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**Environmental Cost Accounting –  
Assessing the Environmental Responsibility Effort**

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**Abstract:** The paper's aim is to evaluate different approaches of environmental cost accounting used around the world. One of the main issues of modern enterprise is to affirm its responsible behavior and to connect it with a positive economic benefit for the shareholders. Practically the management systems must find a way to address all the stakeholders' interests and needs.

**Keywords:** environment; cost; responsibility; stakeholders

## **1 Introduction**

Steele and Powell (2002) define environmental accounting as the identification, allocation and analysis of material streams and their related money flows by using environmental accounting systems to provide insight in environmental impacts and associated financial effects.

The internal environmental cost can include those financial efforts engaged for the annual environmental reports and local community relationship activities and the expenses voluntarily registered for environmental programs such as tree planting. The costs themselves are not intangible, but the direct benefits that result from relationship or corporate image expenses often are (de Beer, Friend, 2006).

The literature documented a number of attempts for full cost environmental accounting and reporting such as maintenance cost, asset valuation and damage cost (Herbohn, 2005). Maintenance cost approaches focus on the maintenance of natural capital and have been used in the Net Value Added experiment (1990–1994) of BSO/Dutch Origin, and the Sustainable Cost experiments of Landcare Research New Zealand (Bebbington & Tan, 1996, 1997) and Interface Europe (Howes, 2000). Asset valuation approaches focus on valuation of environmental assets and changes of them, as in the case with the Supplementary Economic Accounts experiment (1995–1998) of Earth Sanctuaries. At last damage cost systems are concerned with estimates of external environmental costs from an organization's operations.

The consumption of natural capital is considered to be the depletion of environmental elements, pollution and deterioration of nature initial conditions (Bartelmus, 2009). Depletion values are in market prices, calculated as the change in the net present value of a natural resource stock during the accounting period; it also equals the value of the net rent (profit) from the use of the natural resource—net of a 'normal return to natural capital' (United Nations et al., 2003, ch.10 B). The maintenance is then strictly related to environmental degradation and has a direct function of growth.

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## 2 Environmental Costs Accounting

One of the advantages of separate calculation of environmental costs relate to not affecting the existing system of management accounting. This approach has shortcomings because it does not adapt easily to highlight integrated technology (new production systems performing less waste, etc..) Or the costs involved in situations where the environment is neglected. This method records cost if such costs arising from environmental regulations. Although environmental costs may be allocated to cost centers and targets, environmental protection is integrated into the management accounting and there is a clear representation of how costs should be treated integrated technologies and environmental protection.

Separate entry method is used and developed, for example in Japan, where they issued Guidelines for Introducing Environmental Accounting System EAS year (Guidelines for the introduction of environmental accounting system), jointly by the Environment Agency of Japan (JEA), research institutes and businesses. The aim is to achieve efficiency calculation of rates for Japanese companies, based on financial information and physical environmental impact. Term JEA hopes to standardize the information obtained from all enterprises that report and it provides free software that assists the registration of environmental costs and the reporting of information to JEA.

### 2.1 Full Environmental Cost Management Accounting

Total cost is a conventional method of accounting which aims to allocate the direct costs and indirect to the product, product line, processes and activities. IFAC mean total cost and environmental cost accounting, identification, assessment and conventional cost allocation, environmental and social processes, products, activities and budgets. The key element of this definition is that you cannot get a direct identification of environmental costs and must be allocated. Estimating future costs, particularly environmental ones, is important. There is a cost approach on environmental risks based on the total cost. Besides direct cost environment, this approach includes the cost of environmental commitments. Expanding the vision is based on the fact that most environmental costs appear not as a result of environmental activities, but because of environmental regulations.

Traditionally, total costs are the dominant cost accounting in general. For example in Australia, direct cost method is not recognized in financial accounting, and that management accounting systems in the country tend to ignore that method (Schaltegger, Wagner, 2005).

The total costs are imperfections that environmental protection is considered a cost of business rather than an opportunity. Conflicting information about the cost of pollution processes and products is not usually considered useful because of end-of-pipe technologies (processes or activities to create waste disposal and processing of a production process, unlike these clean technologies aimed at eliminating the causes and sources of pollution) under the fixed costs of production and thus independent of the technology's costs fluctuate considerably depending on product usability. Allocation of fixed costs per unit of product may be an incorrect procedure in management accounting in certain situations. For example, when environmental costs are considered indirect costs to be allocated to reduce their transparency highlight the need to implement effective management of environmental costs. Considering the environment as a factor generating costs leads to a negative attitude on the prevention of pollution. The opportunity cost attracted to neglect environmental protection is not considered. In the impossibility of making the right decisions based on full cost accounting, it can be criticized for not able to identify individual costs of processes and products.

### 2.2 Direct Environmental Cost Accounting

The main advantage of this approach is possible to identify the product environmental costs based on causal relationships based economy. Direct cost of fixed and variable costs are treated as separate accounting information is relevant both short and long term. The literature is proposed a multi-stage direct environmental cost by identifying environmental cost centers, which allows localization of the

potential for environmental savings, taking into account the material and energy costs (Schreiner, 1988). It proposed a system that goes from the types of cost, by cost center accounting, cost accounting according to objective, internalizing such external effects.

The main issue considered by the direct cost approach is achieving a proper separation of environmental costs from other cost categories. This has not been explained so far. Classical accounts were also subject to criticism because it is oriented towards past costs, and little or no cost to present and future (Schaltegger, Wagner, 2005).

### **2.3 Processes Environmental Costs Approaches**

Conventional approaches in this area (total cost and direct cost) are too limited to meet environmental protection as a causal factor cost. In such conditions adjacent to promote environmental activities in place of others based on clean production technologies.

Accounting for environmental costs should be oriented in two directions. First should be included in the analysis phase began (upstream) and final (downstream) of the production process. Secondly it is necessary to incorporate environmental costs that arise during the production phase and product sales. Extending environmental accounts at a level to cover the product life cycle will focus on competition and consumer benefits. Next logical development of new methods of cost analysis activities, the processes and environmental target.

One of the main advantages of assessing the cost of environmental activity or process is the integration of environmental accounting in strategic business management process and its connection with the objectives and general activities.

### **2.4 Processes Environmental Costs Approaches**

According to neoclassical economic theory, committed to making a product cost is the value of other products that could be made instead. In other words because of limited resources a good can be produced only by not producing another one. This opportunity of another product is removed. The best of these alternative values to be waived are known as opportunity cost of the business. The decision to implement and use an environmental accounting system to manage limited resources is an opportunity cost, because the resources could be used for other purposes, possibly more profitable (Pramanik, 2002).

Using the concept of opportunity cost of environmental information, a manager who was allocated a budget to invest in an environmental accounting system until the marginal cost will equal the expected marginal benefits of investment. Information about the marginal cost is important because it refers to differences between different alternatives. Its role is to weight the volume of calculations necessary to compare different alternative plans, eliminating elements that are not affected by the decision.

Companies face costs of environmental impact, and its protection. The latter decrease with the increase of related environmental impact as pollution prevention and control leads to decline. Protection costs include costs incurred for environmental accounting for collection and analysis used in the development of effective strategies to prevent and reduce pollution, and measures of environmental impact management. Total cost is the sum of costs and environmental impact of its protection. Marginal cost of pollution prevention is the cost of organizational, technical and accounting to reduce environmental impact. The latter includes the costs of any "failure" of the system, fines, penalties, additional administrative costs and legal advice, which can occur if the organization fails to eliminate environmental impact.

## **2.5 Environmental Effort – Investment or Expenses?**

If you had expenses capitalized or should be considered a problem that occurs in accounting and financial treatment of environmental costs. Traditional financial accounting, the difference between expenses and assets is clear - an asset is a resource controlled by the enterprise as a result of past and future events are expected to obtain economic benefits, costs are changes in terms of declining economic benefits during the financial year-accounting, or reduce output as assets or liabilities arise as a result (Schaltegger, Buritt, 2000).

In practice, it is difficult to determine what effect (increase or decrease) of change in economic benefits occurs when engaging in measures to prevent or reduce pollution.

Environmental investments have been defined by the Canadian Institute of Chartered Accountants (ICCA) as:

- Prevention or elimination of environmental damage and resource conservation;
- Removal of environmental damage from past incidents.

All ICCA has identified two approaches to the question concerning the accounting treatment for capitalization or environmental costs:

- Addressing increasing future benefits (IFB): present payments result in an estimated increase in future economic benefits associated with the asset;
- Addressing the added cost of future benefits (ACOFB): Environmental costs are capitalized if they are considered to be attached to the asset future benefits, regardless of whether or not an economic benefit.

Financial statements are prepared in a way the company's financial performance is not affected by non-financial issues. In purely economic terms, capitalization of costs should be allowed only where these costs contribute to an added economic benefit in the future (future total benefits, the approach to IFB).

In special cases, costs of remediation or pollution prevention can be considered active if they are absolutely necessary to carry the company, even if they do not affect future cash flows. In this case, spending ensures a constant asset value that would achieve reductions in the future if such costs would be incurred in now.

Another question arises about the type of action of environmental change from the old end-of-pipe technologies (cleaning) to modern prevention. If the company acts in a classical style (end-of-pipe), environmental costs are more easily identifiable, can be attached to input measures in accordance with environmental standards. The company has adopted the broader technologies (clean production processes), it becomes more difficult to identify compliance costs. If environmental management decisions are incorporated in the process and realize both environmental improvements and cost savings, it becomes difficult to separate the costs of environmental management of production costs (Pramanik, 2002).

In terms of environment, capitalization (ACOFB approach) is preferred that prevent pollution creates environmental benefits. Moreover, depreciation capitalization favors a number of years, and thus facilitates long-term approach to green production programs and interventions are not limited to simple point.

However it can be argued that in most cases, pollution prevention activities involving expenses and nothing more, because they are reflected as a mandatory repair to society and nature. From this perspective, environmental remediation costs to be considered current expenditures for environmental policy are required by national and regional level. The purpose of such costs is more appropriate to use in industrial land and protect the surrounding communities, but to create a business asset. In this case, pollution is seen as an increase in obligations of the company (to nature). Cost reduction of these obligations must be engaged and not recognized as investment.

ACOFB approach may be preferred if it is not expected emergence of new problems for the near future, that could give rise to other environmental obligations. In this case, a prudent and rational management, class environmental costs necessary to prevent a problem, among assets.

IASB chose IFB approach (IAS 16), while the European Federation of Accountants (EFA) and urgent Working Group (EITF) of FASB approach embraced ACOFB.

IAS 16 allows capitalization of environmental cost, if it generates future economic benefits other assets (IAS 16, paragraph 11), and the cost is recovered. Such items of property are classified to be recognized as assets because they enable an entity to obtain future economic benefits from related assets in excess of what could be achieved if those costs were not incurred. For example, a manufacturer of chemical fertilizers can introduce new processes for handling chemicals, to comply with environmental requirements for production and storage of hazardous chemicals related improvements are recognized as assets because without them the entity is unable to manufacture and sell chemical products, the conditions are. However, the resulting carrying amount of such an asset and related assets is reviewed for impairment in conformity with IAS 36 - Impairment of Assets.

The obligations for costs accounted for under IAS 16 (and IAS 2), are recognized and measured under IAS 37 - Provisions, Contingent Liabilities and Contingent Assets.

However, there is a limit to the standard identified by Schaltegger (2002) namely that when compliance is reminiscent of "environmental requirements" does not mention if it is just about the legal character, and also its social, which arises from the social relations of the enterprise.

FEE recommends that the cost of employment which prevents the effects of environmental impact to be capitalized, and the remediation, cleaning of sites of past effects of environmental impact, to be treated as expenses.

Even if capitalization is generally accepted environmental investments bringing future benefits, some costs of voluntary activities designed to meet the needs of different stakeholders, not covered by IAS 16 and hence cannot be treated as assets.

Other European recommendations (2003-R02), discusses environmental costs can be capitalized where they were made in order to prevent or preserve natural resources, if they provide future economic benefits. These charges may not be counted as an asset unless they are intended to serve sustainable business activity and if they meet one of the criteria:

- Expenses are necessary for being able to obtain future economic benefits expected to allow the extension of life, increase capacity or improve safety or effectiveness of other assets belonging to them (for their level of performance as estimated before the performance evaluation expenses;
- Expenses for minimizing or avoiding probable environmental contamination due to the company's future activities.

When environmental expense recorded in the asset is linked to another existing asset, it must be treated as part of the asset and cannot be accounted for separately.

### **3 Conclusion**

There are different approaches for environmental cost assessment and accounting. All these methods are focused on managing the financial effort made by the enterprise for a responsible behavior regarding the environmental protection. Also as any cost component the environmental related one has its contribution and impact upon performances and market status. Nevertheless the environmental costs are not only the expression of internalization of environmental impact of economic activity but also the financial footprint of voluntary measures and actions.

The catch of environmental cost impact upon the economic and financial activity is that there are many different ways of assessing are registering it with different results. The best example is maybe

the different approaches of environmental investment and expense. The interpretation of these two key concepts has fiscal and performance effects each time the two elements are regarded in one of the postures.

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