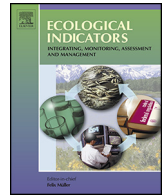




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Composite indicator for measuring corporate sustainability

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ABSTRACT

Corporate sustainability performance is a multidimensional concept based on the original idea of sustainable development, replacing the traditional understanding of corporate performance only as capital appreciation for owners. The objective of this paper is to present a model for the measurement of corporate sustainability – Complex Performance Indicator (CPI). CPI integrates the environmental, social, economic and corporate governance performance of the company. CPI contains seventeen key performance indicators which were gradually determined from the basic set of performance indicators using statistical methods. CPI sums up the complex corporate performance into a single value but, at the same time, the set of aggregated sub-indicators of individual performance areas enables a detailed analysis and determination of the impact of various performance areas and factors on the complex corporate performance. The introduction of benchmarking is a crucial element in the entire model, as it enables to interpret the aggregated information and to quantify the performance gap. The results including their visualisation are presented in the case study. The complex assessment of corporate performance helps to uncover the weaknesses of the company that could become a threat and to identify strengths which the company might pursue as an opportunity. The results of such an analysis serve as the point of reference for deciding about the future.

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1. Introduction

In corporate management sustainability is a key concept pervading the entire value chain. The corporate sustainability definition is based on the stakeholder theory (Donaldson and Preston, 1995; Freeman, 1984) and corporate social responsibility (Garriga and Melé, 2004; Carroll, 2000, 1999, 1991, 1979). The definition of corporate sustainability (Bansal, 2005; Van Marrewijk, 2003; Dyllick and Hockerts, 2002) follows from the macro-economic concept of sustainable development (WCED, 1987). Sustainable development is based on a triple-bottom-line, i.e. the balance of environmental, social and economic pillars (Elkington, 1997). In addition to these three basic pillars there is a fourth factor of corporate sustainability: corporate governance (CG). In such case we refer to ESG (environmental, social, governance) factors of corporate sustainability. Companies are trying to achieve long-term benefits by integrating activities associated with sustainability into their strategies (Chabowski et al., 2011; Cruz et al., 2006). In

general, companies integrate sustainability practices because they are obliged to do it or because they want to do it (Van Marrewijk, 2003).

Many authors emphasise that corporate performance should not be viewed only on the basis of economic results arguing that the assessment should include non-financial indicators (Kaplan and Norton, 1996, 2001; Carroll, 2000; Waddock and Smith, 2000) that focus on intangible assets and take into account relationships with employees, customers and other stakeholders. Many indicators have been developed in the past twenty years which measure the corporate performance in the context of its sustainability and accountability. Measuring corporate sustainability means measuring the extent in which companies incorporate economic, environmental, social and governance factors into their activities and, ultimately, measuring the impact of their activities on their environment (Artiach et al., 2010; Labuschagne et al., 2005). The objective of the paper is to propose a model for measuring corporate sustainability and for assessing the complex corporate performance: the model integrates environmental, social, economic and corporate governance performance of the company and is based on financial and non-financial indicators. The model follows the recommendations of international organisations that deal with the corporate sustainability. The model aggregates

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a number of partial indicators into a single piece of information and it uses the strengths of composite indicators. The result is the Complex Performance Indicator (CPI).

2. Theoretical approach to the assessment of corporate sustainability

Based on the literature the following approaches were identified for assessing and measuring corporate sustainability:

- sets of individual indicators
- Sustainability Balanced Scorecard
- composite indicator (composite index)

An evaluation using a set of indicators is the oldest approach to measuring and evaluating corporate sustainability. There are a number of international institutions that deal with corporate sustainability (Table 1).

Indicators of sustainable production are the subjects of studies and surveys of academics [Krajnc and Glavic \(2003\)](#), [Veleva and Ellenbecker \(2001\)](#), [Veleva et al. \(2001\)](#) and [Callens and Tyteca \(1999\)](#). Also in the literature we can find sustainability indicators specific to individual fields of economic activity, such as tourism ([Roberts and Tribe, 2008](#); [Miller, 2001](#)), agriculture ([Rigby et al., 2001](#)), and mining industry ([Azapagic, 2004](#)).

The Sustainability Balanced Scorecard (SBSC) is another way to assess the sustainability indicators. The indicators are designed and arranged in such way that they form a tie between the strategy and operational activities with an emphasis on performance measurement. SBSC is based on the causal hierarchical system of strategic objectives formulated along four or five perspectives: financial, customer, processes, learning and growth, and non-market ([Möller and Schaltegger, 2005](#); [Figge et al., 2002](#); [Epstein and Wisner, 2001](#)).

The advantage of composite indicators as compared to the system of individual indicators is that they summarise complex multidimensional phenomena in a single figure which is easy to interpret ([Joint Research Centre-European Commission, 2008](#)). The

Table 1
Organisations dealing with the measurement of corporate sustainability.

Institution	Document	Description
Global Reporting Initiative	G4 Sustainability Reporting Guidelines (GRI, 2013)	Reporting framework and a set of economic, and ESG indicators
International Integrated Reporting Council	The International <IR> Framework (IIRC, 2013)	Framework for the integrated reporting on corporate sustainability and value creation
United Nations Conference on Trade and Development	Guidance on Corporate Responsibility Indicators in Annual Reports (UNCTAD, 2008)	Overview of ESG indicators
CFA Institute	Environmental, Social and Governance Factors at Listed Companies: A Manual for Investors (CFA Institute, 2008)	ESG factors in the context of investing
Society of Investment Professionals in Germany	Key Performance Indicators (KPIs) for Extra-/Non-Financial Reporting (DVFA, 2007)	ESG indicators for non-financial reporting
European Academy of Business in Society	Corporate Responsibility, Market Valuation and Measuring the Financial and Non-Financial Performance of the Firm (Cranfield School of Management, 2009)	Non-financial drivers and ESG factors of market value

methods for designing macro indices of sustainability can be used also for indices at the corporate level. [Singh et al. \(2007\)](#) utilised the analytical hierarchy process (AHP) method to create the sustainability performance index in the steel industry. [Krajnc and Glavič \(2005a,b\)](#) created the Composite sustainable development index (I_{CSD}) based on GRI indicators. The value-based approach of [Figge and Hahn \(2005\)](#) is based on the opportunity costs. Their concept of Sustainable Value Added evaluates the use of economic, environmental and social capital relative to a benchmark. [Zhou et al. \(2012\)](#), in designing the composite sustainability index combined methods of data normalisation, weighting and aggregation of indicators and, based on a case study and sensitivity analysis, list the strengths and weaknesses of each method. [Buys et al. \(2014\)](#) developed the Bayesian network model – Sustainability Scorecard for assessing environmental, economic and social performance. None of the listed composite indices does include the CG responsibility and its impact on the corporate sustainability.

A special group of composite indices includes indices concerning responsible investing. They are, for example, Dow Jones Sustainability Index, FTSE4Good Sustainability Indexes, Morningstar Socially Responsible Investment Index, and the Ethibel Sustainability Index.

3. Materials and methods

In this study various statistical methods were combined. Methods and approaches used in designing the model are presented in this section. The model integrating environmental, social, economic and CG performance is an aggregate indicator considering all four elements of corporate performance. The model for measuring corporate sustainability should satisfy the following criteria:

- it should integrate the four factors of corporate sustainability – economic, environmental, social and corporate governance,
- it should not be based only on financial indicators but should also include non-financial indicators,
- it should not be universal but should reflect the specifics of the industry in which the company operates,
- it should be easy to interpret, i.e. the composite corporate performance indicator is a model in the mathematical sense,
- the calculation must be simple,
- it should include the principle of benchmarking,
- individual indicators must be relative and data for the calculation must be available.

The process of designing the Complex Performance Indicator (CPI) was broken down to five steps. In the first step the basic set of environmental, social, economic and CG key performance indicators (KPIs) was created. The second step aimed at reducing the number of KPIs which was achieved by removing duplicate information by way of correlation analysis and, further, by way of factor analysis in order to minimise the information loss of original KPIs. Weights were assigned to the KPIs in the third step because various indicators have varying importance in companies, they have different impacts on the complex performance and assigning weights to the KPIs will bring them closer to reality. It was also necessary to establish benchmarks for the reduced set of KPIs in order to quantify the gaps in the corporate sustainability performance. In the last step, aggregation methods were used to synthesise KPIs into a single composite indicator measuring the complex corporate performance.

The CPI model was designed and tested on real data. The data were obtained by way of a questionnaire survey. In order to collect data in an efficient way the questionnaire was designed to verify the proposed basic KPIs while assigning weights to individual KPIs.

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