Journal of Environmental Management 217 (2018) 253–267

Contents lists available at ScienceDirect

Journal of Environmental Management

journal homepage: www.elsevier.com/locate/jenvman

Research article

Sustainability performance evaluation: Literature review and future directions

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ARTICLE INFO

Article history:
Received 29 December 2017
Received in revised form
2 March 2018
Accepted 14 March 2018

Keywords:
Sustainability
Performance assessment
Performance evaluation
Performance measurement
Literature review

ABSTRACT

Current global economic activities are increasingly being perceived as unsustainable. Despite the high number of publications, sustainability science remains highly dispersed over diverse approaches and topics. This article aims to provide a structured overview of sustainability performance evaluation related publications and to document the current state of literature, categorize publications, analyze and link trends, as well as highlight gaps and provide research recommendations. 128 articles between 2007 and 2018 are identified. The results suggest that sustainability performance evaluation models shall be more balanced, suitable criteria and their interrelations shall be well defined and subjectivity of qualitative criteria inherent to sustainability indicators shall be considered. To address this subjectivity, group decision-making techniques and other analytical methods that can deal with uncertainty, conflicting indicators, and linguistic evaluations can be used in future works. By presenting research gaps, this review stimulates researchers to establish practically applicable sustainability performance evaluation frameworks to help assess and compare the degree of sustainability, leading to more sustainable business practices. The review is unique in defining corporate sustainability performance evaluation for the first time, exploring the gap between sustainability accounting and sustainability assessment, and coming up with a structured overview of innovative research recommendations about integrating analytical assessment methods into conceptual sustainability frameworks.

1. Introduction

Sustainable development has become a very popular field of research in the last decade. Driven by social changes, environmental deterioration and accompanying public interest, sustainability is becoming a key topic among academics, regulators, and businesses. Scientific research on sustainability can help businesses to adopt those strategies that meet the expectations of their current stakeholders in a broader sense, and at the same time safeguard, sustain and enhance social assets and natural resources for the future (Deloitte and Touche and BCSD, 1992).

Sustainable development shall address the needs of today without compromising future generations' own ability to fulfill their needs while protecting Earth's ecosystems and its life support capabilities (Griggs et al., 2013; WCED, 1987). However, current economic activities are becoming increasingly unsustainable, as economic benefits are reaped locally, while external costs are borne globally. Finding solutions to these problems first requires the assessment of the level of these impacts, i.e. measuring main aspects of sustainability performance and assessing it on the basis of collected data. The multidimensional and intertwined nature of the sustainability context in terms of ecologic resources, societal sensitivities and economic realities turns this need into a challenge. In this paper, the current state of Sustainability Performance Evaluation (SPE) literature is reviewed with a business perspective to capture these needs and come up with research recommendations.

Sustainability is a trending topic in the literature. Thousands of articles are published every year that deal with sustainability in one way or the other. Despite this popularity, the majority of these publications are actually extensively environment-focused, interchanging sustainability with low ecological impacts and ignoring its economic and social dimensions. Moreover, the literature usually pays little attention to what to exactly measure and how to interpret them in order to identify the sustainability performance. Sustainability performance as a new term is also largely ignored. This article defines sustainability performance as the aggregate

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https://doi.org/10.1016/j.jenvman.2018.03.064
0301-4797/

negative or positive bottom line of economic, environmental and social impacts of an entity against a defined baseline. SPE deals with the evaluation of sustainability performance.

Although SPE is widely researched and discussed in the literature under different names, the definition of SPE as a term is lacking. This paper makes the first attempt to do so by exploring the definitions of sustainability performance presented by AccountAbility (2005), performance evaluation by Hu and Gorton (1997), performance measurement by Neely et al. (1995) and environmental performance assessment by Zhang (2010). Based on these definitions, this article defines SPE as the quantification of an organization's total performance based on performance indicators, which can include its policies, decisions, and actions creating economic, social and environmental results.

The concept of sustainability has various perspectives, such as environmental protection, ecosystem services, economic considerations, social acceptance, license to operate and externalities, besides many other aspects (Bartelmus, 2010; Figge and Hahn, 2004; Keijzers, 2002). The recent literature clearly suggests that sustainability science is starting to extend beyond the terms of green and competitiveness towards a more holistic, integrated and methodological understanding of sustainability. Decision makers are aware of the need for systematic sustainability evaluation approaches for assessing complex systems to replace linear, formatted solutions (Lobos and Partidario, 2014). Such tools are inevitably focused on past sustainability performance, underlining the need for updating corporate SPE systems over time (Searcy, 2014), as well as other tools that account for future sustainability risks (Lumsden, 2004).

Under the heading of sustainability management, sustainability performance can be a major concern in sustainability accounting, assessment and reporting processes. The aspect of accounting is closely related with what information to collect for which purpose by defining suitable indicators and measuring them, which requires robust conceptual models, such as indicator sets. The aspect of assessment is about giving a meaning to the collected qualitative and quantitative data by means of analytical integration techniques. Once accounted and assessed, the overall sustainability performance can then be reported as a strategic tool for corporate management and communication. These three main aspects can be approached from the transparency or performance improvement points of view (Maas et al., 2016a).

This study proposes that SPE covers both sustainability accounting and assessment aspects, which can subsequently be used for disclosure (reporting) or decision-making purposes by businesses. Accounting mostly deals with identifying what data (e.g. which key performance indicators - KPIs) to collect for the next steps, requiring conceptual models to be based on. Assessment, on the other hand, is about how to aggregate collected data and turn them into useful messages, which can be effectively accomplished with numerical methods. Once the sustainability performance is captured, they are then reported with standard or custom frameworks. While these three aspects cannot always be separated this distinctively, the extent of their integration largely depends on the specific framework in question, such as XBRL, an emerging international business reporting standard for digital business reporting (Seele, 2016).

A closer look will be taken at these accounting and assessment aspects by analyzing publications about conceptual models and analytical approaches in literature, respectively. To gain a broader perspective, literature reviews will also be discussed. This article thus focuses on the first two boxes of Fig. 1; i.e. the evaluation of sustainability performance.

Despite the high number of sustainability-related articles, the number and scope of literature reviews combining both accounting and assessment aspects are quite limited. They mostly appear to present the state of the art, rather than critically and comparatively analyzing articles and identifying patterns for an integrated SPE. To address this need, this review intends to highlight these gaps and formulate research recommendations. The scope is limited to corporate SPE within organizational boundaries to maintain its thematic focus.

While essential, a perfect SPE is not possible in a world of rapid change, interdependency and uncertainty (Ravetz, 2000). Nevertheless, taking an accurate account of the sustainability performance is not only needed to limit its misuse and undermining, such as greenwashing. SPE can help companies in better understanding their overall impact on their shareholders, their environment, and communities as a whole, and take the necessary measures to mitigate or improve them. Sustainability performance can be approached in various ways. Researchers in environmental sciences, for instance, can be more interested in specific aspects of SPE, such as assessing environmental impacts of industrial processes. Literature in finance and management also discusses sustainability performance mostly in terms of continuity of financial performance, long-term competitiveness and corporate strategy. Operation research literature, on the other hand, focuses on the measurement, ranking, policy guidance and decision-making based on a wide range of sustainability impacts. This paper deals with the latter.

The article will continue with Section 2, which will introduce the methodology of the review. Section 3 will present a list of reviewed publications, along with their categorization and provide a review of the literature for conceptual and analytical papers. In Section 4, the observations derived from Section 2 and 3 will be examined and the findings will be analyzed in a structured way. Section 5 will provide the identified research gaps and recommendations for researchers. Section 5 will discuss the results and conclude this review.

2. Research methodology

The proposed research methodology consists of two consecutive methodological steps. First, it is explained how the papers are identified as the data collection approach, and then how these papers are analyzed.

2.1. Data collection approach

This article follows a structured approach (see Fig. 2) and includes international publications in the English language between 2007 and 2018 that have appeared in the Web of Science and Scopus databases. Conference papers and articles on other databases are excluded.

Journals in the fields of engineering, finance, sustainability science and management are searched in their titles, keywords, and abstracts with the following terms: sustainability performance assessment, sustainability performance evaluation, and sustainability performance measurement. While these keyword combinations initially returned a high number of results, many papers are disregarded as their scope is mostly to only environmental, or social aspects, lacking a holistic view. Similarly, many do not specifically discuss sustainability accounting and assessment. In addition to academic references, non-academic publications are explored with the thematic expertise of the authors and recent literature review articles to also include those publications that are employed by the industry. The analysis ultimately reached a total of 128 publications. These articles are then clustered in terms of their publication year, subject and main objective (i.e. literature reviews, conceptual frameworks for accounting purposes, or analytical techniques for