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Sustainability performance for Brazilian electricity power industry: An assessment integrating social, economic and environmental issues

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ABSTRACT

The increased pressure on companies to address sustainability issues has resulted in the development of several voluntary corporate sustainability integration approaches. The array of existing approaches is large and overwhelming, resulting in companies not understanding what corporate sustainability really means for their businesses. Considering environmental, economic and social issues, this paper aims at assessing the performance of the Brazilian electricity power industry in terms of its sustainability performance. An analysis of Global Reporting Initiative (GRI) indicators for the energy sector lead to an assessment of its sustainability performance by applying Data Envelopment Analysis (DEA) specified with a directional distance function (DDF). Five scenarios were created: (i) Flexible weights; (ii) Triple bottom line; (iii) Social issues; (iv) Economic issues; and (v) Environmental issues. With considering (i) flexibility weights, almost all companies are efficient. We also found a significant difference when we compared (i) with the other four scenarios (ii, iii, iv and v). Taking into account the triple bottom line scenario (ii), the results indicate that companies were less efficient when compared with the flexible weights scenario (i). Taking into account the last three scenarios (iii, iv and v), only four companies were considered as providing top benchmarks in sustainability performance.

1. Introduction

During the last 30 years, globalization, environmental pollution, and the shortage of resources have led to an increase of stakeholder pressure on companies to expand their focus to sustainability, and responsible business performance in addition to financial performance (Leszczynska, 2012). This increase has resulted in the development of several voluntary approaches: tools, instruments and initiatives to support companies with the integration of corporate sustainability (CS) into their core business processes. For example: cleaner production, corporate social responsibility, sustainability reporting, environmental management systems, and corporate sustainability (for other approaches see Robèrt et al., 2002; Ness et al., 2007; Baumgartner, 2008; Lozano, 2012; Singh et al., 2012).

There are considerable differences among the approaches. For example, Lozano (2012) found that most focus on operations and processes, and management and strategy, followed by assessment and communication. With efforts having been made through combining two or more different approaches to extend the focus of analysis (Ness et al., 2007), none address all sustainability issues covering the full corporate system.

With the variety of CS integration approaches, serving as a basis for the decision-making on future actions, the consideration of the appropriateness of a course of action to a particular business situation is key (Medel-González et al., 2013). Moreover, these approaches aim to give support with tracking strategies on the three sustainability issues at all organizational levels (Medel-González et al., 2013).

Despite the attention from scientific and professional literature on the development of these approaches, there is a lack of clarity regarding the focus of the overall discussion and the use of the term 'sustainability' by these approaches (Glavic and Lukman, 2007; Sartori et al., 2014). Therefore, companies have to face the challenge and apply CS integration approaches that enable the combination of environmental, economic and social issue indicators into a single framework (Lozano and Huisingh, 2011). This integrated and multi issue perspective facilitates the understanding and comparative assessment of corporate sustainability performance (Lozano, 2013) and the presentation of results to decision-makers (Erechtchoukova and Khaiter, 2013).

The aim of this paper is to contribute to the understanding of corporate sustainability performance by assessing the efficiency of the

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electricity power industry in Brazil. It emphasises the importance of using quantitative methods to assess sustainability performance by using sets of indicators (Maxim, 2014) covering all three sustainability issues (i.e. social, economic and environmental). We applied the Data Envelopment Analysis (DEA) method specified with a Directional Distance Function (DDF) using sustainability indicators from GRI reports.

This paper also contributes to a better understanding of the current situation of the Brazilian power industry considering CS in different scenarios. Various initiatives have been created in Brazil to respond to CS issue demands, such as the Water Law (1997) and the Environmental Crimes Law (1998), a Business Council for Sustainable Development, the National Environment Program, the National Energy Plan (2030), the Rouanet Law (encouraging cultural investment) (1991), National Solid Waste Policy (2010) (MMA, 2008), showing that the increased focus of political actions on sustainability have an impact in both the Brazilian private and public sectors. Consequently, this paper also discusses policy implications for decision-makers.

The paper is organized as follows. First, we review the relevant literature on CS performance and integration approaches. Second, we present the method applied to develop this study. This is followed by the results and the discussion of the research outcomes in light of the literature. Finally, the main conclusions are drawn.

2. Theoretical background

Sustainability is a subject that is gaining greater attention in the academic field and in business. It becomes quite critical for the reported information to be comparable across companies that operate in the same industry or sector (Ng and Nathwani, 2012). For example, it is not possible to determine accurate values of reference for sustainability (Azar et al., 1996), apart from the process of quality control, making the determination of the relevance of information reported by companies in certain sectors a key challenge for sustainability reporting (Ng and Nathwani, 2012; Searcy and Elkhawas, 2012). Also, stakeholders have difficulties in measuring and assessing the actual extent of a firms' performance directly (Lee and Saen, 2012).

According to Bell and Morse (2008), to understanding sustainability it is required to recognize and work with unities. Even though one should not focus on the sustainability of isolated entities, but rather on the sustainability of entities as interconnected parts, it is still necessary within each area to develop a range of context-specific sustainability definitions, goals, indicators, etc. The multi-issue sustainability perspective contributes to making explicit the three principles underlying sustainable development: Environmental integrity; Social equity; and, economic prosperity over time (Gatti and Seele, 2014). Here, as described by Kajikawa (2008), the economy, the environment, and society are interlinked in the biosphere in a manner in which natural capital sustains the economy, which in turn supports quality of life - for example, health, security, and the pursuit of happiness.

2.1. Approaches for sustainability performance

Over the last 20 years, different initiatives related to environmental and sustainability performance of companies have been developed. The diversity of existing frameworks could appear as a business strength to achieve more sustainable business. Medel-González et al. (2013) describe two different reporting models related to environmental and sustainability performance: GRI and ISO 14031.

Sustainability reports are the primary mechanism through which corporations share information on their sustainability performance (Searcy and Elkhawas, 2012). This information consists of disclosures by corporations about how they manage the various issues related to sustainable economic development and on metrics designed to show their actual performance over time (Hess, 2014). Sustainability reporting has become popular and the Global Reporting Initiative (GRI) is the most used global guideline for corporate sustainability reports (Searcy and Elkhawas, 2012).

The disclosure of certain sustainability information can be an instrument for generating favourable impressions of an organization's sustainability performance, preserving organizational legitimacy, including the 'social license to operate', risk of regulatory mandates, and enhanced reputation, thus creating a potential improvement in productivity through technological innovation on environmental protection (Hahn and Lülfs, 2013; Wang et al., 2014).

The ISO 14031 standard provides guidance on the design and use of environmental performance evaluation within an organization. It describes two broad categories of indicators: (i) Environmental Performance Indicators (EPI): specific expressions that provide information about the environmental performance of an organization; (ii) Environmental Condition Indicators (ECI): to provide information on the environmental condition. This information can help an organization to understand the actual or potential impact of its processes on environmental issues, and thus support the planning and implementation of the environmental performance evaluation.

The key method for sustainability performance evaluation is the use of indicators (Dalal-Clayton and Bass, 2002). Indicators can help to identify, define, and communicate about sustainability issues, and they can be used to forecast and monitor the results of choices. Lozano (2012) found that most companies focus on operations and processes, and management and strategy, followed by assessment and communication. With efforts having been made through combining two or more different approaches to extend the focus of analysis (Ness et al., 2007), none addresses all sustainability issues covering the full corporate system.

Searcy and Elkhawas (2012) note that the development of sustainability indicators to meet established needs has been an endeavour of the academic literature, both at the firm and corporation levels. These indicators should correspond to the policies, strategies and goals of an organization, according to their business area, by providing key information for their corporate sustainability decision-making process (Medel-González et al., 2013).

For example, Krajnc and Glavic (2005) proposed an index to measure corporate sustainability by aggregating GRI indicators. The composite indicators are considered to be a good vehicle for helping to measure sustainable development and progress achieved in it (UNCSD, 2012). Starik and Kanashiro (2013, p.11) support the "exploration and development of sustainability solutions that are multi-level, systematically integrated (including their inputs, processes, outputs, and feedbacks), and multi-stakeholder oriented".

Monitoring progress towards an improved contribution to the sustainable development of society requires the identification of indicators that provide manageable units of economic, environmental and social conditions (Bohringer and Jochem, 2007). This implies that companies need to achieve mutually interdependent sets of issues: the Triple Bottom Line (TBL) of planet, people and prosperity; thus integrating economic, social and environmental issues (Elkington, 1998). According to Samuel et al. (2013) using indicators does not ensure sustainable operations, but rather the monitoring of performance and transparency in information dissemination with respect to TBL.

By constructing quantitative measures, it is possible to specify which sustainability aspects will be measured, which will be preserved or developed, and how these different aspects may be related or integrated. In summary, complexity, uncertainties and the interactions of economic, environmental, and social systems bewilder companies regarding their actions and decisions on the path to sustainability. This complexity calls for new approaches to corporate sustainability, bringing on board stakeholder interests (Garcia et al., 2016). In the next section we provide models for integrated performance assessment at the company level.