

ENVIRONMENTAL SUSTAINABILITY INDICATORS: A REPORTING TOOL OF CORPORATE RESPONSIBILITY

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Abstract:

Companies are becoming increasingly aware about the sustainability challenges and address new policies to respond to corporate environmental responsibility. Having as model the indicators published at macroeconomic level, companies may answer the need of validating their practices designated to ensure responsible activities by identifying and reporting a set of sustainability indicators. By visualizing phenomena and highlighting trends, sustainability indicators simplify, quantify, analyse and communicate otherwise complex and complicated information. The objective of this paper is to debate on the existing environmental sustainability indicators that might be used in designing a composite environmental sustainability index as a useful tool for policy making and public communication. Fundamental research is used to outline key environmental sustainability indicators. Debates are conducted in order to establish the usefulness of possible approaches.

Key words: *Environmental indicators, sustainability index, reporting, corporate responsibility*

JEL classification: *M40, M 48, Q 51, Q 56, Q 57*

1. INTRODUCTION

Sustainable development is an abstract and a complex concept, but one which has real and challenging implications for the way that businesses function. It may be regarded as the progressive and balanced achievement of sustained economic development, emerging in social equity and environmental sustainability (Krajnc and Glavic, 2005).

The Brundtland report's definition of sustainable development (UN, 1987), "development, which meets the needs of the present without compromising the ability of the future generations to meet their own needs" is used in this paper since it is a familiar and widely accepted definition. However, the well-known disadvantage of this definition is that it is too general for detailed application at microeconomic level.

The objective of this paper is to analyze to what extent a set of indicators may give substance to the corporate social responsibility (CSR) contribution to strong sustainability from the perspective of the use of natural resources and the environment. Our research propositions are intended to connect the sustainability concept to the corporate responsibility and to particularize the environmental side of this connection by referring to sustainability indicators' reporting from companies' perspective.

In order to achieve the objective, the paper relies on fundamental research that is related to inductive accounting theory and uses scientific methods for identification of corporate reporting theoretical and practical difficulties in economic entities from the perspective of recognized environmental sustainability indicators. The theoretical basis of our paper is the current CSR theory connected to capital theory. They are referred to in order to introduce the environmental sustainability indicators as a reporting tool of corporate responsibility implied by business motivations regarding global sustainability requirements.

Environmental reporting of companies is poorly developed, widely accepted standards for sustainability are not yet available, and companies usually address their environmental effects only on a local level, thereby using a large number of indicators. As a result, the generated information is incompatible, does not address the sustainability issue as a whole, or provides hardly any additional knowledge on the environmental sustainability of a production system. Thus, indicators vary among companies and generate incompatible information, which makes it virtually impossible to assess strong sustainability on a company level (Gerbens-Leenes et al., 2003).

Given the amount and complexity of available information, there is an urgent need to improve the content, format and accessibility of communicating environmental responsibility through sustainability indicators. However, a complex problem still consists of the aggregation of different indicators into a properly constructed index that would be able to ensure the business' sustainability assessment (Krajnc and Glavic, 2005). Therefore, in this paper we debate on the utility of introducing composite environmental sustainability index at microeconomic level, based on existing indexes reported at macroeconomic level.

The limitations of our study consist in controversial approaches and in scientific uncertainty that live space for pessimists to question the effectively contribution of CSR activities to the sustainability goals.

2. SUSTAINABILITY REPORTING AND CORPORATE RESPONSIBILITY

In this paragraph, based on current CSR practices and theory as well as on businesses motivations regarding environmental and social sustainability, we introduce the role of corporations in influencing consumption patterns. The translation of Brundtland definition into business perspectives and the three dimensions of sustainability (economic, social, and environmental) leads any sustainable business to take into account "the interests of future generations, biodiversity, animal protection, human rights, life cycle impacts, and principles like equity, accountability, transparency, openness, education and learning, and local action and scale" (van Kleef and Roome, 2007, in Malovics et al., 2008).

Researchers dealing with corporate sustainability emphasize the role of more effective and less natural resource-intensive (both concerning energy and materials) production methods and systems. As the World Business Council on Sustainable Development asserts, the eco-efficiency, seen as the centre of business attention, is not the single factor that may determine the technological optimization to contribute to resource and energy conservation. The recognized problem with this approach is the so-called rebound effect that can be observed on both the micro and macro levels (Dyllick and Hockerts, 2002). On the micro (company) level, for example, even if companies manage to reduce the quantity of material use per product unit, but the total use of raw material increases because output grows more rapidly than efficiency. Human beings basically use improved technological efficiency to increase comfort and improve their quality of life, not to reduce resource consumption.

CSR is gaining more importance in today's business life, and its different definitions emphasize its contribution to sustainability. The core idea of the CSR concept is that the business sector should play a deeper (noneconomic) role in society than only producing goods and making profits. This includes society and environmentally driven actions, meaning that the business sector is supposed to go beyond its profit-oriented commercial activities and increase the well-being of the community, thereby making the world a better place (Robins, 2005). However, internal CSR practices, where most of the CSR resources are spent, mainly focus on relative sustainability and eco-efficiency, while external practices, although concentrating on

absolute sustainability, still represent a very low rate of business resources, and mostly only focus on the local level.

When discussing sustainable development, most economists use the capital theory approach (Hart, 1995). This approach assumes that we can keep the level of welfare at a minimum on a constant level by providing them with at least the same amount of capital (natural or man-made) the present generation owns. The environmental aspect of sustainability includes being responsible for future generations by sustaining a certain level of natural resources, thereby providing essential functions to human society, since business corporations are the main actors in an economy which transforms natural capital into man-made capital.

Sustainable development can be divided into weak and strong sustainability. Weak sustainability means that even if the quantity of natural capital is decreasing by creating man-made capital, total capital can be maintained, which would be enough to fulfil the criteria of sustainability. Strong sustainability on the other hand is less permissive, saying that natural capital cannot be substituted by man-made capital and may suffer irreversible harm, so that is necessary to maintain not only the aggregate but also the amount of available natural capital (Malovics et al., 2008).

In this article the CSR practices are referred to in the context of strong environmental sustainability, justified by the reality of energy consumption to transform materials into goods and services. As Tahir and Darton (2010) asserted, the limited energy resources have to be taken into account, even if there are many opportunities for mitigating resource depletion and environmental degradation through the substitution of manufactured capital.

These issues have led the industry to engage in sustainability debate and initiate strategies for responding to the challenges of sustainable development. The major challenge to industry is to demonstrate its contribution to the welfare and well being of current generation without compromising the potential of future generations for a better quality of life (Singh, 2007). The triple bottom line approach is a concept, which addresses the three issues, viz. environmental performance, economic performance and societal performance of the company. Nowadays, many companies recognize and monitor these three aspects using sustainability indicators which provide information on how the company contributes to sustainable development (Azapagic and Perdan, 2000).

An overall picture on current CSR practices is offered by Rondinelli and Berry's (2000) study on the environmental reports of various companies. They divide CSR activities into external and internal practices, as presented in Table 1.

Table 1. CSR practices at microeconomic level

External CSR practices	Internal CSR practices
<ul style="list-style-type: none"> ▪ incentives for employees and managers collaborating on environmental improvement projects; ▪ philanthropic activities that support community, national, and international efforts to improve environmental conditions; ▪ strategic alliances between economic entities and environmental and public interest groups to solve crucial environmental problems. 	<ul style="list-style-type: none"> ▪ enhanced regulatory compliance to reduce the corporations' negative environmental impacts of hazardous emissions; ▪ adoption of pollution prevention and clean manufacturing practices; ▪ redesign of products and processes to achieve more beneficial environmental impacts for customers and communities; ▪ materials reduction; ▪ recycling and re-use; ▪ resource conservation.

(Source: Rondinelli and Berry, 2000)

Both external and internal practices contribute to environmental sustainability; both also have deficiencies regarding strong sustainability. While external practices are often local and represent only a very small part of companies' profits (Rondinelli and Berry, 2000), the problem with internal practices is the aforementioned rebound effect.

Since CSR practices are mainly motivated by business reasons, companies fail to address larger questions such as e.g. their impacts on communities through the ways they do business, including how they influence consumption patterns. However, it is not clear how far individual businesses are actually able to influence consumption, and corporate behaviour is to a high extent determined by the rules of the current economic system (Malovics et al., 2008).

3. ENVIRONMENTAL APPROACH OF SUSTAINABILITY INDICATORS

To move towards the goal of sustainable development, decision-makers need information. Since this idea gained currency following the publication of the influential *Brundtland Report* (UN, 1987), businesses have been examining ways to assess how sustainable their operations are (GRI Reports List, 2010). One common technique is to use an appropriate set of indicators (Tahir and Darton, 2010). The role of sustainability indicators is to structure and communicate information about key issues and their trends considered relevant for sustainable development (Rametsteiner et al., 2011). These act as a guide, so the choice of which indicators to use is critical in monitoring and directing progress towards sustainability. The efforts to develop sustainability indicators have strongly increased since the beginning of the 1990s, often led by intergovernmental processes (Rametsteiner, 2011).

Sustainability reporting has evolved swiftly from an ambitious concept to a widely adopted practice. Nowadays, many companies recognize and monitor these three parallel aspects using sustainability indicators, which provide information on how the company contributes to sustainable development (Azapagic and Perdan, 2000).

At a general level, indicators have been defined by Ott (1978), cited by Rametsteiner et al. (2011) as a way to "reduce a large quantity of data to its simplest form, retaining essential meaning for the questions that are being asked". We subscribe to the opinion of Rametsteiner et al. (2011) that indicators describe more than the current conditions or trends by creating an understanding and insight about how human and / or environmental systems operate. They see indicators as instruments that offer a better understanding of how human actions affect different dimensions of sustainability (economy, environment, social issues) and that helps to more clearly foresee the consequences of action or inaction. Also, indicators translate mostly declarative sustainability issues into quantifiable measures for better address the key sustainability concerns (Azapagic, 2004).

In the process of applying the requirements of Earth Summit (1992), governments have introduced the approach of "sustainability indicators" as a key method to provide a basis for sustainability-related decision-making within corporations (WCED, 1992). Nowadays, there are a number of frameworks of sustainability assessment that address corporate responsibility. The World Business Council for Sustainable Development (WBCSD, 1997), the Global Reporting Initiative (GRI, 2002, 2006) and development of standards (OECD, 2002) were the foundation for sustainability reporting (Krajnc and Glavic, 2005).

The WBCSD framework attempts to measure progress towards economic and environmentally sustainability using indicators that are relevant and meaningful for business (Schmidheiny et al., 1997). In 1997, the United Nations Environment Program (UNEP) together with the United States nongovernmental organization, Coalition for Environmentally Responsible Economics (CERES) launched the GRI with the goal of "enhancing the quality, rigor and utility of sustainability reporting". Reporting is

therefore the strong focal point of the guidelines. The GRI uses a hierarchical framework in three focus areas, namely social, economic, and environmental, while The United Nations Commission on Sustainable Development (UNCSD) constructed a sustainability indicator framework for the evaluation of governmental progress towards sustainable development goals.

The explicit goal of the GRI undertaking was to harmonize numerous reporting systems used at the time, aiming to expand their scope (by introducing social, economic and environmental performance indicators), their flexibility (by addressing descriptive and quantitative indicators), and to confer a greater importance to stakeholders (industry, the financial sector, the accounting profession, civil society, environmental and human rights NGOs, organized labour, and others) (Brown et al., 2009).

According to GRI Guidelines (2006), the environmental dimension of sustainability concerns an organization's impacts on living and non-living natural systems, including ecosystems, land, air, and water. Environmental Indicators cover performance related to inputs (e.g., material, energy, water) and outputs (e.g., emissions, effluents, waste; performance related to biodiversity; environmental compliance; environmental expenditure and the impacts of products and services.

At global level, the UNCSD started work on the development of sustainability indicators soon after presenting a first indicator set in 1995. According to UNCSD framework sustainability indicators are grouped into 38 sub-themes and 15 main themes that are divided between the four aspects of sustainable development.

The European Commission has assigned a high priority to the rapid development of Indicators of Sustainable Development, as announced in the Communication from the Commission to the Council and the European Parliament on *Directions for the EU on Environmental Indicators and Green National Accounting* (Guinomet et al., in Moldan et al., 1997). Following and supporting the work of the UNCSD, European Union (EU) sustainable development was introduced in 1997 as a core objective in the Amsterdam Treaty. A subset of the UNCSD Indicators of Sustainable Development list has been selected by EUROSTAT, according to relevance and data availability for a sufficient number of EU member states. The methodology for describing the environmental component of sustainable development by means of environmental pressure indices aims to define a set of indicators, describing pressures on the environment resulting from human activities, in a highly aggregated format for the ten problem areas (as seen in Table 2) of the European Union's Fifth Environmental Action Programme, *Towards Sustainability*.

Table 2. Sustainability area addressing environmental indicators as seen by different reporting frameworks

UNCSD Framework	GRI G3 Guidelines	European Union's Fifth Environmental Action Programme
Air/Climate Land/Soil Water (fresh and marine water resources) Other natural resources: biological and mineral Waste Natural disasters	Materials Energy Water Biodiversity Emissions, Effluents, and Waste Products and Services Compliance Transport Overall	Climate Change Ozone Layer Depletion Loss of Biodiversity Resource Depletion Waste Air Pollution Dispersion of Toxins Water Pollution & Water Resources Marine Environment & Coastal Zones Urban Problems, Noise & Odours

Using the current state of environmental indicators requirements, Azapagic (2004) developed a framework for sustainability indicators for the mining and minerals industry, which is also compatible to GRI. Krajnc and Glavic (2005) collected and developed a standardized set of sustainability indicators for companies covering all main aspects of sustainable development. Krajnc and Glavic (2005) developed a model for integrated assessment of sustainable development. Comparison amongst countries on economic, environment and social issues were also performed quantitatively. Despite the indices developed, there is still no useful method for integrated sustainability assessment on the company level available.

4. DEBATES FOR COMPOSITE ENVIRONMENTAL SUSTAINABILITY INDEX

Agenda 21, the document published as a result of Earth Summit debates (1992), acknowledges that “commonly used indicators such as GNP and measurement of individual source or pollution flows do not provide adequate indications of sustainability”. The problem with trying to monitor and evaluate progress towards sustainable development is not the lack of potential indicators, but their multiplicity and their interdependence. Given the divergent views on indicators, the challenge following Rio was to develop a concept of indicators of sustainable development in order to reach consensus on a suitable set that can adequately reflect the wide range of concerns encompassed by sustainable development, as promoted in Agenda 21, and that can be broadly used and incorporated at macro-level.

In recent years, international research has focused on the development of composite indices mostly for cross-national comparisons of economic, societal, environmental and/or sustainable progress of nations in a quantitative fashion (Krajnc and Glavic, 2005).

This paper supports the using of composite environmental sustainability index that will enable comparisons of companies in specific sector regarding sustainability performance. In this respect, our paper examines the existing approaches and debates on the use of such index based on the idea that composite indicators are a way of distilling reality into a manageable form. Saisana et al. (2005), as cited by Saltelli (2005), observed that the temptation of stakeholders and practitioners to summarize complex and sometime elusive processes into a single figure to benchmark country performance for policy consumption seems irresistible.

Although the common principle to aggregate indicators for assessment of the company has gained acceptance, it has also become evident that methods for the aggregation of indicators are either not sufficiently well established yet, or are under development, or are not available with respect to all the sustainability aspects (Krajnc and Glavic, 2005).

The main arguments of using or not using composite index are the following, adapted from Saisana and Tarantola (2002). The arguments in favor of composite index are based on the idea that they:

- can summaries complex, multi-dimensional realities with a view to supporting decision makers;
- are easier to interpret than a battery of many separate indicators;
- can assess progress of countries over time;
- reduce the visible size of a set of indicators without dropping the underlying information base. Thus make it possible to include more information within the existing size limit;
- place issues of country performance and progress at the centre of the policy arena;

- facilitate communication with general public (i.e. citizens, media, etc.) and promote accountability;
- help to construct/underpin narratives for lay and literate audiences;
- enable users to compare complex dimensions effectively.

The arguments against the use of composite index refer to the possibilities that they may:

- send misleading policy messages if poorly constructed or misinterpreted;
- invite simplistic policy conclusions;
- be misused, e.g. to support a desired policy, if the construction process is not transparent and/or lacks sound statistical or conceptual principles;
- disguise serious failings in some dimensions and increase the difficulty of identifying proper remedial action, if the construction process is not transparent;
- lead to inappropriate policies if dimensions of performance that are difficult to measure are ignored.

As Hall (2005) suggests, in establishing the components of a composite index, certain scientific and technical criteria were applied to the indicators before their adoption. Thus, the indicators have to be representative, be scientifically valid, be simple and easy to interpret, show trends over time, give early warning about irreversible trends where possible, be sensitive to the changes they are meant to indicate, be based on readily available data or be available at reasonable cost, be based on data adequately documents and of known quality, be capable of being updated at regular intervals, and have a guideline or target against which to compare them.

Studying the vast list of existing environmental composite indexes, we propose for companies' use the 2005 Environmental Sustainability Index (ESI), released at the annual meeting of the World Economic Forum in 2005. It is a measure of the overall impact on the environment and it is based on a compilation of 21 indicators that derive from 76 underlying data sets and are summarized the indicator values in 5 thematic categories: Environmental Systems; Reducing Environmental Stresses; Reducing Human Vulnerability; Social and Institutional Capacity; and Global Stewardship. The ESI offers a tool for underlying indicators and variables regarding the pollution control and natural resource management, by facilitating comparative analysis across countries. It provides a mechanism for making environmental management more quantitative, empirically grounded, and systematic (Esty et al., 2005).

CONCLUSIONS

Linking corporate responsibility to sustainable development requirements, our paper argue for the need of implementing at the micro level a coherent set of indicators showing the environmental reality through the companies' activities. Their actions directed toward environmental sustainability are perceived more easily through specific indicators, built on the basis of established international reporting frameworks. Furthermore, aggregation of such indicators in composite environmental index provides more relevance and credibility for companies, directed them towards ensuring environmental sustainability. Through this paper we presents arguments, based on literature review and on existing reporting frameworks for sustainability reporting, for companies to adapt the existing macroeconomic composite sustainability indexes. This initiative will support the strong sustainability required at international level.

The limits of our study reside in the open questions related to the application of composite index: correlation among indicators and compensability between indicators that we will discuss and analyze in our future work.

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