COMPLETE ECOLOGICAL COST ACCOUNTING (CECA) IN THE CONTEXT OF SUSTAINABILITY: A CRITICAL VIEW [a]

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ABSTRACT

In the last decade, sustainability has emerged as one of the main issues addressed in academic research. This matter has also involved companies and their activities in the social, environmental and financial scope. However, while companies have started showing greater interest in preserving the environment and in considering social aspects, the measurement of involved costs has not been an easy task. The concept of Complete Ecological Cost Accounting (CECA) is a tool that intends to measure the costs in a comprehensive manner, integrating traditional accounting and so-called social-environment accounting. This article aims to make a critical analysis of the CECA model and proposes guidelines for its improvement. The focus is to suggest a complementation of the model by integrating parameters to collect data and assess results from a qualitative and quantitative point of view, thereby allowing companies to evaluate their level of maturity as it relates to socio-environmental issues.

Keywords: externalities, critical analysis, literature review.

CONTABILIDADE DE CUSTOS ECOLÓGICOS COMPLETOS NO CONTEXTO DA SUSTENTABILIDADE

RESUMO

Recentemente, a sustentabilidade tem sido uma das principais questões abordadas na pesquisa acadêmica, envolvendo as empresas e suas atividades no escopo social, ambiental e econômico. Porém, apesar de as empresas começarem a mostrar maior interesse na preservação do meio ambiente e nos aspectos sociais, a questão da mensuração dos custos envolvidos não foi uma tarefa fácil. Com o intuito de auxiliar as empresas nesta questão, foi criado o conceito de contabilidade de custos ecológicos completos (CCEC) que é uma ferramenta a qual se pretende medir os custos de maneira abrangente, integrando a contabilidade tradicional à chamada contabilidade socioambiental. O objetivo deste artigo é contribuir para a construção do conhecimento no campo da contabilidade de custos ecológicos completos (CCEC), ampliar sua divulgação e aplicação além de sugerir diretrizes para seu aprimoramento.

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Palavras-chave: externalidades; análise crítica, revisão literatura.

INTRODUCTION

Nowadays, a new reality is affecting the everyday operations of small, medium, and big companies: the necessity to adapt their organizational and operational areas to the concepts and demands of sustainability. This is due mainly to the fact that sustainability is becoming a new competitive approach (CALARGE et al. 2009).

It is not precisely defined when the sustainability concept started having a relevant aspect for the organizations, but an important landmark lies regarding the increase in the worries with the environmental questions, mainly regarding the effects coming from the global warming (XU et al., 2006).

JOHN ELKINGTON mentioned the term sustainability for the first time in 1987 when he was promulgating the concept that human actions should be guided not only by economic questions, but also in social and environmental ones, thus maintaining sustainable conditions for future generations.

LABODOVÁ (2004) states that sustainable entrepreneurship means decreasing the environmental impact of a company in an economically viable way and using a preventative approach with a continuous improvement principle. FRESNER AND ENGELHARDT (2004) complement this concept by highlighting three dimensions on which companies must focus: the social, the ecological and the economic. They call these TBL (Triple Bottom Line).

In the organizational environment, BARRON (2010) explains that the key to sustainable development is the ability to integrate economic development, social progress, and environmental quality. For ROMANINI (2007), the discussion of sustainable companies does not concern only big companies, which suffer more pressure from stockholders to show that they do not adopt wrong socio-environmental attitudes. Society has also started to see small and medium-sized companies as capable of generating risks to the environment.

One difficult aspect is to measure and to integrate the internal and external costs in such a way as to make clear the contribution of companies towards sustainability, *id est*, showing in a bookkeeping way the company's ability to integrate the Triple Bottom Line.

Recently, a tool for measuring these data has been created, called Complete Ecological Costs Accounting (CECA). Although, it is still in development stages.

In this context, this article shows the main aspects related to the CECA based on the literature, as well as other associated concepts, such as: externalities, implementation approaches, benefits, advantages, difficulties and recommendations in regard to implementing the CECA. This article also seeks to analyze and discuss the CECA model and propose guidelines for its improvement. In particular, the article suggests complementing the CECA model with parameters to collect data and assess results in a qualitative and quantitative manner, thereby enabling the assessment of businesses' maturity, when it comes to social and environmental issues.

Research Method

The research method consisted of studying and analyzing bibliographic material in a particular subject area, within a certain period of time. Through this process, the research provides an overview or state-of-the-art report on a specific topic, emphasizing new ideas, methods and

sub-themes that have more or less emphasis in literature (MACHI & MCEVOY, 2009). It covers a wide range of phenomena that the researcher could not find directly (HART, 2003).

In this article, the methodological approach of this study includes a literature review to identify scientific contributions to the subject, the CECA model. The focuses are understood their bases, explained in order to create a framework for analysis and a discussion of the main pillars in the corporate and academic environments. The critical analysis aims to discuss the model and finally, suggest guidelines for its improvement. Table 1 shows these steps.

As it is based on a literature review, this work is characterized by analytical, thematic, updating and critical work, according to the treatment and approach of the analyzed references.

In order to reach the goal proposed in this research, studies based on a bibliographical survey of secondary sources were made, the main characteristics of which are shown on Table 1.

Table 1. Classification of the type of bibliographical survey performed in the research

Characteristics	**Literature review classification**	**Justification**
Purpose	Analytical	Performed on a specific topic, so that the summation of these studies provides an overview of the subject studied.
Range	Thematic	The work is resented inside a specific clipping of a theme.
Function	Update	This includes recent published literature and the current state of knowledge, thus drawing attention to work carried out on the most important issues.
Approach	Critical	The selection of papers was done in a selective manner, emitting judgments about them.

Source: NORONHA & FERREIRA (2000)

The method had to be structured to enable exploration of corporate managers' perceptions with regard to their relations with the environment, strategic positioning and their motivation to deploy this tool by analyzing its advantages and disadvantages (CHULIÁN, 2006).

Purposive sampling was used to select businesses participating in the study. The discussion, in this context, was conducted with professionals in the areas of safety and the environment. Researchers were selected to join the discussion if they were involved in environmental management in academia (FORZA, 2002).

The objective of the proposed analysis is to contribute to the construction of knowledge in the field of CECA, expand its dissemination and implementation and suggest guidelines for its improvement.

The concept of the Complete Ecological Costs Accounting (CECA) and externalities

The registration of ecological and social facts happens when the company's activity, independently of the segment it works in, interferes somehow with the natural and social environment (ICF INCORPORATED, 2007).

Thus, the need for managing ecological and social information begins to constitute an important strategic aspect,

and the company may seek to avoid worries and problems regarding its activity while ensuring the continuity of long-term actions.

The CECA seeks to establish an analysis that allows the integration of the internal costs of an organization (including all the environmental costs), with the external ones linked to the environmental and social impacts of its activities, operations, products and/or services. This allows the organization to approach sustainability in terms of financial quantifiable information (CHULIÁN, 2006; JIMENÉZ, 2006).

The first discussion about this system happened during the *5º Programa de Acción en Materia de Medio Ambiente de La Comisión Europea*, which had as one of its goals the discussion of a tool that would include a company's usage and consumption of natural resources as part of the total production costs of its goods and services. The traditional financial accountancy systems present limitations regarding social and environmental aspects, mainly because it is restricted to legislated costs, exempting the intangible benefits of social and environmental investments.

Traditional accountancy is restricted, by its own original concept, to the internal costs of the organization and to environmental investments (linked to the prevention, mitigation and remediation of environmental impacts and possible fines due to environmental reasons) and does not possess the capacity to analyze externalities (JIMENÉZ, 2006).

The term externality may be understood as the social and environmental impact arising from a company's activities, unrecognized by traditional accountable financial information systems, but capable of influencing, in a favorable or an unfavorable way, other activities in the company's productive process (CHULIÁN, 2006; LIMA & VIEGAS 2002).

The externalities may be represented both in a positive way (for example, the decrease of pollutants sent into the atmosphere) or a negative way (for example, environmental degradation in any of its forms). This situation should be measured in the case of an evaluated unit (LIMA & VIEGAS 2002).

The characterization of externalities may consider three main aspects:

- *Identification*: the social and ecological externalities that represent threats to the company's permanence in the market must be identified. This identification is directly linked to the kind of effect generated (readily identified or not) and the company's position in regard to the effects, being classified as pro-active (the action comes before the effects), reflexive (the action happens during monitoring) or reactive (the action happens after the effects). Some tools may be used in this phase, such as: evaluation of risks, tracking the energy and material flow, analysis of the products and services life cycles, investments in residues selectivity and treatment/prevention of pollution and training.
- *Measurement*: the ecological externality will be considered when it can be technically estimated and a reasonable probability of it happening exists. For measuring the ecological externalities, companies must use systematic evaluations of environmental auditing and specialized consulting or develop proper mechanisms for raising the cost of actions to prevent/recover environmental damages. Indicators for measuring the externalities may include public opinion polls, client satisfaction surveys, variations on turnover and the company's image.
- *Recognition*: the externalities may be registered with competent documentation or estimates correctly based on studies. Currently, companies have chosen to show information of a social and environmental nature in additional statements, such as balance

sheets and added-value statements, among other things.

Aspects regarding the structuring and applying of the CECA

According to CHULIÁN (2006), the CECA is tackled in literature by means of two main approaches:

- *the approach guided towards the organization's internal management:* when accountancy is considered mainly as a way to readapt the internal costs and identify the external ones, the main role of the CECA would be to determine the correct product price instead of providing a measure for sustaining the company's activities;
- *the approach guided toward obtaining social benefits for the organization:* it determines the actions' economic values, indicating whether the organization's activities have a higher or lower sustainability degree.

Independently of these approaches, we may check the advantages and disadvantages of the CECA when compared to traditional accountancy, as shown in Table 2.

Table 2. Advantages and disadvantages of applying the CECA versus traditional accountancy

Advantages	Disadvantages
- Allows the comparison between companies; - Uses some concepts of traditional accountancy and obtains the total cost information; - Translates sustainability into a business language, that is, monetary; - Contributes to a better understanding of the company's operations; - Promotes the company's self-regulation and stimulates a proactive character, anticipating stricter legal norms; - Shows the corporate commitment to sustainable development and environmental issues; - Lists the company's acts for promoting social benefits.	- Difficulty to scale correctly the organization's operations scope and activities; - Creates difficulties for obtaining the necessary information for measuring and valuing the company's impacts; - Lack of knowledge and personnel training in the company for implementing the system; - Lack of incentives for its adoption.

The implementation of the CECA, according to JIMENÉZ (2006), must fulfill four main stages: defining the defrayal object; specifying the analysis reach scope; identifying and measuring the externalities involved using several techniques, including eco-balance and analysis of the life cycle or ecological impact; and the last stage, calculating the external costs.

At the end of these four stages, the company will obtain the consolidated results regarding the organization's internal and external costs (CHULIÁN, 2006), which may be illustrated by the model in Figure 1.

Complete Ecological Costs Accountancy (CECA)	Traditional financial accountancy	Internal Costs and Entries	Entries - Expenses = Economic Benefit
		External Costs and Entries	Positive Externalities - Negative Externalities = Social Benefit

Figure 1. Model representing CECA

Highlighting this approach, JIMENÉZ (2006) presents three stages in the usage of the CECA by a transportation company: listing data, exposing the data and checking/concluding. During the first stage of the study, the author presents, in a qualitative way, the company's socio-environmental programs, attitudes and their sustainability policy. During the second stage, the company's external costs are presented (externalities), both the positive externalities based on the company's socio-environmental programs expenses and the negative externalities based on the expense of pollution emitted by the company's vehicles, as recorded in governmental studies. From these data, the author performs the calculations and analyzes if the company has a sustainable policy or not.

Comprehending the concept and identifying correctly the externalities, as CHULIÁN (2006) shows in his CECA model, is crucial to the implementation's success.

The usage of the CECA model is still in an experimental stage in the industrial environment. Some examples, mentioned in the literature, of companies implementing these systems are: BSO/Origin (HUIZING & DEKKER, 1992); Ontario Hydro (ICF INCORPORATED, 1996); Baxter International (BENETT & JAMES, 1997).

Other scholarly works presented the empirical aspect of valuing external costs (BEBBINGTON & GRAY, 2001); the successes and failures of implementing the CECA (ANTHEAUME, 2004); and practical implementation recommendations (HERBOHN, 2005).

The main causes of failing to apply the CECA can be cited: difficulty at identifying the company's externalities given the lack of a standardized methodology; the conflict of dealing with the concept of sustainability with an accountancy approach; difficulty registering the totality of external costs (JIMENÉZ, 2006).

Critical analyses of CECA model

SIMON et al. (2011) are among the first authors to critically analyze the CECA model. The first discussion pointed out in the analysis refers to the adequacy of the original model name: Complete Ecological Cost Accounting (CECA). Researchers and experts in academia suggest using "environmental costs" instead of "ecological costs," because the latter refers to a very broad subject area, as opposed to "environmental," which uses more specific data such as cost analysis, the focus of the model. Not that this is a limiting factor for the model, but changing the name to Complete Environmental Cost Accounting may be better suited to the purpose of the method.

The fact that the model does not have a scale for classifying the relationship (social benefit) / (economic benefit) is a limiting factor for its application. The suggestion here is to investigate companies in reference to the values they apply to their environments and, from there, set up a rating or a review scale. It is observed that the model has no references and examples of possible positive and negative externalities whose the existence of which would greatly facilitate its implementation. Additionally, it is observed that the model does not define or present practical tools for identifying, measuring and assigning values to the mechanisms of positive or negative externalities. In addition, the fact that the negative externalities are related to sensitive issues such as, for example, allocation of fines for non-compliance with environmental laws and accidents at work. Positive externalities need to be broadened to include social and environmental actions taken by companies, issues relating to standards for certification, the capture of rainwater and reuse of water, the use of returnable packaging and the remanufacturing process. The author of the model highlights limitations, such as the difficulty of defining the scope of the organization's operations, the difficulty of obtaining information needed for the measurement and valuation of impacts, the lack of knowledge and training of company personnel who will implement the system, the lack of incentives for adoption and the ethical and moral issues (CHULIÁN, 2006).

Note that the model needs to be completed with the addition of parameters to collect data and assess results in a qualitative and quantitative manner. In order to successfully assess the maturity of businesses, in regard to socio-environmental issues (POJASEK, 2011; ISO, 2010; MAGAZINE, 2009; VDW, 2009; BSI, 1999), its important involves the CCEC and integrate it with normative standards like environmental (ISO 14000), occupational health and safety (OHSAS 18000), social responsibility (ISO 26000). In addition, the concept of sustainability and Initiatives such as Cleaner Production and Energy Efficiency Blue Competence - Sustainable Technologies, needs to be involved with the new full ecological accounting model, measuring their externalities.

Regarding the new alternatives proposed for performing corporate accountancy, the CECA tackles two fundamental points: the translation of sustainability into a business language with monetary data and the comparison of information related to companies' sustainable actions.

Nonetheless, this bookkeeping approach model is recent and still needs further discussion in academic literature, as well as a higher diffusion and application throughout industrial segments.

One of the main problems causing difficulties while applying the CECA is the absence of formal accountable procedures to perform the calculation of the model's externalities, this stage being of paramount importance when it comes to differentiating the CECA from traditional accountancy models.

Therefore, the initial experiences so far suggest the need for more detailed and descriptive studies of companies, studies that will allow a conceptual model for applying the CECA to be proposed.

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