

APPLICATION OF BENCHMARKING IN ENVIRONMENTAL MANAGEMENT

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***Abstract:** The contribution is focused on one of the methods of improving business performance – environmental benchmarking, which is an effective management tool used within the frame of environmental sphere. The paper defines all benchmarking types and specifies their use in environmental management.*

***Keywords:** environmental benchmarking; environmental management; types of benchmarking*

1. Introduction

Environmental management is widely and rapidly evolving discipline. Enterprises are key contributors to economic, environmental and social well-being, as most of their activities involve the consumption of primary resources and raw materials, while generating waste. Enterprises are an important factor in the process of realizing a sustainable, environment-friendly development. On the one hand enterprises cause problems through their shortsighted profit orientation, and through their fierce exploitation of nature. On the other hand big companies may solve these problems by developing social, economic and ecological innovations.

In the previous decades, regulatory measures have been mainly used to dictate a certain approach for enterprises and other organizations towards the environment. Nowadays a major change has emerged as enterprises come to realize that more cognizant and pro-active environmental behavior would result in economic and competitive benefits, ensuring in the same time their legislative compliance. At present, enterprises pay attention to their environmental and sustainability reports, and they do it for good reasons. Leading companies have learned over time that only by systematizing and integrating environmental protection into overall management practices can achieve affordable, consistent compliance with internal and external requirements. Another reason is that more and more stakeholders use the reports for important decision-making. Enterprises review them to decide potential partners, consumers to choose whose products and services they want to buy, and college graduates to evaluate prospective employees.

2. Environmental management

Environmental management is the management of interaction by modern human societies with and impact upon the environment. Environmental management is a systematic approach to environmental protection in all aspects of business, through which the company integrate care about environment into its business strategy and current operations. [6] Approach rests in the creation, implementation and maintenance of suitably structured Environmental Management System (EMS), which is part of the total management system, covering all aspects of environmental conduct of business.

Environmental management standard (system or protocol) attempts to reduce environmental impact as measured by some objective criteria. The most widely used standard for environmental risk management is the ISO 14001 standard, which is closely aligned to the Eco-Management and Audit Scheme (EMAS). Implementation of EMAS is voluntary, but leaders of some enterprises realize that if they want to succeed in today's highly competitive world it is good to adopt an environmental management system. The result of environmental management system adoption is on the one hand contribution to sustainable economic growth and prosperity of the company, on the other hand a gradual reduction of the negative impact of its activities, products or services on the environment. [6] General benefits from adopting and implementing environmental management systems are as follows. Firstly, improvement of environmental management is beneficial for the planet and a fundamental requirement of global sustainability. Secondly, improvement of environmental performance can be seen as a future requirement for sustainable commerce.

In connection with environmental management it is effective to use an environmental management tool - environmental benchmarking, which can be defined as a continuous process of measuring environmental performance, systems, processes and products within the company and comparing them with competitors or other successful enterprise. The aim of such comparing is to adopt the new practices and procedures and in particular to obtain information which leads to improve business and environmental performance. Within the frame of environmental management, benchmarking has for example become an essential approach for determining best available techniques (BAT) under the Integrated Pollution Prevention and Control (IPPC). Enterprises carry out benchmarking with the parameters of BAT. More about in [4].

3. Benchmarking

3.1. General aspects of benchmarking

Benchmarking presents continuous, systematic monitoring and evaluation of how well and effectively the enterprise carries out the service or produces the product, as compared with enterprise which represents the best. In case that the procedures are better elsewhere, the company is trying to apply them to themselves, so that its efficiency match to the competitors efficiency or even better is higher than the competitions efficiency. Benchmarking is the process of comparing the enterprise with its competitors besides that, benchmarking is also active in seeking the best ideas, methods and approaches that are applicable to the enterprise and could contribute to increase its efficiency.

Benchmarking is a process of measurement, which may significantly contribute to achieve competitive advantage. The American Productivity and Quality Center defines benchmarking as: "The process of identifying, understanding, and adapting outstanding practices and processes from organization anywhere in the world to help organization improve its performance." The simpler definition of benchmarking, which is widely accepted is: "The search for and implementation of best practices." [3] While a number of definitions for benchmarking can be found in the literature, they all essentially share the same theme.

3.2. History and expanding of benchmarking

Performance comparison of business is used since the emergence of industrial production, but the initiator, who carried out the first comprehensive benchmarking project is the enterprise The Xerox Corporation, which used benchmarking as a management tool for the first time in

1979. [3] Since that time benchmarking procedures are constantly improved. Benchmarking is influenced by the development of management systems, statistical methods and information technology.

Benchmarking in the Czech Republic, same as in many other countries, is used in both, the private and public sectors. The state supports the propagation of information in this area particularly through the publication of aggregate statistical data. The state also entered the study involving the benchmarking in areas such as policy making. In the Czech Republic there are two organizations which are involved in benchmarking. They are "Česká společnost pro jakost" (ČSJ) and "Czech Invest". ČSJ, which represents the Global Benchmarking Network, offers "Electronic data-file ČSJ" and the "Benchmarking database ČSJ" for public sector organizations. Electronic data-file ČSJ consists of 18 questionnaires focusing on different aspects of the functioning of the organization. One of these questionnaires is focused on environmental management. But as it is not compulsory, many enterprises do not fill in this questionnaire.

In the world benchmarking has become widely accepted and widely used business practice. In regular global surveys of 25 different "management tools", which have been carried out by the Bain & Company since 1993, benchmarking was in the year 2009 the most popular tool. The questionnaire that shows benchmarking as the most heavily used tool, was completed by 1,430 international executives from companies in a broad range of industries and focuses on 25 tools. [8]

4. Benchmarking in environmental management

Nowadays, benchmarking is also used in an environmental sphere. The main impulse for expansion of benchmarking in environmental management was the rise of compulsory and voluntary reporting and standards ISO 14 000. Enterprises began to use environmental benchmarking for identification of eco-efficient solutions and benchmarking has become an integral part of environmental management. [5]

Environmental benchmarking is an environmental management tool that can provide a substantial contribution to the improvement of environmental performance by facilitating the identification of the gap between company performance and a given performance. [7]

Environmental benchmarking can be defined as a continuous process of measuring environmental performance, systems, processes and products within the company and comparing them with competitors or other successful enterprise. The aim of such comparing is to adopt the new practices and procedures and in particular to obtain information which leads to improve business and environmental performance.

Principally, the idea and methodology of environmental benchmarking is not too different from general definition of benchmarking. It could be questioned how much appropriate is to use the term "environmental benchmarking" and if it should be used at all. Instead of environmental benchmarking we could also say "benchmarking of environmental performance", "benchmarking for continuous environmental improvement, benchmarking for cost improvement in waste management" or "benchmarking of environmental strategies", depending on the scope of the benchmarking process. [2]

As with general benchmarking, there are different notions about what environmental benchmarking actually means. Often, the term "environmental benchmarking" is perceived simply to listing and comparing or ranking environmental performance of different enterprises.

Often people think that they are doing benchmarking, even though they are doing just performance assessment. If environmental benchmarking is understood as an improvement tool, it should go further. It should involve analysis of the practices which lead to superior environmental performance. It could be said that benchmarking is the next step after environmental performance, which is taken to discover that those identified as having best practices are doing that you are not doing. [2]

Although, most benchmarking frameworks consider financial metrics and management issues, environmental benchmarking is also focused on environmentally related practices and indicators which will lead to superior environmental performance. [11] There might be some controversy about whether the aim of environmental benchmarking should be an improvement from the environmental point of view, or whether the driver for improvement is simply costs. A best practice in this sense should conserve the environment and at the same time be cost effective.

Environmental benchmarking is about finding out how "best-in-class" or "best of the best" enterprises (depends on type of benchmarking) achieve high performances in managing the environment or eco-efficiency, and then also about adapting these superior practices into own enterprise. Eco-efficiency in this case refers to better environmental quality and higher citizen satisfaction at lowest possible costs. Eco-efficiency of benchmarking depends on techniques which are used to eliminate the reasons that caused the lower performance. In case that are primarily used preventive techniques, benchmarking leads to eco-efficient solutions. It is attested that benchmarking can greatly assist in the use of eco-efficient solutions throughout the life cycle. [5]

4.1. Subject of environmental benchmarking

Environmental benchmarking can be used to improve environmental management system in general, but the scope of environmental benchmarking is across all areas of an enterprise activity. The subject of environmental benchmarking can be for example environmental performance measurement and data management systems, environmental accounting, development, resource assessment, energy management, waste prevention, emergency response systems, customer service, systems auditing practices, environmental policy development, or environmental education and training.

The main specific purposes of benchmarking in environmental management are:

- Ø To compare the environmental performance of the enterprise, its functions and processes with similar organizations, functions and processes.
- Ø To identify the elements that caused the difference between the areas being compared, and if possible rectify the objective to abolish the causes that caused the lower performance.

4.2. Affinity of environmental benchmarking to other instruments used in environmental management

Benchmarking is closely linked to other voluntary instruments, which are used in environmental management. They are for example:

- Ø EMS (environmental management system): is appropriate when benchmarking is an integral part of EMS, as benchmarking can provide a basis for setting targets for continuous improvement.
- Ø LCA (life cycle analysis): concept of life cycle should be an important input for benchmarking.

Ø Reporting: benchmarking is used to determine the indicators (in terms of planning and reporting). [5]

4.3. Possible problems and benefits of environmental benchmarking

Benchmarking has primarily strengths, but there are also weaknesses. Table 1 shows SWOT analysis of environmental benchmarking, which shows strengths, weaknesses, opportunities and also threats of this management tool.

Tab. 1: SWOT analysis of environmental benchmarking

Strengths	Weaknesses
<ul style="list-style-type: none"> Ø wide range of use; Ø not difficult to use; Ø helps to increase business competitiveness; Ø has already yielded many good results; Ø leads to streamlining of environmental management; Ø used to establish indicators for reporting and targets for improvement; Ø create motivation for change; Ø used to analyze the potential for waste prevention and pollution. 	<ul style="list-style-type: none"> Ø difficult to find appropriate data; Ø lack of information about material, energy and financial flows; Ø reactive tool, stimulate the reaction to the best practice that already exists.
Opportunities	Threats
<ul style="list-style-type: none"> Ø may facilitate the necessary organizational change at all levels of management; Ø may initiate the process of improvement by setting more ambitious goals; Ø may leads to higher customer satisfaction, cost savings and more effective work of managers and employees; Ø may improve decision-making (based on better information); Ø may lead the company to eliminate unnecessary business activities and focus on priorities; Ø enterprise may find strategic market opportunities; Ø enterprise may identify operations that should be improved; 	<ul style="list-style-type: none"> Ø may lead to uncritically accepting foreign experience, which does not have to represent the best solution; Ø due to taking foreign experience, it may constitute a barrier to innovation; Ø there may be used unsuitable indicators; Ø there may be used inadequate data.

Source: own.

Environmental benchmarking has many **benefits** for enterprises. Due to comparison with competitors, enterprise may find strategic market opportunities, which allow them to increase quality of its products. That leads to fulfill better customer needs and wishes. The enterprise can identify the operations that should be improved, from an environmental perspective. And also the enterprise can detect its strengths and weaknesses. Defining the strengths and weaknesses can be a springboard to set up a new business strategy for many enterprises. It initiates the process of improvement by setting more ambitious goals. Environmental benchmarking provides the way to improve operations and processes in environmental friendly

way, higher customer satisfaction, cost savings and more effective work of managers and employees. It improves decision-making (based on better information). In general, benchmarking results, in its correct interpretation, lead the company to eliminate unnecessary business activities and focus on priorities. Environmental benchmarking same as other types of benchmarking helps to increase business competitiveness.

The first **problem** of environmental benchmarking is that it is often problematic to identify and quantify environment-related costs and benefits. It might be also difficult to justify the effort of a benchmarking study because the environmental costs and expected benefits are difficult to prove. Ecosystems are very complex, and it is not always possible to allocate certain effects to certain specific measures from the ecological as well as the financial point of view. Other problems are for example that enterprises could uncritically accept foreign practice, which does not have to be the best for enterprise. Therefore it is necessary to consider the impact of changes, which would be based on environmental benchmarking.

4.4. Different types of environmental benchmarking

Environmental benchmarking activities can have very different objectives and scopes, and there is no single way to approach benchmarking. The term benchmarking is used to describe a number of different activities. Different types of environmental benchmarking processes can be distinguished and benchmarking methodology varies depending on what is compared.

There has been many different classification of environmental benchmarking. For example Bartolomeo identifies five broad types of environmental benchmarking: internal, best-in-class, competitive, sector and eco-rating. Other classification by Youth and Welford define four categories of environmental benchmarking. First type is regulatory benchmarking made by government agencies to assess conformance to legislation and regulation. As a second type they define public benchmarking in which enterprises are benchmarked against other enterprises and the information is made public. Third type is market sector benchmarking, where enterprise compare themselves against industry averages. The last type is business service benchmarking in which enterprise can be confidentially benchmarked against other enterprises. [10]

Al-Marshari and also others benchmarking specialists, writes about three general benchmarking types. These types of benchmarking can be applied in the environmental sphere, same as in other spheres. The simplest benchmarking type is **metric benchmarking** (also called performance benchmarking or index benchmarking), which concerns comparisons of performance data. It focuses on relative performance using the selected set of benchmarks. It addresses the question what performance or how many units of measure the enterprise achieves. It helps enterprises to pinpoint aspects of environmental performance that need to improve. Evaluated are mainly quality parameters (including technical parameters) and productivity (production cost, price). Within the framework of environmental benchmarking it focuses on indicators which are used for environmental management. This type of benchmarking is often carried out as a consortium (a study carried out more than one organization), with the participation of third parties - consultants. This is the most used type of benchmarking in the environmental policy. It mainly focuses on finding the elements that led the company to lower the negative environmental impact. [1]

The second type is **process benchmarking**. This type of benchmarking has great potential, but is difficult and expensive. It is used when the objective is to improve certain methods and practices of major importance within the organization. It goes beyond the pure analysis of performance data. It tries to identify the design and characteristics of a process that is the best

practice. Benchmarking partners are sought among enterprises with the best practical processes, which carry out such work or provide similar services.

Both mentioned benchmarking types are closely linked and are widely used in environmental management. While metric benchmarking answer the question WHAT or HOW MANY, process benchmarking seek the answer to HOW the organization achieves excellent performance. Metric benchmarking measures and compares the consequences, while process benchmarking looks for the causes. Comparing the results is important to identify activities that need to improve, conversely comparing activities and processes shows activity that leads to better results.

There is another type of benchmarking - **diagnostic benchmarking** (strategic benchmarking), which strive to explore both environmental practices and environmental performance and establish not only the company's results areas which are relatively weak, but also practices which exhibit room for improvement. Diagnostic benchmarking compares strategic choices and dispositions which are made by other enterprises to obtain information for improving their own strategy. [9]

The most widely accepted fundamental types of process benchmarking were discussed by many scholars and are as follows: **Internal benchmarking** is the comparison within one's own company. **Competitive benchmarking** is the direct comparison of own performance or results against the best real competitors. This type of benchmarking may be limited by difficulty of obtaining useful and accurate information about competitors. **Functional benchmarking** compares specific enterprise functions to the same functions in another enterprise, which is known to be operating a best practice in this function. Most of these comparisons are done outside the sector, but the comparison has to take into account cultural, geographical and other factors to be valid. **Generic benchmarking** compares enterprises own processes against the best processes of other enterprises, regardless of in which industry or what service the benchmark operate. It compares enterprises process with a process which was designed for a different use, but which can be adapted to enterprises process. [1]

In fact aforesaid types of benchmarking do not have to be valid only for process benchmarking. While metric, process and diagnostic benchmarking answers the question what we benchmark, internal, competitive, functional and generic benchmarking answer the question against whom we benchmark. So there can for example be a metric benchmarking which is made between competitors (competitive benchmarking). Some combinations of benchmarking types are more suitable for environmental sphere than others. Table 2 lists the combinations of different types of benchmarking with an aspect to environmental management.

Tab. 2: Different types of benchmarking with an aspect to environmental management

Types of benchmarking	Performance benchmarking	Process benchmarking	Diagnostic benchmarking
INTERNAL BENCHMARKING	It is the simplest type of benchmarking. It helps enterprises to pinpoint aspects of environmental performance, but in limited degree. Does not show what environmental friendly performance is really possible to achieve. <i>It has medium relevance of use in environmental management.</i>	It is a good type of benchmarking to start with, but not bursting can be expected. It is not very useful benchmarking type for environmental sphere. <i>It has medium relevance of use in environmental management.</i>	It is not possible to find different strategies in own enterprise. This type is not used at all in terms of environmental management. <i>It has very low relevance of use in environmental management.</i>
COMPETITIVE BENCHMARKING	It is a comparison of company's performance with performance of the best real competitors. It is the most often used benchmarking type within environmental sphere. It is widely used, because is not difficult and is not expensive and gives good comparability of environmental performance and also helps enterprises to pinpoint aspects of environmental performance. <i>It has high relevance of use in environmental management.</i>	It says how ho improve environmental performance. It has a great potential. It is very useful benchmarking type, but may be limited by difficulty of obtaining useful and exact data about competitors, as there are legal and ethical limitations. <i>It has high relevance of use in environmental management. (But the relevance is smaller than relevance of performance or diagnostic benchmarking).</i>	Competitors give the best ideas how the strategies could be improved. Competitors are best partners for diagnostic benchmarking. This benchmarking type has a great potential in environmental management. <i>It has high relevance of use in environmental management.</i>
FUNCTIONAL BENCHMARKING	One of the most often used benchmarking types in environmental sphere. Useful for certain aspects, but comparability is not always given. <i>It has high relevance of use in environmental management.</i>	It has a great potential, but it is difficult and expensive. This benchmarking type is a good way for finding new ideas. <i>It has high relevance of use in environmental management.</i>	This type of benchmarking may bring the opportunity to find ideas for strategy improvement, but it does not happen often as there are different business ideas among enterprises. <i>It has low relevance of use in environmental management.</i>
GENERIC BENCHMARKING	It has low comparability of performance due to differences in processes and products. <i>It has low relevance of use in environmental management.</i>	It is the best way for finding new ideas and achieving foremost improvement in environmental sphere. <i>It has high relevance of use in environmental management.</i>	Not very useful because tool because of differences in business ideas. <i>It has low relevance of use in environmental management.</i>

Source: own.

From table 2 we can see that some combinations of benchmarking are more suitable for use in environmental management than others. Very suitable combinations of benchmarking are: competitive performance benchmarking, competitive strategic benchmarking, functional

performance benchmarking, functional process benchmarking and generic process benchmarking.

5. Conclusion

Environmental benchmarking is an effective tool, which is used in environmental management. It can be assumed that environmental benchmarking will continue to develop by further increasing claims in environmental and social profile of enterprises and also by further development of monitoring and information technology. It can also be assumed that environmental activities of all enterprises will be very important in the future, especially corporate activities will be crucial. It is obvious that benchmarking can help enterprises in improving environmental performance. Contribution shows that there is no "one" approach to environmental benchmarking. It is clear that certain types of benchmarking are better than others to be used in environmental management. Every combination of benchmarking types has different relevance of use and has its own strengths and weaknesses. The most frequently used type of benchmarking is performance benchmarking, which has high relevance of use in environmental management when it is used as competitive or functional benchmarking. Process benchmarking has high relevance of use in environmental management when is used as functional, generic, eventually as competitive benchmarking. Diagnostic benchmarking has high relevance of use in environmental management when is used as competitive benchmarking. On the other side, there are combinations of benchmarking types, which are not relevant to use in environmental management.

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