monetary and physical aspects of organizational environmental impacts [8][13]. Being the focus of this study, EMA will be revisited and discussed in

greater detail in this paper. However, some frequently used EMA definitions are summarized in Table 1 For the purpose of this study, EMA is defined as the generation, analysis and use of monetary and physical (or financial and non-financial) environment related information in order to improve organizational financial and environmental performance.

Table 1 A summary of definitions of environmental management accounting

Source	Definition
Birkin	EMA provides a service to management that is rooted in the internal functions of the firm but is outward-looking where appropriate.... EMA is a straightforward development of management accountancy.
Bennett and James	[EMA is] the generation, analysis and use of financial and non-financial information in order to improve corporate environmental and economic performance.
Graff et al.	In terms of management (or internal) accounting, EA (environmental accounting) is the way that business can account for the material use and environmental costs of their operations. Material accounting is a means of tracking material flows through a facility in order to characterize inputs and outputs for purposes of evaluating both resource efficiency and environmental improvement opportunities. Environmental cost accounting is how environmental costs – including those that are often hidden in general overhead accounts – are identified and allocated to the material flows or other physical aspects of a firm's operations (as might be identified via material accounting).
Bartolomeo et al.	EMA is the generation, analysis and use of financial and related non-financial information in order to integrate corporate environmental and economic policies, and build sustainable business.
UNSD	EMA thus represents a combined approach which provides for the transition of data from financial accounting and cost accounting to increase material efficiency, reduce environmental impact and risk and reduce costs of environmental protection.
Burritt, Hahn and Schaltegger	It is proposed that EMA be defined as a generic term that includes both Monetary Environmental Management Accounting (MEMA) and Physical Environmental Management Accounting (PEMA).
UNSD	EMA is simply a better and more comprehensive approach to management accounting, with a particular focus on costs related to wasted raw materials and other environmental issues. Key points are: <ul style="list-style-type: none"> • y EMA focuses on costs internal to the company; EMA does not include costs to society or the environment for which a company is not held accountable. • EMA places particular emphasis on accounting for environment-related costs such as waste management costs and the lost value of wasted raw materials. • EMA encompasses not only cost information, but also information on quantities, flows and disposal of materials and energy. • EMA information is valuable for many types of management activities or decisions, but is particularly useful for environmental management. • EMA's main use is typically for internal management and decision-making, but EMA information is increasingly being used for external reporting purposes in financial reports or annual environmental reports.
Bouma and Correlje	EMA can be regarded as a subset of environmental accounting which refers to accounting systems and techniques that provide decision-makers and management with financial and non-financial information about the firm or organisation and its environment.
Bennett, Rikhardsson and Schaltegger	EMA is understood here as environmental accounting which is specifically addressed to supporting the information needs of the organisation's own management.
Rikhardsson et al.	EMA is a form of technology. Not in the sense that a car or a computer is a technology, but in the sense of a managerial technology, which combines knowledge, methodology and practice and applies these to linking environmental management and economic results. Technology is often defined as putting knowledge to practical use, and EMA covers various tools and techniques of targeted information collection, analysis and communication and is thus a type of information management technology or managerial technology... it is important to emphasize that EMA covers a large set of different tools ranging from environmental cost accounting, to investment appraisal, budgeting, performance measurement and material flow accounting.

3. Environmental management accounting and the role of accountants

Most business activities have environmental impacts. Almost all environmental impacts also have business costs, such as consuming raw materials, using utilities such as water and energy, and generating waste[20]. Environmental management accounting uses standard accountancy methods to identify, analyze, manage and reduce these costs in a way that can benefit both the business and the environment. In addition to financial costs, you can use environmental management accounting to identify other issues such as non-compliance, negative public relations and health and safety problems. The process also enables you to identify which activities have the biggest environmental impacts and costs. This enables managers to set goals and priorities for managing these activities and reducing their impact.

4. The role of environmental management accounting in the development of management accounting for the environmental

In response to criticisms of management accounting in general, a number of innovative management accounting techniques have been developed. These techniques have shifted the focus and impacted on the whole process of management accounting, including planning, controlling, decision making and communication [19][21]. EMA is also subject to the same influence. In 1998, the International Federation of Accountants (IFAC) issued a statement on management accounting concepts outlining the development of management accounting through four distinguishable stages with a different focus in each stage. The four stages are:

- Stage 1 (pre 1950) – a focus on cost determination and financial control;
- Stage 2 (by 1965) – a focus on the provision of information for management planning and control;
- Stage 3 (by 1985) – a focus on the reduction of waste in resources used in business processes; and
- Stage 4 (by 1995) – a focus on generation or creation of value through the effective use of resources (IFAC 1998b).

The focus of management accounting has been extended from information provision

Stage 2) to the reduction of resource loss (Stage 3) and to the effective use of resources (Stage 4) [18]. The shift in focus has made management accounting an integral part of the environmental management process in contemporary organizations. In particular,

the focus in Stage 3 is central to physical EMA in terms of accounting for the flows of natural resources (i.e. energy, water and other materials), whereas the focus in Stage 4 is parallel to that of EMA that considers benefits and costs with regard to eco-efficiency. For most organizations having applied or implemented EMA, their main focus is on meeting the goals of Stages 1 and/or 2 with implemented practices ranging from simply adjusting existing accounting systems to adopting an integrated EMA system that links monetary and physical information. The International Federation of Accountants (2005) comments that the current EMA applications are continuing to move in the same direction as suggested in the development of management accounting. When inattention to environmental costs is justified to be ineffective, and the efficient use of resources proves to create value over the long run, EMA is part of the solution to problems with conventional management accounting, and fits in well with the trend of management accounting for the environment.

5. Types of information included under environmental management accounting

In practice, EMA adoption ranges from simple adjustments to existing accounting systems to implementation of a comprehensive EMA system that links conventional monetary and physical information systems. To implement EMA practices, both monetary and physical data on material uses, labor hours and other cost drivers are relevant and required. The two types of information monetary and physical – included under EMA are discussed below .

5.1 Physical environmental information

According to the International Federation of Accountants (IFAC) (2005), EMA places particular emphasis on the physical information related to the flow of energy, water, materials and wastes. It is because material purchase costs can be a significant cost driver, and many of the organizational environmental impacts are directly associated with the use of these resources and the generation of wastes. The physical information collected under EMA is therefore essential to the identification of many environmental costs, and allows an organization to assess and report the physical aspects of its environmental performance. This is true not only for manufacturing industries but also for service organizations. Resources such as energy, water and other materials are essential to support organizational activities and operations. To set measurable environmental targets and effectively manage environmental impacts, tracking and reducing the amounts of resources used and wastes generated is

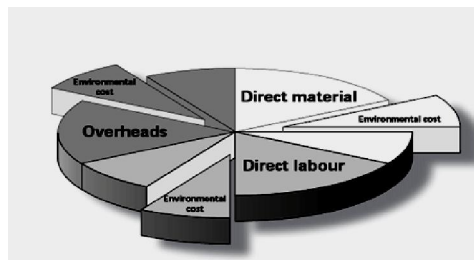
necessary. Physical EMA requires an organization to trace resources/materials inputs and outputs and to ensure that the resources/materials are not left unaccounted for. The physical information collected can then be used to create environmental performance indicators (EPIs), which in turn help an organization set environmental targets and report its environmental performance. The IFAC (2005) states that physical information does not provide all the required data to effectively manage organizational environmental impacts, but it is the information that management accounting can provide for the purpose of environmental management.

5.2. Monetary environmental information

How monetary environmental costs (or simply environmental costs) are measured mainly depends on the intended use of the information. Environmental costs typically refer to the types of costs that are clearly driven by efforts to control or prevent environmental damages (e.g. the costs associated with cleaning up sites after production or wastewater treatment costs). According to the IFAC (2005), environmental costs under EMA comprise other monetary information needed to cost-effectively manage organizational environmental performance. Examples include the purchase costs of natural resources (e.g. energy and water) and materials that are used or eventually become wasted. The IFAC (2005) explains that resource/material purchase costs are certainly considered in internal management decision-making, but they do not necessarily be considered as environmental costs. However, the costs are environment-related and this information is required to evaluate the financial aspects of organizational environmental management related to the use of the resources and materials. In this regard, physical EMA can be linked to monetary EMA by supplying the required information on the amounts of resources/materials used and wastes generated to assess the purchase costs. As mentioned, the intended use of information helps determine the environmental costs an organization would choose to trace. For organizations to determine relevant environmental costs that suit their operations and strategic planning, an introduction to environmental cost categorization is required.

6. Research objectives

The below diagram illustrates that the environmental cost is being hidden under direct labor, direct material and overheads.



To accrue greater benefits from the environmental management accounting system the company should also identify opportunities that may generate revenue by selling waste by-products and integrating the environment with various other aspects of business management that support and implement the system. The firm should also determine the costs and savings that the system might generate, and identify the precise method for pricing products as per industry standards. Last but not the least; companies should also focus on designing more environmental friendly products and attuning the processes that might provide a competitive edge to the company over its nearest rivals [15].

Most businesses have therefore become aware of the implication of environmental issues on its operations, services and products. The firms are aware that risks associated to environment cannot be ignored and form an integral part of running a business successfully by implementing innovative product designs, marketing concepts and managing the finances. On the other hand, ignoring environmental issues may result into adverse impact on the businesses. Oftentimes, government and other regulatory authorities impose fines and environmental taxes on companies that do not abide by the rules and damage the environment. Other punishments or losses include decrease of land value, devaluation of brands, loss of sales, boycotts by consumers, loss of insurance, legal notices and law suits, and damage of the company's image in the market. Most of the businesses are affected by pressures due to environmental issues, and therefore, from the accounting viewpoint, the pressure is felt on external reporting, which includes disclosing environmental issues in financial or annual reports under separate accounts. Although, experts have differing views about the quality and nature of such accounts, most environmental issues cannot just be dealt through external reporting. However, it is important to manage environmental issues even before reporting them for which a sound environmental management accounting system is required.

7. Environmental management accounting and cost factor

Some of the cost information that managers need to identify and project are environmental performance and the associated economic performance. EMA practitioners and researchers have developed various EMA methodologies and approaches that can be followed by various organizations. It has been seen and dealt with that not all emissions and waste can be reduced. Some of them are inevitable but it is financial best interest of the organizations to use the materials, water and energy in as much less quantity for achieving their goals. Proactive and preventive environmental management that can help reduce the amount of the waste generation, also treating the waste material for reuse can reduce purchase costs of the material not used or lost as wastes. Therefore, assessment of these costs allows the managers to better understand the potential monetary value of the environmental management for preventive measures. In operations related to manufacturing includes, the processing cost of raw material and other materials. This has been adjudged till the point that till the point it is converted into waste and emissions. The processing costs can also include the proportion of equipment depreciation also the labor costs that can be aided to generate the emission and waste rather than producing the final product. Waste and emission control cost covers the costs of handling, treating and disposing emissions and waste. It may also include compensation costs and remediation related to environmental damage. Also, any regulatory compliance costs related to waste and emission control. Environmental accounting system is often influenced by the end treatment of the data analysed, which might be used for reporting financial figures, evaluating the overall performance of the company or to analyze the role of the management in general. For instance, while using environmental accounting in terms of monetary analysis, it is important to take into account the environmental performance results. Thus, in the absence of an environmental accounting system, it would become difficult to collect the facts and information for making a corporate environmental report card. Such a reporting system would also rely heavily on the financial units of measurement. Additionally; the social costs are also taken into account. These costs are incurred by a company are those that represent the organization's expenditure towards environment and society. For these costs, the businesses can not be held legally accountable. These costs are met by public funding and are mostly labeled as externalities. Although, calculating social costs can be difficult and often controversial, it is nonetheless, important for an

organization to incur these costs, as these costs provide the precision to publish claims about environmental costs.

8. Identify opportunities to cut environmental costs

Once you have identified environmental costs, you should analyze them to see where they can be reduced or eliminated. The largest environmental costs are likely to include:

- waste and effluent disposal
- water consumption
- energy
- transport
- consumables and raw materials

Waste

Waste production offers significant opportunities for savings because of its effect on:

- costs of unused raw materials and disposal
- costs of transport, storage and handling
- possible penalties for compliance failures such as pollution
- taxes for landfill

9. The challenge for accounting – accounting for the environment

Accounting is now facing the challenge to account for the environment through its traditional role of recording and reporting financial information and through its potential role to manage environmental performance. Long ago, Tinker and Niemark (1987) argued that society expects that organizations repair or prevent damage to the environment (i.e. manage and minimize their environmental impacts). Much of the challenge for accounting has now been reinforced further by the changing societal expectations and ever-growing pressure on improving organizational environmental performance. Due to the increasing community concerns over the environment, organizations have to face the fact that they do not have an inherent right to the environment (in particular the use of natural resources) and they have to fulfill a new 'social contract' that is emerging. Gray, Owen and Adams describe a society as essentially 'a series of individual "social contracts" between members of society and society itself'. These contracts define the rights and responsibilities of the parties in that relationship and change the challenge facing the business organizations. Donaldson and Dunfee indicate that the business game is now 'played by different rules and harbours different penalties and benefits than it did decades ago' [10]. Organizations today are held responsible and accountable for a

variety of issues, including environmental issues. Failure to meet the expectations will result in the revocation of an organization's 'license to operate' and affect its long-term survival [9][10]. The changing society expectations have brought about more and tighter environmental regulations. Gray and Bebbington argue that 'without a "greener accounting" many environmental initiatives will simply not get off the ground' [14]. To manage the environmental issues, pressures, associated costs and potential cost savings, various types of expertise from the accounting discipline are required. Research and studies regarding how accounting can contribute to the environment are well documented [3][5]. They also indicate problems with conventional accounting in addressing these issues. Conventional accounting, in an economic/business context, involves identifying, measuring, and communicating economic information to facilitate informed judgments and decisions by users of information [12]. It seems that annual reports prepared by companies that adopt this objective should be primarily economic in focus. A review of the International Accounting Standards Board Conceptual Framework (or IASB Framework) reveals that conventional accounting does not usually give explicit, separate recognition to organization-related environmental impacts and fails to provide a full account of the use of many resources, such as land, air and water. To manage the environmental issues, pressures, associated costs and potential cost savings, various types of expertise from the accounting discipline are required. Research and studies regarding how accounting can contribute to the environment are well documented. They also indicate problems with conventional accounting in addressing these issues. Conventional accounting, in an economic/business context, involves identifying, measuring, and communicating economic information to facilitate informed judgments and decisions by users of information

10. CONCLUSION

Accounting is now facing the challenge to account for the environment through its traditional role of recording and reporting financial information and through its potential role to manage environmental performance. The central theme of this paper is to illustrate the benefits of environmental management accounting system and find out how businesses can implement this system to garner better market value and position. Some of the major benefits of the environmental management accounting include aiding companies to take responsible decisions relating to issues such as allocating costs, capital budgeting or designing

processes. Experts believe that companies can use the following steps to implement the accounting system in an effective manner. The first and the foremost step are to identify the opportunities so that unnecessary costs are eliminated that does not give any value to a product or process.

Furthermore, companies need to find out the environmental costs from the account sheets which are often hidden under the overhead accounts, direct labor accounts or direct material accounts. It has been found that in most cases, environmental costs are hidden in different parts of the management accounting system. The largest environmental costs are likely to include:

- Waste and effluent disposal
- Water consumption
- Energy
- Transport
- Consumables and raw materials

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