Sustainability Indicators Evaluation and Reporting: Case Study for Building and Construction Sector

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Abstract: - Current trends of sustainability indicators evaluation (i.e. measurement of economic/financial, environmental, social and governance (ESG) performance) and corporate sustainable reporting are discussed in the paper. The focus is on the building and construction sector. The relationship between sustainability indicators and reporting is an important issue; and the development of advanced methods to identify key performance indicators for ESG performance is discussed here along with the possibility of the utilization of information and communication technology and XBRL taxonomy.

Key-Words: - Sustainability indicators, Key performance indicators, Corporate sustainability reporting, GRI, EMAS, UN Global Compact, UNEP FI, ISO 26000, XBRL, Building and Construction sector

1 Introduction

The research in the field of sustainability (economic, environmental and social) and ESG (environmental social and governance) indicators, evaluation and corporate sustainability reporting in the Czech Republic [1], [2], [3] reflect the overall global world trends [4], [5], [6], [7]. Successful corporate sustainability, i.e., the capacity of an organization to continue operating over a long period of time, depends on the sustainability of its stakeholder relationships. The available statistics show that through all objective benefits the sustainability and ESG indicators evaluation and corporate sustainability reporting can bring an appropriate feedback to businesses.

Theoretical approaches of international organizations United Nations Environment Programme Finance Initiative (UNEP FI) [8], International Financial Reporting Standards (IFRS) [9], Corporate Social Responsibility (CSR) [10], European Federation of Financial Analysts Societies (EFFAS) [11], Society of Investment Professionals in Germany (DVFA) [12], [13], Socially Responsible Investment (SRI) [14], United Nations Principles of Responsible Investment (UN PRI) [15], Organization for Economic Co-operation and Development (OECD) [16], [17], Global Reporting Initiative (GRI) [18], [19], [20] International Federation of Accountants (IFAC) [21], United Nations Conference on Trade and Development (UNCTAD) [22], [23], International Integrated Reporting Council (IIRC) [24] and United Nations Global Compact [25] have arisen from the their research, studies and reports in relation to the development of sustainability and ESG indicators. They are summarized in the Fig. 1 introduced in [26].

![Figure 1. Relationships of organizations to sustainability and ESG indicators. Source [26]](image-url)

This one is taken from results of the research team of the Faculty of Business and Management (FBM) of Brno University of Technology (BUT) and the Faculty of Business and Economics (FBE) of Mendel University in Brno (MENDELU) in the
project No P403/11/2085 Construction of Methods for Multi-factorial Assessment of Company Complex Performance in Selected Sectors, [1], [2], [3], [27], [28]. The project is funded by the Grant Agency of the Czech Republic.

The main goal of the research in this project has been specified by its six partial research targets [1] solved in 2011-2014:

1) The analysis of the state-of-the-art of economic, environmental, social and governance aspects of corporate performance through targeted research of the global information and database sources available at the FBM BUT and the FBE MENDELU using available Information and Communication Technologies (ICTs) tools.

2) A detailed analysis of the implementation of economic, environmental, social and governance reporting in chosen economic activities and its justification.

3) Assessment, analysis, and the categorization of contemporary characteristics of the individual pillars (economic; environmental; social and governance) of corporate performance (or the attractive sustainability of success) in relation to the measure of progress or dynamics of the development of overall corporate performance.

4) The identification of the importance and relative roles of Environmental, Social and Governance (ESG) factors using ESG data and Key Performance Indicators (KPIs) in the overall company performance.

5) The construction of quantitative and qualitative methods of the multifactor measurement of corporate performance in the chosen economic activities with the use of ICT tools.

6) An application of developed methods for multifactor measurement of corporate performance of chosen economic activities in practice with feedback for possible change correction aimed at further improvement.

We have analyzed sustainability indicators and ESG factors in chosen companies of the Construction sector in the Czech Republic which have implemented and certified international management standards [29], i.e. quality (ISO 9000), environmental (ISO 14000 and EMAS) and occupational health and safety (ISO 18000) management systems. Some of them have also implemented the Corporate social responsibility (or ISO 26000), [19], management system.

We have investigated how sustainability and ESG data and information can be monitored, codified, registered and transformed to Key Performance Indicators (KPIs), e.g. [1], [4], [13]. This fact indirectly indicates that, in the case of such needs, these organizations were able to use this sustainability and ESG data and incorporate them into their corporate sustainability reports, which issued from reporting frameworks, see [13], [18], [19], [22], [23], [24].

We have focused on these critical partial processes in our research areas: integration of economic, environmental, social and governance performance indicators and their transformation into sustainability indicators of sustainability of corporate success.

Our analyses of the possibilities of corporate performance indicators measurements in chosen organizations of the Building and Construction sector by means of chosen KPIs were based on analyses of previous findings [1], [2], [3], [26], [27], [28] and their results will be also discussed in the paper.

2 Sustainability and ESG indicators and reporting for Construction Sector

2.1 Introduction

In this chapter we introduce some results of our analysis of the state-of-the-art of economic, environmental, social and governance aspects of corporate performance indicators of the Building and Construction Sector, where we have focused on the new approach of GRI reporting developed with other organizations on common approaches to corporate performance indicators and reporting [28], [30], and where we consider also the important European Union (EU) legislation (i.e. Construction Product Regulation (CPR) - Regulation (EU) No 305/2011 laying down harmonized conditions for the marketing of construction products and Documents on Best Environmental Management Practice of the Building and Construction Sector) and the United Nations Environment Programme of Sustainable Buildings and Climate Initiative (UNEP SBCI) [31]. The construction sector is covered by Section F of the NACE Classification, divisions 41 to 43. According to NACE, the construction sector includes the complete construction of buildings (division 41), the complete construction of civil engineering works (division 42), as well as specialized construction activities, if carried out only as a part of the construction process (division 43).

The GRI is a very important network-based organization that produces a comprehensive sustainability reporting framework that is widely used around the world. It has developed the Construction and Real Estate Supplement (CRESS)
The CRESS is intended for companies that:
1. invest in, develop, construct, or manage buildings; and
2. invest in, develop or construct infrastructure.

The Construction sector has a significant impact on the economy, society, and environment, in ways that are both positive and negative.

The construction sector has not only a significant role in the EU economy, but it is also a major contributor to the EU energy consumption and greenhouse gas emissions. Construction activities and buildings are related to various impacts on the environment. The key aspects are land use, the consumption of raw materials, energy and water, the production of waste, as well as noise and air emissions, e.g., 42 % of the total EU final energy consumption, 35 % of the greenhouse emissions, about 50 wt. % of extracted materials and 22 wt. % of waste generation is related to buildings.

The UNEP SBCI [31] suggests that buildings are responsible for more than 40 % of global energy use and one third of global greenhouse gas emissions. It also estimates that buildings are responsible for up to 80 % of greenhouse gas emissions in our cities and towns. Reducing global greenhouse gas emissions in the built environment is also widely recognized as the least expensive abatement opportunity. The UNEP SBCI estimates that the built environment is globally responsible for 30 % of natural material use and 20 % of water use. The creation and maintenance of the built environment also significantly affects natural ecosystems and transforms or eradicates long-standing habitats. The Construction sector also produces large quantities of waste and UNEP SBCI estimates that the built environment contributes to 30 % of total solid waste generation.

In socio-economic terms, the built environment has significant direct and indirect impacts on social well-being and the livelihoods and prosperity of communities and individuals. The sector, through its various activities as a major employer with a diverse and complex supply chain, can positively impact local economies by providing jobs, training and industry. The sector provides homes, education and recreational facilities for communities, but it can also be responsible for displacing many people.

From sustainability and ESG data it is possible to determine KPIs. Let us consider that KPIs are organized into the four pillars (economics, environmental, social and corporate governance) and the fifth pillar Sustainability of Success (long term viability) [26].

2.2 Sustainability indicator evaluation and reporting in the Building and Construction sector

The creation of reliable methods of corporate performance measurement in the Building and Construction sector where concurrent action of multiple factors is in play can be considered a prerequisite for success not only in decision-making, but also with regard to corporate governance, comparison possibilities, development of a healthy competition environment, etc.

The GRI, EU, UN and OECD initiatives together with the IFAC, DVFA and IIRC state that corporate performance and sustainability indicators may be both quantitative and qualitative and that they should cover the reporting entity’s direct and indirect impacts across economic, environmental, social and governance dimensions.

Economic indicators include proxies for the organization’s impact on resources at the shareholder level and on other economic systems at the local, national and global level. This heading also encompasses issues dealing with remuneration paid to employees and money received from customers, to name but a few.

Environmental indicators deal with the measurement of an organization’s environmental impact via its products and services and its activities.

Social indicators deal with labor practices, human rights and broader social issues affecting a broad range of stakeholders [14]. An important element of the social performance is occupational health and safety. The trend underscoring the social aspects of sustainable development is the concept of CSR [10]. Other key issues related to the CSR are: human rights, employees’ rights, involvement of municipalities and relationships with suppliers, information policy including issues such as releasing information, transparency, educating the consumers and anti-corruption measures.

Governance indicators enlarge Sustainability indicators and deal with corporate governance. This
is a term that refers broadly to the rules, processes, or laws by which businesses are operated, regulated, and controlled. The term can refer to internal governance indicators/factors defined by the officers, stockholders or constitution of a corporation, as well as to external forces such as consumer groups, clients, and government regulations. The corporate governance issues in the Czech Republic from the Corporate Governance Code of companies, which is based on the OECD principles 2004 [17].

2.2.1 Economic performance integration and its KPIs

Financial reporting standards, such as IFRS and US Generally Accepted Accounting Principles (U.S. GAAP) and ESG reporting frameworks, principally the GRI Guidelines [18], will act as structural supports for potential integrated reporting frameworks of integrated economic performance [24].

Research of the direction of the economic performance indicators of project No P403/11/2085 has focused on the analysis of the reporting framework of the GRI [18] and IFAC Sustainability Framework 2.0 [33]. Furthermore, the research dealt with economic indicators which have been published in the Yearbook of Czech Statistical Office [34] and selected economic indicators of financial statements according to Czech accounting standards (from 2011) and a comprehensive analysis of the voluntary reporting of 10 large Czech companies of the Construction and Manufacturing sector has also been done [26].

We proposed the Key Performance Indicators (KPIs) for the measurement of economic performance in relation to the sustainability and ESG indicators. The economic performance indicators provide quantitative forms of feedback which reflect the results in the framework of corporate strategy. The approach is not different when we control environmental, social and governance issues. The non-financial KPIs that an organization develops, manages and ultimately reports – whether internally or externally – will depend on its strategic priorities, and will reflect the unique nature of the organization. What is most important is to recognize what is measured, what is controlled, and it is important that the measures create value for the company and its stakeholders. The proposed KPIs can help organizations to plan and manage their economic priorities, in particular, when the economic indicators are focused on the core business strategy, by means of operational plans, which include performance targets.

Table 1. Economic KPIs

<table>
<thead>
<tr>
<th>Indicator</th>
<th>KPIs</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC1 Profit</td>
<td>EBIT</td>
<td>Earnings before Interest and Taxes</td>
</tr>
<tr>
<td></td>
<td>EBITDA</td>
<td>Earnings before Interest, Taxes, Depreciation and Amortization</td>
</tr>
<tr>
<td></td>
<td>EAT</td>
<td>Earnings after Taxes / Net profit</td>
</tr>
<tr>
<td></td>
<td>EPS</td>
<td>Earnings Per Share, P/E = Price Earnings Ratio</td>
</tr>
<tr>
<td>EC2 Cash Flow</td>
<td>FCF</td>
<td>EBIT * (1-Tax rate) + Depreciation and Amortization - Changes in Working Capital - Capital expenditure</td>
</tr>
<tr>
<td></td>
<td>OCF</td>
<td>Operating Cash Flow</td>
</tr>
<tr>
<td></td>
<td>All the cash flows arising from the main activity of the company, which is the subject of its business (the movement of stocks, receivables, obligations)</td>
<td></td>
</tr>
<tr>
<td>EC3 Revenues</td>
<td>TR</td>
<td>Total revenues</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total revenue is the total receipts of a company from the sale of any given quantity of a product, i.e. Revenues from own goods and services + Revenues from sale of merchandise (goods for resale) + Revenues of fixed assets + Revenues from sale of materials + Revenues of securities</td>
</tr>
<tr>
<td>EC4 Turnover size</td>
<td>Turnover size</td>
<td>Revenues from own goods and services + Revenues from sale of merchandise (goods for resale) + Revenues of securities</td>
</tr>
<tr>
<td>EC5 Profit margin</td>
<td>Profit margin</td>
<td>The difference between turnover (revenues) from sales of goods and expenses on merchandise sold (i.e. on goods sold in the same condition as received)</td>
</tr>
<tr>
<td></td>
<td>ROE = EAT / Equity</td>
<td></td>
</tr>
<tr>
<td>EC6 Indicators of economic performance</td>
<td>Return on Equity</td>
<td>ROI = EBIT / Total capital</td>
</tr>
<tr>
<td></td>
<td>Return on Investment</td>
<td>ROA = EBIT / Assets</td>
</tr>
<tr>
<td></td>
<td>Return on Assets</td>
<td>ROS = EAT / Revenues</td>
</tr>
<tr>
<td></td>
<td>Return On Capital Employed</td>
<td>ROCE = EBIT / Equity + Long-term liabilities</td>
</tr>
</tbody>
</table>
The proposed KPIs for measurement of the corporate performance in relation to the ESG indicators were established on the basis of the results of empirical research by the team of FBM BUT, [26], see Tab. 1. These indicators EC1 – EC7 differ from indicators proposed in CRESS [30], where are defined only in general following GRI 3.0 Guidelines:

- **Economic Performance indicators**: EC1 (Commentary added to clarify sources of financial information. Commentary added to report on specific breakdown for payments to governments. Commentary added to refer to methodology for calculating community investments and clarifying infrastructure investments) and EC2 (Commentary added to report financial implications and other risks and opportunities for the organization’s activities due to other sustainability issues. Commentary added to provide new definitions on Qualitative Financial implications and Obsolescence).

- **Market Presence indicator**: EC7 (Commentary added to include procedures for local hiring for all direct employees, contractors and sub-contractors hired from the local community. Commentary added to provide definitions on contractors and sub-contractors.

- **Indirect Economic Impact indicators**: EC8 (Commentary added to explain other significant infrastructure investments made by the reporting organization.) and EC9 (Commentary added to add examples of indirect economic impacts).

All our proposed economic performance indicators EC1 – EC7 give measureable values. A company in the Czech Republic can compare some of them with the country’s benchmark value, e.g., the EVA indicator is able to calculate and compare with the benchmark value online on the web of the Ministry of Industry and Trade of the Czech Republic.

We have also used our developed XBRL tools to facilitate the calculations and the visualizations of these integrated economic performance indicators [27].

### 2.2.2 Integration of environmental performance and its KPIs

We have determined KPIs for environmental reporting (environmental protection expenses, wastes, charges, air pollution, waste water discharge, cross border agreements etc.) using results of our previous research in this field [1], [22] using G3.1 guideline CRESS and EMAS indicators. We have identified direct and indirect environmental aspects of construction sectors, where we issued Reference Documents on Best Environmental Management Practice in the Building and Construction Sector [35], see Fig. 2.

![Fig. 2. Direct and indirect environmental aspects of the construction sector. Source: [35]](image)

However we have selected a certain set of environmental KPIs following key areas of the environment from GRI’s Reporting Guidelines CRESS [30] and EMAS and used GRI notations:

1) **Efficiency of material consumption**, where we have chosen EN1 and EN2 indicators from CRESS;

2) **Energy efficiency**, where we have selected EN3, EN4, EN5, EN6, EN7 indicators and an additional CRE1 indicator (Building Energy Intensity) from CRESS;

3) **Water management**, where we have selected EN8, EN9, EN10 indicators and additional CRE2 indicator (Building Water Intensity) from CRESS;

4) **Waste management**, where we have selected EN22 indicator from CERSS and additional EN22a indicator (Total annual generation of hazardous waste) from [1];

5) **Biodiversity**, where we have selected EN12 and EN13 indicators from CRESS;

6) **Air pollution**, where we have selected EN16, EN17, EN18, EN20 indicators and additional CRE3 indicators (Greenhouse gas emissions intensity from buildings) and CRE4 (Greenhouse gas emissions intensity from new construction and redevelopment activity) from CRESS;

7) **Other relevant indicators of the influence of the organization’s activity on the environment, where we have selected EN26, EN29 indicators**

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and additional CRE5 indicator (Land and other assets remediated and in need of remediation for the existing or intended land use according to applicable legal designations) from CRESS.

The above set of selected environmental KPIs differs from our past set of KPIs introduced in [1], [2], [3] and describes more appropriate KPIs in sustainability and ESG indicators for the building and construction sector.

Some constructions of KPIs represent absolute performance (e.g., total GHG emissions, total water use), which is not normalized by factors such as floor area or building users. However, where it is practical to do so and will be helpful in interpretation, the reporting organizations should consider using ‘like-for-like’ analysis for absolute KPIs to enable comparability over a defined period of time of our research project.

We have also used our developed XBRL tools to facilitate the calculations and the visualizations of this set of integrated environmental performance indicators [27].

2.2.3 Integration of social performance

The social dimension of corporate sustainability concerns the impacts the given organization has on the social systems within which it operates. We are going to determine the KPIs for social performance based on the GRI Framework and its social performance indicators, in order to identify some key performance aspects surrounding labor practices, human rights, society, and product responsibility [7], [14], as was done in the GRI’s Reporting Guidelines CRESS [30].

We have to consider that labor practices indicators also draw upon two instruments which directly address the social responsibilities of business enterprises: the ILO Tripartite Declaration Concerning Multinational Enterprises and Social Policy [36], and the OECD Guidelines for Multinational Enterprises [16] and we must take into account: employment; labor/management relations; health and safety; training and education; diversity and opportunity.

Therefore we have selected again a certain set of social KPIs following key areas of the social area from GRI’s Reporting Guidelines CRESS [30]:

1) Labor Practices and Decent Work indicators are broadly based on the concept of decent work. We have taken into account:
   • Employment – LA1 and LA3 indicators from CRESS;
   • Occupational Health and Safety – LA7, LA8 indicators and additional CRE6 indicator (Percentage of the organization operating in verified compliance with an internationally recognized health and safety management system) from CRESS;
   • Training and Education – LA10 indicator;
   • Diversity and Equal Opportunity – LA13 indicator from CRESS;
   • Equal Remuneration for Women and Men – LA14 indicator from CRESS.

2) Human Rights indicators require companies to report on the extent to which human rights are considered in investment and supplier/contractor selection practices. We have taken into account from CRESS:
   • Non-discrimination – HR4 indicator;
   • Child labour – HR6 indicator.

3) Society indicators focus the attention on the impacts organizations have on the communities in which they operate, and they disclose how the risks that may arise from interactions with other social institutions are managed and mediated. We have taken into account from CRESS:
   • Local community – SO1, SO9 indicators and additional CRE7 indicator (Number of persons voluntarily and involuntarily displaced and/or resettled by development, broken down by project);
   • Public policy – SO5 and SO6 indicators.

4) Product responsibility indicators address the aspects of a reporting organization’s products and services that directly affect customers. We have taken into account from CRESS namely:
   • Customer Health and Safety – PR1 and PR2 indicators;
   • Products and Services Labelling – PR3, PR4, PR5 indicators and additional indicator CRE8 (Type and number of sustainability certification, rating and labelling schemes for new construction, management, occupation and redevelopment).

The integration process of the development of the complete set of social performance indicators is in progress and the final version of KPIs is planned to be complete, as a part of our research project, towards the end of this year.

We have used also our developed XBRL tools to facilitate the calculations and the visualizations of these integrated social performance indicators [27].

2.3 Sustainability indicators
Sustainability indicators for building and construction sectors are formed by the sets of the abovementioned economic, environmental and
social indicators. If the performance and competitiveness of the companies on the current markets should increase, then it is necessary to develop a complete system of sustainability and ESG performance evaluation, based upon the cooperation of the interdisciplinary teams, which can contribute to the growth of the total performance of the company [28].

The sustainability and ESG performance evaluation and its sustainability indicators will be indisputably reflected by the sustainability of company success, in the growth of the offered value and care for the market from the side of the customers, the increase of their satisfaction and loyalty on the one side and an improvement of the company’s image and its business partners, with an augmentation of their position and welfare on the other side [3].

3 Conclusion
Analysis of the state-of-art on economic, environmental, social and corporate governance aspects of company performance and corporate sustainability has been presented. The proposed set of abovementioned sustainability indicators for all companies in a given building and construction sector monitors to a much greater extent the development dynamics, as up to now [30]. CEO decision-making is based on a qualified assessment (measurement) of a situation determined at the same time by multiple indicators, primarily in their horizontal development [2], [4], [5], [22]. In pursuit of an outstanding information force, emphasis is currently being placed not only on the absolute data, but primarily on the changing data and the analyses of changes of these changes. That is, the dynamics of systems is the focus of attention. Vertical analyses that are applied adequately then add a further dimension to the conditions for decision making. These were carried out in the project No P403/11/2085. In this context other methods have to be discussed: logical and empirical methods, methods of qualitative and quantitative research such as statistical modeling, see [6], [28].

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