

ASSESSMENT OF SUSTAINABILITY ASPECTS IN A COMPANY

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Abstract. Having sustainability as a goal, decisions on products or processes within a company requires integrating technical, economic, environmental and social aspects of all activities being made. Technical and economical aspects are traditionally solved and evaluated with already known methods. Financial analysis, cash flows or marketing goals as basic information are traditionally evaluated. On the other hand environmental and social requirements are hardly ever evaluated or are not solved at all. Many companies implement waste management or environmental departments only to empower potential cost savings and avoid wasting. But concept of sustainability requires much more. This paper deals with evaluation of environmental and social aspects and impacts. The main goal is to determine and suitably evaluate all relevant sustainable aspects of products and processes within company, to empower company's competitiveness, corporate social responsibility and corporate sustainability. The research methodology for this paper consists of qualitative research and examination of primary resources - research articles and secondary literature review process.

Keywords: environmental accounting, innovation, corporate social responsibility.

Jel classification: M14, O31, Q51, Q53, Q56

1. Introduction

Sustainability as an essential objective of company operations requires that any decision about products, processes and innovations is based on a complex assessment of economic, technical and environmental and social aspects as well.

Economic aspects have typically been dealt with by means of well-known and sophisticated financial and marketing analysis methods, while technology and engineering methods are used for technical aspects assessment. Environmental and social requirements have often been neglected if not completely missing. Many companies introduce waste management systems and environmental accounting in consideration of potential savings and avoiding material wastage. However, a company sustainability concept requires much more.

The aim of this contribution is therefore primarily to specify principle, role and importance of assessment of environmental and social aspects and their impact. The main objective is to determine optimized ways of selection and evaluation of sustainability aspects for company products and processes to reinforce company competitiveness, social responsibility and sustainability.

Our investigation in companies, mainly of chemical industry in the Czech Republic however

gave evidence that environmental and especially social aspects of products, processes and innovations are not adequately evaluated. The used research methods involve qualitative research in 5 companies of chemical industry in the Czech Republic and study of primary resources, such as scientific publications and case studies.

2. Traditional evaluation of products and processes

Corporate sustainable development is a normative concept which involves trade-offs among social, ecological and economic objectives, and is required to sustain the integrity of the overall system (Hediger 2000). All dimensions of sustainability should be considered in the process of corporate strategic sustainable development planning (Čiegis, Gineitiene 2008).

As sustainable development becomes a more important objective in civil infrastructure planning and policymaking, quality of life (QoL) is an increasingly important measure to understand, characterize, and apply effectively in the search for and development of appropriate corporate solutions for sustainable development (Fischer, Amekudyi 2011).

Focus on sustainability as guiding principle for corporate economic activity has generated many

(often conflicting) definitions of corporate sustainable development (O'Hara 1995).

Mapping the future sustainable competitiveness creates a need for research initiatives to develop the new concept of competitiveness, with much of the research focusing on how sustainable development and competitiveness interact (Balkyte, Peleckis 2010). A major emphasis of modern strategic thinking involves the role innovation plays in the profile of the organization (Cooper 1998).

Today technical solutions and economic assessment of company products, processes and innovations have typically been solved by means of **financial analysis**, cash flow assessment or marketing targets determination as basic source of information contained in every feasibility study (Project, 2009).

Corporate profitability depends on the ability to offer better products or use better technology in a short time (Branska, 2011). The expected return is achieved by founding the decision about a product on the assessment of future revenues and expenses. A company's decision is in general influenced by the relative marginal cost of production between the regions, the cost of relocation, the cost of exporting its good across borders, as well as the relative size of the regions (Barbier, Hultberg 2007). Financial assessment is important; the project-generated net cash flows must correspond to the required company financial performance, reflect the future revenue ability within an acceptable time horizon and return the spent investment and operational costs.

Technical structure and attributes together with marketing activities directly influence customer satisfaction, which has major impact on future company revenues (Karatepe 2007). Therefore management's decisions about the selection and continuation of product or project works with the use of financial assessment appear to be a useful tool. But evaluating and comparing development alternatives with regard to sustainability is more and more an important goal for comprehensive corporate product, process or project appraisal (Senner 2011).

In assessment of an innovation project, e.g. an investment, a simple method can be used based on a net present value (NPV) (Doraszelski 2001). Nevertheless, it is essential that financial analysis is not the only assessment criterion. The assessment must involve both quantitative and qualitative criteria covering the objectives in terms of economic, environmental and social perspective. Overall assessment must be a complex and systemic unit of **technical, economic, environmental and social aspects and impacts**.

Environmental and social requirements have recently been dealt with only superficially, if not omitted at all. The reason could be their lower significance as viewed by company management, lower stress put on the company's social responsibility (Dhaoui 2008), lack of finance (Vlckova, Patak 2011) and missing information about the aspects that should be judged as environmental and social requirements (Vavra *et al.* 2011). The opportunity to save costs and the effort to prevent rare materials wastage seems to be a strong motivation for the improvement of company's environmental and social performance; therefore the improvement of assessment processes is an inevitable step on the way to a sustainable company and a sustainable society.

3. Environmental and social aspects

When assessing company products and processes, the *environmental aspect* presents a feature that influences or is influenced by the surrounding environment (Ejdys, Matuszak-Flejszman 2010). If a product or process has impact on interpersonal relationship, social stratification, social relations, culture or social structures, then it has a *social aspect* (Hochgerner 2010).

To identify environmental and social aspects, it is essential to recognize whether and to what extent the product or process influence the environment and the society.

Besides the determination of all the relevant product and process aspects, it is essential to monitor the direct and indirect environmental and social aspects, and also to integrate the potential aspects determining their importance, probability and origin. The expected impact including its description should be determined for each aspect, and the measures to be taken to reduce optional negative impact.

The direct aspects are connected with the project activities where we assume the company's influence and control. Indirect aspects relate to the current or potential activities outside the company's control, such as customer controlled aspects, involvement of stakeholders or aspects controlled within the supplier chain.

The following list of major **environmental aspects** was compiled on the basis of our previous research (Vavra *et al.* 2010):

- Local natural resources
- Material processing
- Material storage and use
- Energy consumption
- Air pollution
- Water pollution
- Soil

- Visual and sound effects
- Product
- Waste management
- Other.

The environmental aspect groups rank in order of a product life cycle, and in detail, according to their particular aspect and impact. **Determination of social aspects in a company is a much more complex task** than environmental aspects determination. Social aspects have a wider impact (such as demographic changes, working problems (Gimzauskiene, Kloviene 2010), financial provision and family life impact (Pukeliene, Starkauskiene 2011)) than more or less pre-defined environmental issues.

Basic concept of the Social Impact Assessment (SIA) views all the areas directly or indirectly influenced by people as social aspects. Focusing on the social aspects of corporate products, processes and innovations is focusing on the structural competence attributes of the organization that are needed to create appropriate product. Organizational culture, communication processes, and shared knowledge are some examples of these competence attributes (Vesa *et al.* 2006). On the basis of our previous research, the following areas for social aspects assessment can be recommended to a company management (Vavra *et al.* 2010):

Work and operating procedures

- Work positions of employees
- Work relations
- Occupational health and safety
- Education and training
- Company culture

Responsibility for products

- Law and regulatory measures compliance
- Customers health and safety
- Product and service labelling
- Marketing communication

Human rights

- Wide variety and equal opportunity
- Freedom of association and collective bargaining
- Child labour
- Forced labour

Social performance indicators

- Impact on the society (company environment)
- Impact on other stakeholders

Environmental and social aspects assessment is meaningful only for products or processes with higher importance at the given moment. Only the most important environmental and social aspects must be systematically monitored and assessed; it is not necessary to deal with all such determined major aspects; it concerns only factors that can be

influenced and controlled by the company (Edwards 2004). Precise determination of aspects with essential and critical meaning is an important prerequisite for the appropriate and effective focus of the whole project team. The correct determination of major aspects should be based on the following questions:

- Is the aspect a subject of environmental or other laws or directives? All these aspects are important.
- Is the aspect a subject of company policy, company objectives or voluntary declarations? Such aspects should be assessed as important.
- What is the stakeholders' opinion? Aspects considered important by external stakeholders (mostly customers and society (Thabrew *et al.* 2009)) should be dealt with as important ones.
- Does the aspect increase the environmental performance of the company, i.e. increases the ability to prevent ecological risks?
- Is there an assumption that an aspect could have a serious negative impact on the society?
- Are there other aspects assessed by the project manager as threatening? Many obstacles must be overcome and numerous problems have to be solved during the project completion. To ensure a successful completion, it is essential to monitor certain aspects even in a short-term perspective, and to pay to them special attention at a certain moment.

Such aspects should be described in detail, including their impact and a precise setup of monitoring and assessment system.

4. Sustainable evaluation of products and processes

Products, processes and projects must be assessed to discover whether they complete the expected objectives, contribute to the expected environmental performance and whether social expectations and requirements have been met. Consequently, it is essential to find suitable attitudes to improve the products and processes, especially by means of system-controlled processes and innovations. There exist several generic attitudes to support assessment methods involving the connected economic, environmental and, in some cases, social criteria.

4.1. LCA as a tool for environmental aspects evaluation

Today an additional tool to compulsory environmental regulations international standards or other voluntary tools should be implemented (Ruzevicius 2009). Companies started to implement environment management systems (EMS) for the production processes and environmental performance

improvement. International Standards Organization (ISO) 14001 regulations or the EU supported European Union Environmental Management and Auditing Scheme (EMAS) include environmental performance monitoring and measuring (Frondel *et al.* 2007). There is the relationship between the adoption of environmental management practices and firms' success at environmental innovation and performance (Theyel 2000).

Life cycle analysis presents an easily accessible tool facilitating the involvement of sustainability aspects in company processes and operations (Heijungs *et al.* 1992). This tool became, through the ISO 14040:2006, a standard integrating the life cycle analysis (LCA) and the life cycle inventory (LCI) (ISO 14040).

An LCA study starts by identifying the objectives, followed by life cycle inventory (LCI) summarizing the amount of incoming and outgoing material and energy flows within a product system (Koci, 2009). The environmental impact is calculated for individual materials and energy flows in the life cycle impact assessment stage. There is a strong trend to express possible damage to the environment as precisely as possible (ISO 2006).

Several methods can be used for the LCIA stage. The first complex method to be used was the EDIP 97 method, showing the basic principles of environmental impact assessment (Wenzel *et al.* 2000). A sophisticated method is CML-IA that can be used, in regard to its complexity, for most LCA studies (Guinée *et al.* 2002). The end-point methods, such as **Eco-indicator 99** (Goedkoop, Spriensma 2001), **Ecofactors** (Brand *et al.* 1998), **EPS 2000** (Ryding, Steen 1991), **EDIP 2003** (Hauschild, Potting 2004) or **IMPACT 2000+** (Jolliet *et al.* 2003) are used for a precise environmental damage calculation.

An essential principle of most of the above mentioned methods is the characterization of all the elementary flows summarizing and calculating all material and energy flows affecting the environment. Results calculated this way are then grouped into a smaller number of so called damage categories.

Using the LCA method based on the EMS principles should be constituted on the construction and assessment of process diagrams (Guinée *et al.* 2002). Recommendations to use such process charts are grounded on the clarity provided by such visually presented documents about the production process structure. Its users are enabled to understand the ways the production process works and optional methods of its improvement (Adler 1998). It is already in the product planning and forming stage (that is in the formulation of an innovation project), project managers should de-

termine all the process and operations inputs step by step and including the consumed material, chemical substances and especially energy resources (Bojnec, Papler 2011).

It is essential to stipulate the decisions making procedures and process outcomes, which involves both the products and services and waste flows in the form of emissions, water pollution, noise, smell, solid or hazardous waste or other expected impact.

4.2. Extending LCA for social aspects evaluation?

For a complex assessment as to whether a product or service sustainability, it is essential to implement methods for product and process social aspect assessment in a company. A most frequently used methodology, the Social Impact Assessment (SIA), facilitates the SIA techniques and application especially in national organizations, governments, developer organizations and "campaign organizations". Application of social aspects assessment up to the company performance (product) level and processes has not yet been sufficiently processed (Mačerinskienė, Vasiliauskaitė 2007). To assess sustainability performances of projects, a framework of appropriate criteria and associated indicators had to be defined (Alan, Carin 2007).

LCA method has been used in the last 20 years for the product environmental aspect assessment. But LCA seems to be viable for sustainable aspects assessment on the condition that the life cycle impacts determination stage is extended by social aspects determination and by expression of the corresponding social impact. An LCA study performed through the LCIA deals with environmental aspects and their impact; however, it is complicated to calculate social aspects (except of health protection).

In a thorough construction of a process diagram itself, it is possible to identify almost all the environmental aspects (and impact) and our research questions examined whether LCA should be extended to cover social aspects.

Application of process charts for the environmental and social aspects identification should be modified to involve the following aspects:

- 1) division of a production process into individual operations and sub-procedures for a more precise identification and information gathering,
- 2) production of process charts based on material and energy operations assessment,
- 3) identification of environmental and social aspects based on the process chart input and output information transfer,
- 4) determination of major environmental and social aspects and their optional impact by the com-

parison with the pre-determined criteria of importance,

- 5) regular monitoring and assessment of social and environmental aspects and their impact.

Successful extension of LCA with social issues should bring very positive effects because LCA should be easily implemented with International Standard and currently represents very known and popular concept.

Our research focus on question, whether LCA should be used for evaluating of social aspects or if there is any other suitable option of a complex methodology for sustainable product and process aspects and impact assessment.

5. Findings

Our investigation in companies, mainly of chemical industry in the Czech Republic however gave evidence that evaluation of environmental and especially social are not effectively realised in business practice.

Our research confirmed that LCA should be successfully used for evaluating of environmental aspect. Respondents mostly agree with LCA application when environmental aspects should be evaluated. **Life cycle expression via construction and assessment of process diagrams is very popular**, although currently not as much used among managers.

On the other hand implementation of extended LCA covering social aspects was mostly refused by respondents. There is the whole line of factors which complicate, eventually do not enable its implementation. The main reason against extending LCA for evaluation of social aspects was mentioned **lack of knowledge about all relevant social aspects related with corporate product, processes and innovation projects**. The second reason for rejection of extended LCA was **unclear conception how to links social aspects with particular product life cycle stages**. The third problem was related with problem of **social impact measurement and selection of corporate social indicators**.

With respondents was discussed another suitable option of a complex methodology for sustainable product and process aspects and impact - the method of individually made Scorecards ("Impact" Scorecard). A number of effective decision making methods that support decisions under conditions of multiple criteria have appeared in the last decade (Zavadskas 2011), but The Impact Scorecard offered formulation of a synoptic system of the selected Key Performance Indicators (KPI) for environmental and social area (Grybaitė, Tvaronavičienė 2008). The indicators are usually

divided into global (common) and thematic (local) type and their number should be fairly limited. Indicators should be expressed either in quantitative or qualitative terms (Šijanec *et al.* 2009). As a data source annual statements are frequently used, because they are considered to be one of the most important means of the company to communicate with various stakeholders (Bartkus, Grunda 2011). Too many indicators will make it impossible to use them for all the products and processes due to time and technical demands in their recognition. Low number of indicators will disable the main function of the tool, which is:

- 1) Determination and repeated measuring of environmental and social company performance
- 2) Identification of optional benefits for the society, employees, environment or other companies by the management.

The research shows that 30-40 should be an optimum number of indicators. This number can provide for a sufficient overview of the environmental and social aspects and impact at their simultaneous monitoring by means of the current information systems level. The target is a scorecard presenting a balanced portfolio of the objectives for optimization of the economic, environmental and social performance with the option of risk identification and options of added value growth (Sakalauskas 2010). In corporate decision making to promote sustainability, uncertainty and risk factors can be important elements because they can influence which alternative is perceived as the most desirable depending on a wide range of parameters (Jeon 2010).

To determined social aspects, it is essential that in the identification of negative and potential positive social impact, the company communicates with its stakeholders. It is then required to label the aspects, connect them with company objectives and provide for the employees ability and resources for monitoring of these aspects. Indirectly a successful reputation for sustainable management of corporate products, processes and innovations will attract the creative and enthusiastic people to the organization who will then represent the foundations for future innovation and development. In this respect, the development of an innovative culture will be self-perpetuating once initiated (Steele, Murray 2004).

The first systemic measures to identify human rights and poverty aspects have been observed recently in Coca-Cola, SABMiller and Oxfam America (SABMiller 2010). First studies have been published in the field of business ethics and social-oriented programmes in Co-operative Bank (Co-operative Bank 2010) and Barclays (Reeves 2002).

We can assume that especially the human rights concept in terms of a company social impact will soon become equally important as the environmental impact concept.

6. Conclusions

Products, processes and projects must be assessed to discover whether they complete the expected objectives, contribute to the expected environmental performance and whether social expectations and requirements have been met. Company's product, processes and projects evaluation process is modern tool of corporate sustainable management. It is necessary abandon common and incorrect idea that only the financial and technical evaluation of innovation project efficiency is a sufficient method for the manager's decisions referring to selecting and continuing a project. Best practice of efficient evaluation process is based on two requirements – effective identification of environmental and social aspects and selection of appropriate indicators for measurement.

Our research in chosen companies of chemical industry in the Czech Republic revealed lack of knowledge about all relevant environmental and social aspects related with corporate product, processes and innovation projects. Determination of sustainable aspects of products, processes and innovation projects is a first necessary step for improvement of decision making processes in order to be sure that upcoming actions and decisions leads to corporate sustainability, corporate social responsibility and sustainable development. Therefore one can recommend building and improving evaluation systems via LCA activities. Research confirmed that LCA should be successfully used for evaluating of environmental aspect and expression of product life cycle via construction and assessment of process diagrams is very popular, although currently not as much used.

On the other hand implementation of extended LCA covering social aspects was mostly refused by respondents and more suitable option of a complex methodology for sustainable product and process aspects and impact so far has been the method of individually made Scorecards – Impact Scorecard.

Possibilities of efficient connection of LCA method as a viable tool for environmental impacts assessment and “Impact” Scorecard as a suitable tool for social impact assessment are new challenges for our future research activities.

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