

Natasa Petrovic¹, Dragoslav Slovic², Marko Cirovic³
AN APPROACH TO MEASURING ENVIRONMENTAL
PERFORMANCE OF ORGANIZATIONS

Introduction of the integration of environmental thinking into every aspect of social, political, and economic activity has become central to the environmental debate. Therefore, societies and organizations need to make a drastic shift to a sustainable socioeconomic system with fewer environmental impacts. There is an increasing recognition that good environmental performance makes consequential good organization sense. Organizations that measure, manage and communicate their environmental performance are inherently well placed. They understand how to improve their processes, reduce their costs, comply with regulatory requirements and stakeholder expectations and take advantage of new green market opportunities. This paper considers an approach in which organizations are now developing new "win-win" strategies in this area to simultaneously benefit organization, its customers, and the environment.

Keywords: sustainable development, environmental performance, environmental performance indicators, measuring environmental performance indicators.

Наташа Петровіч, Драгослав Словіч, Марко Чіровіч
НОВИЙ ПІДХІД ДО ОЦІНЮВАННЯ ЕКОЛОГІЧНОЇ
ЕФЕКТИВНОСТІ ПІДПРИЄМСТВА

У статті показано, що сьогодні екологічне мислення інтегроване в кожен аспект соціальної, політичної та економічної діяльності. Тому підприємствам і організаціям необхідно перейти до стійкої соціально-економічної діяльності з меншими екологічними наслідками. Вже майже повсюдно визнано, що високі екологічні показники діяльності позитивно впливають на організаційні аспекти. Компанії, які управляють своєю екологічною діяльністю і роблять її прозорою, виходять у лідери. Їхнє керівництво розуміє, як покращити процеси діяльності, скоротити витрати, дотримуватися нормативних вимог і відповідати очікуванням акціонерів, і користуються новими можливостями екоринку. Розглянуто підхід, за якого організації в даний час розробляють нові безпрограшні стратегії в цій області, вигідні одночасно для організації, її клієнтів і навколишнього середовища.

Ключові слова: сталий розвиток, екологічна ефективність, показники екологічної ефективності, вимірювання показників екологічної ефективності.

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Наташа Петрович, Драгослав Слович, Марко Чирович
НОВЫЙ ПОДХОД К ОЦЕНКЕ ЭКОЛОГИЧЕСКОЙ
ЭФФЕКТИВНОСТИ ПРЕДПРИЯТИЯ

В статье показано, что сегодня экологическое мышление интегрировано в каждый аспект социальной, политической и экономической деятельности. Поэтому предприятиям и организациям необходимо перейти к устойчивой социально-экономической системе деятельности с меньшими экологическими последствиями. Уже почти повсеместно признано, что хорошие экологические показатели деятельности положительно влияют на организационные аспекты. Компании, которые управляют своей экологической деятельностью и делают ее прозрачной, выходят в лидеры. Их правление понимает, как улучшить процессы деятельности, сократить затраты,

¹ Correspondence author, PhD, Associate Professor, University of Belgrade, Serbia.

² PhD, Assistant Professor, University of Belgrade, Serbia

³ Teaching Associate, University of Belgrade, Serbia.

соблюсти нормативные требований и соответствовать ожиданиям акционеров, и пользуются новыми возможностями экорынка. Рассмотрен подход, при котором организации в настоящее время разрабатывают новые беспроигрышные стратегии в этой области, выгодные одновременно для организации, ее клиентов и окружающей среды.

Ключевые слова: устойчивое развитие, экологическая эффективность, показатели экологической эффективности, измерение показателей экологической эффективности.

When you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot express it in numbers, your knowledge is of a meagre and unsatisfactory kind. It may be the beginning of knowledge, but you have scarcely, in your thoughts, advanced to the stage of science.

Lord Kelvin

1. Introduction.

As a result of population growth and economic development, humans have exerted a considerable impact on the Earth and have become seriously incompatible with natural resources, environment and economy. At the same time, as outcomes, environmental problems appear as one of the greatest problems of the 21st century. The rapid technological advancements and industrialization have resulted in an increased level of negligence and insensitive behavior, leading to the destruction of environmental balance (Cetin & Nisanci, 2010). Human civilization has never been closer to ecological collapse: 1/3 of humanity lives in poverty, and another 2 bln people are projected to join the human race over the next 40 years (Worldwatch Institute, 2012). The implication of this ecological situation is obvious: to be sustainable, human beings must live within nature's carrying capacity; and they must measure where they are now and how far they can go (United Nations, 1972).

In 1992, governments at the Rio Earth Summit made a historic commitment to sustainable development – an economic system that promotes the health of both people and ecosystems. Otherwise, "sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987). Sustainable development is a global development management philosophy aimed to conserve the integrity of the Earth's ecosystems while supporting economic growth and social welfare, and therefore, is linked to ongoing economic growth and development (Petrovic et al., 2011).

In addition, it is important to notice that since sustainability is a multidimensional concept, economic, social and environmental aspects must be considered and integrated, too (e.g. WCED, 1987; Piatek, 2007; Sanchez, 2008; Pawlowski, 2009; Pawlowski, 2010; Tuziak, 2010; Radojicic et al., 2012).

2. Sustainable consumption and production.

One of priorities for immediate actions in strategies of sustainable development every company is sustainable consumption and production. This strategy sets out how this is being taken forward, through measures to promote:

- better products and services, which reduce the environmental impacts from the use of energy, resources, or hazardous substances;
- cleaner, more efficient production processes, which strengthen competitiveness; and shifts in consumption towards goods and services with lower impacts (Petrovic et al., 2012).

The concept of sustainable production emerged at the United Nations Conference on Environment and Development in 1992 and is closely related to the concept of sustainable development. The conference concluded that the major cause for the continued deterioration of the global environment is the unsustainable pattern of consumption and production, especially in industrialized countries (United Nations, 1992).

Sustainable production represents the creation of goods and services using processes and systems that are non-polluting; conserving of energy and natural resources; economically viable; safe and healthful for employees, communities and consumers; and socially and creatively rewarding for all working people (Lowell Center for Sustainable Production, 1998).

All economic activity, and hence the related environmental impacts, are driven by consumption. In the last years, many studies were done to analyze what final consumption activities cause most impacts (Tukker et al., 2008). Sustainable consumption issue was raised for the first time as one of the key issues of sustainability at UN Conference on Environment and Development in Rio in 1992. Sustainable consumption emphasizes that quality of consumption must increase, both of today's generation and future ones. This concept demands optimization of consumption subject, in order to sustain in time utilization and quality of resources, hence environment as well (Becker, 2008).

Fundamentally, the goal of reducing environmental pressure by consumption can be reached via 3 routes: greening production and products, shifting demand to low-impact consumption categories, and lowering material demands.

3. Environmental impacts.

Although, several papers already discussed companies' environmental impacts, the precise meanings of this construct often remains unclear and badly defined (GLRI, 2005). Possible reason for this ambiguity is that perceptions of environmental impact "differ depending on one's view of the environment and the components of the environment that one values" (Riha et al., 1996).

Environmental impact is defined as the degree to which an organization's business processes, activities and operations positively or negatively affect the natural environment. The environmental impact is the consequence of organization's actions in relation to the quality and cleanliness of air, water and soil and, more generally, to the short-term and long-term health of the Earth's global ecosystem. A major initiative of sustainable businesses is to eliminate or decrease the impact made on the environment by harmful chemicals, materials, and waste generated by processes to manufacture products and services (Becker, 2008). Further, organizations around the developed world are facing pressure from governments, international agreements, society and various stakeholders, to improve their behavior towards the natural environment. This pressure, which originally started in the early 1970s, increased especially after the Rio Earth Summit in 1992 (Etzion, 2007).

4. Environmental performance of organizations.

Responsible businesses are at the heart of society. Companies that understand their links with the communities they operate in, and their impact on the environment, are most likely to prosper in the long term. At the same time, interest from stakeholders in firms' environmental performance is all-time high. There is an

increasing recognition that good environmental performance makes good business sense. Environmental risks and uncertainties impact to some extent all companies, and affect investment decisions, consumer behaviour and government policy. Further on, management of energy, natural resources or waste will affect current performance; failure to plan for a future in which environmental factors are likely to be increasingly significant may risk the long-term future of a business.

There are numerous reasons for monitoring how business affects the natural environment. 5 key reasons for tracking and improving business' environmental impacts are:

1) *Reduce costs.* Businesses that have invested in environmental improvements deliver cost savings through efficiency and innovation in products and processes. Further, they may have access to cheaper capital since markets perceive them as less risky. Researches show that firms managing their environmental risks reduce their weighted average cost of capital.

2) *Respond to investor demands.* Investors closely monitoring firm environmental performance, are aware that the firms that understand and manage their environmental impacts are best positioned to benefit from strategic opportunities. This information helps investors make better decisions and recognize companies with stronger environmental performance.

3) *Facilitate regulatory approvals and mitigate operational risk.* Negative environmental impacts can lead to delayed project financing and regulatory approvals at significant cost to the organization. As new environmental issues come to the fore, regulators are exploring options for controlling impacts on air and water. When new regulations are introduced, lagging firms face substantial costs to catch up, and may be handed fines and penalties.

4) *Hire the best employees.* Social responsibility and environmental commitment are important criteria in selecting employers. Also, firms need to provide credible data on their environmental impacts.

5) *Meet customer demand for "green".* Consumers will pay more for responsibly produced goods under some circumstances.

It could be concluded that there is an increasing demand for company reporting that is sharper and more focused on the key impacts on the business and on the environment. It takes needed reporting of environmental performance, which will benefit in two ways (Becker, 2008):

1) It will provide management information to help exploit the cost savings that good environmental performance usually brings.

2) It gives the chance to set out what is significant in firm's environmental performance.

5. Measuring environmental performance of organizations.

Further, companies that measure, manage and communicate their environmental performance are inherently well placed. They understand how to improve their processes, reduce their costs, comply with regulatory requirements and stakeholder expectations and take advantage of new market opportunities (Defra, 2012). International standards on environmental management such as the standard on Environmental Management Systems (ISO 14001) and the Guideline on Environmental Performance Evaluation (ISO 14031) have defined environmental

performance as the result of an organisation's management of its environmental aspects.

Further, there are two commonly used guidelines for measuring environmental performance of organizations:

1) ISO14031 Environmental Performance Evaluation – Guidelines: Specifies the purposes of environmental performance evaluation, preparation of an evaluation plan, data collection, review of results:

- Environmental Performance Indicators – EPIs (focus on environmental aspects like energy and water consumption etc.);

- Environmental Condition Indicators – ECIs (focus on environmental impacts and include indicators like water and air quality parameters).

2) The Global Reporting Initiative's G3 Guidelines provide an extensive list of specific measures, grouped by category:

- materials (material used by weight or volume);
- energy (direct energy consumption by primary energy sources);
- water (total water withdrawal by source);
- biodiversity (habitats protected or restored);
- emissions, effluents and waste (total direct and indirect GHG emissions by weight);

- products and services (percentage of products sold and their packaging materials that are reclaimed by category);

- compliance (monetary value of significant fines and total number of non-monetary sanctions for non-compliance with environmental laws and regulations);

- transport (significant environmental impacts of transporting products and other goods and materials used for organization's operations, and transporting workforce).

6. Environmental Performance Indicators.

Selecting meaningful and effective tools for measuring environmental performance is becoming increasingly important due to the increasing costs of environmental operations; market, regulatory and public pressures; voluntary initiatives, such as the International Chamber of Commerce Business Principles for Sustainable Development; and international standards, such as the International Organization for Standardization (ISO) 14001.

Many metrics are already in use. These include lagging indicators, which measure outputs such as pounds of pollutants emitted or discharged; leading indicators, which are in-process measures of performance; and environmental condition indicators, which measure the direct effect of an activity on the environment. Each type of indicator has its own strengths and weaknesses, and different audiences; most organizations use a mixture of them. Metrics can measure the business value of environmental programs or progress as well as the environmental performance of business operations. This can be particularly effective in demonstrating the value of environmental efforts to management. It can also provide data with which business units can design more efficient processes, decreasing material usage and environmental impacts while at the same time increasing yield and profitability.

Environmental indicators can be used at several levels as tools for: state-of-the-environment reporting, assessing environmental performance of national policies or

international programmes, reporting on progress towards sustainable development. The more general requirements or desirable properties of environmental indicators are:

- the values of the indicators must be measurable (or at least observable);
- data must be either already available or obtainable (through special measuring or monitoring activities);
- the methodology for data gathering, data processing, and construction of indicators must be clear, transparent and standardized;
- means for building and monitoring indicators should be available;
- the indicators or sets of indicators should be cost effective, an issue often overlooked;
- political acceptability at the appropriate level (local, national, and international) must be fostered (indicators that are not acceptable by decision-makers are unlikely to influence decisions);
- participation of, and support by, the public in the use of indicators is highly desirable, as one element of the general requirement of participation of the broader society in the quest for sustainable development (Gallopín, 1997).

There are many definitions for environmental indicators:

- a numerical value derived from actual measurements of a pressure, state or ambient condition, exposure or human health or ecological condition over a specified geographic domain, whose trends over time represent or draw attention to underlying trends in the condition of the environment (EPA, 2003);
- a way to improve the delivery of information for decision-making (UNEP/FIDIC/ICC, 2001);
- an essential tools for tracking environmental progress, supporting policy evaluation and informing the public (OECD, 2004);
- a specific expression that provides information about an organisation's environmental performance (ISO 14001, 2004; ISO 14031, 1999).

Environmental Performance Indicators (EPI) seek to promote action through transparent and easily visualized metrics that allow political leaders to see strengths and weaknesses of their nation's performance compared to other countries. The analysis centers on two overarching environmental objectives:

- 1) reducing environmental stresses on human health;
- 2) promoting ecosystem vitality and sound natural resource management.

Usually, 3 categories of environmental indicators are defined for evaluating and reporting the environmental performance of an organisation (ISO 14031, 1999; European Commission, 2003):

– Operational Performance Indicators – OPIs (they concentrate on the aspects associated with an organisation's operations including activities, products or services and can cover such topics as emissions, product and raw material recycling, fuel consumption of vehicles, or energy usage):

- * Input indicators:
 - Materials,
 - Energy,
 - Services supporting the organisation's operation,
 - Products supporting the organisation's operation.

- * Physical facilities and equipment indicators:
 - Design,
 - Installation,
 - Operation,
 - Maintenance,
 - Land use,
 - Transport.
- * Output indicators:
 - Products provided by the organisation,
 - Services provided by the organisation,
 - Wastes,
 - Emissions.
- Management Performance Indicators – MPIs (they concentrate on the efforts of management to provide the infrastructure for environmental management to succeed and can, among others, cover environmental programmes, objectives and targets, training, incentive schemes, audit frequency, site inspections, administration and community relations):
 - * System indicators:
 - Implementation of policies, and programs,
 - Conformance,
 - Financial performance,
 - Employee involvement.
 - * Functional area indicators:
 - Administration and planning,
 - Purchasing and investments,
 - Health and safety,
 - Community relations.
- Environmental Condition Indicators – ECIs (they give information on the quality of the environment surrounding the organization or the local, regional or global state of the environment: water quality nearby, regional air quality, concentrations of greenhouse gases or the concentration of certain pollutants in soil):
 - * Environmental media indicators:
 - Air,
 - Water,
 - Land.
 - * Bio and anthroposphere indicators:
 - Flora,
 - Fauna,
 - Humans,
 - Aesthetics, heritage and culture.

In general the information given by EPIs can help an organization to understand the actual or potential environmental impact of its environmental aspects better, and thus play an important role in the planning and implementation of an Environmental Management System – EMS as a part of an organization's management system which aims to manage the environmental aspects related to its activities, products and services. We have to emphasize that it is generally difficult to choose the suitable per-

formance indicators, as well as to define their suitable number. Also, when different specific needs for information are to be fulfilled, then different indicators should be chosen, or built, as well as the fact that organizations should make a list of indicators following the general guidelines of the ISO 14031 standard and linking them to the corresponding environmental aspects (Perotto et al., 2008).

Conclusion.

The importance of environmental impact of organization performance is increasing and will continue to do so. The reason for that lies in the fact that since the United Nations Conference on Environment and Development in 1992, sustainability has become a widely shared goal which imposes governments, businesses, organizations, policies and individuals to act in a sustainable manner. Hence, for example, poor management of energy, natural resources or waste can affect current performance of an organization; failure to plan for a future in which environmental factors are likely to be significant may risk the long-term value and future of its business.

Also, governments expect that businesses will need to use environmental performance indicators to adequately capture the link between environmental and financial performance (UNCED, 1992). It can be concluded that environmental performance indicators (EPIs) may help to identify the most significant environmental impacts of organizations, clarify and communicate organizations' environmental goals and progress to employees and stakeholders, as well as provide businesses with a good tool for measuring their sustainable achievements.

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