Optimization of proceedings for the environmental management system certification of an economic agent

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OPTIMIZATION OF PROCEEDINGS FOR THE ENVIRONMENTAL MANAGEMENT SYSTEM CERTIFICATION OF AN ECONOMIC AGENT

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Abstract: *At present, it is known that an effective control of pollution at organization level can't be realized just on technological solutions, but it must be made according to an Environmental Management System incorporated to General Management.*
In many countries, Environmental Management System Implementation has succeeded in making its point, not only by acquired financial benefits such as identification of helpful areas, efficient increase of production, and so on, but also by increase of credibility in getting of bank credits, in bringing of the new investors and promoters.

Key words: *environmental management systems, proceedings, significant environmental aspects.*

1. Introduction

Due to the obvious and proved negative impact of industrial, agricultural, transportation and energy organizations on the environment and under the pressure of environmentalists, civil society, experts and political context, the Environmental Management System was developed. This concept includes the principles, the main courses to take and the indicators needed to assure that the organizations will reach an environmental performance as close as possible to the Best Environmental Practices.

ISO 14001 Standard refers to this concept in the introduction, stating that "all types of organizations are more and more concerned about reaching and exhibiting their performance regarding the environment, by controlling the impact of their own activities, products or services on the environment and taking into consideration their environment policy and objectives. This aspects respect the legislation of economic growth and other measures used to encourage the environmental protection, to increase the awareness of interested parties, including sustainable development"[1].

All organizations are more and more preoccupied to reach and prove an environmental performance by controlling the impact of its activities, products and services on the environment. These aspects are bound by increasingly strict laws, environmental economic policies including the sustainable development.

The general policy of a company consists of economical, technical, social, scientific research, financing, environmental objectives. "The objectives use human, material, informative resources from the company in order to achieve the purpose of the managerial team, to obtain competitive and efficient economic results" [2], in the context of environment-economy requirements.

At the industrial level, integrating the environmental protection objectives along with the economical, social and technological ones is done by changing the entire organizational system, implementing a new point of view that is developed within the environmental management system.

„The eco-economical decision should become the working model for any manager, as well as for administrative and executive boards. Their decisions have the content of a decision with multiple effects" [3].

The SAIEM model is the result of the doctoral thesis Systematic Approach to Integrated Environmental Management presented at the Polytechnic University of Bucharest in 2007. This model has been applied at a water-wastewater company as a case study.

Next, we will present the concept and the steps to applying of the model in order to establish the significant environmental aspects using a multi-criteria analysis.

2. Systemic approach to integrated environmental management

Even if there is not only one certain sustainable future – only one universal sustainable development model – and because indicators do not cover all the quantitative and qualitative targets, the real evolution of the human system in relation with the environment is showed clearer by using dynamic simulation methods.

By doing this we can evaluate more accurately the future values of selected variables - both socio-economical and environmental – we can foresee how reasonable a sustainable development model can be, while being defined by these variables.

„Environmental management, taken as coherent assemble of subsystems that interfere and combine, proves its utility in environmental management systems by the way its results answer to the economical-social command, quantitative and qualitative speaking" [4].

The development of the environmental management system is done by applying the specifications of the international standard ISO 14001. Another possibility is to integrate it with other management systems, figure 1, which can be used by the organization, such as: Quality Management (EN ISO 9001-2008) and the Occupational Health & Safety Advisory Services standard (OHSAS 18001-2007) etc.

A parallel analysis of all three management systems allows the observation that there are multiple similarities between the approach method, general procedures, documentations, evaluation systems, etc.

The Environmental Management system develops in stages for all the undergoing activities, in a unity structure and conception, with the main field of activities of the enterprise as the base.

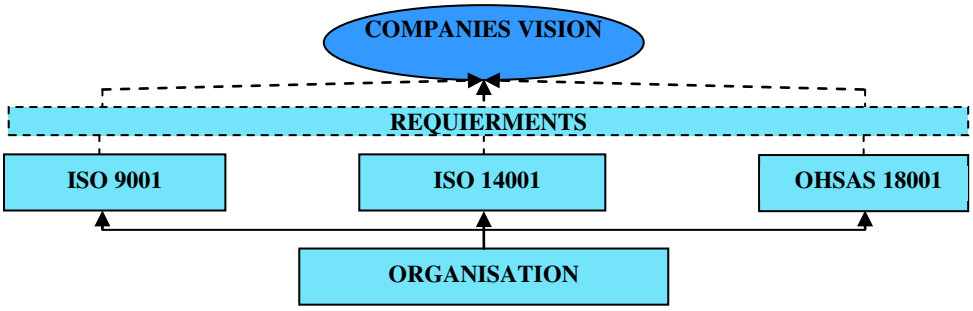

Fig.1 – *Integration of management systems*

Synthetically, all these stages and ways of approaching of the issues are applied at the level of a water-wastewater operator and are presented in figure 2, it can be observed the successive transition:

- the analysis of the determining factors for the systemic approach of the environment integrated management (SAIEM);
- the objectives followed in this type of analysis;
- the description and elaboration of the model as an exemplification of the approach as process and integrated system;
- the application of the SAIEM concept.

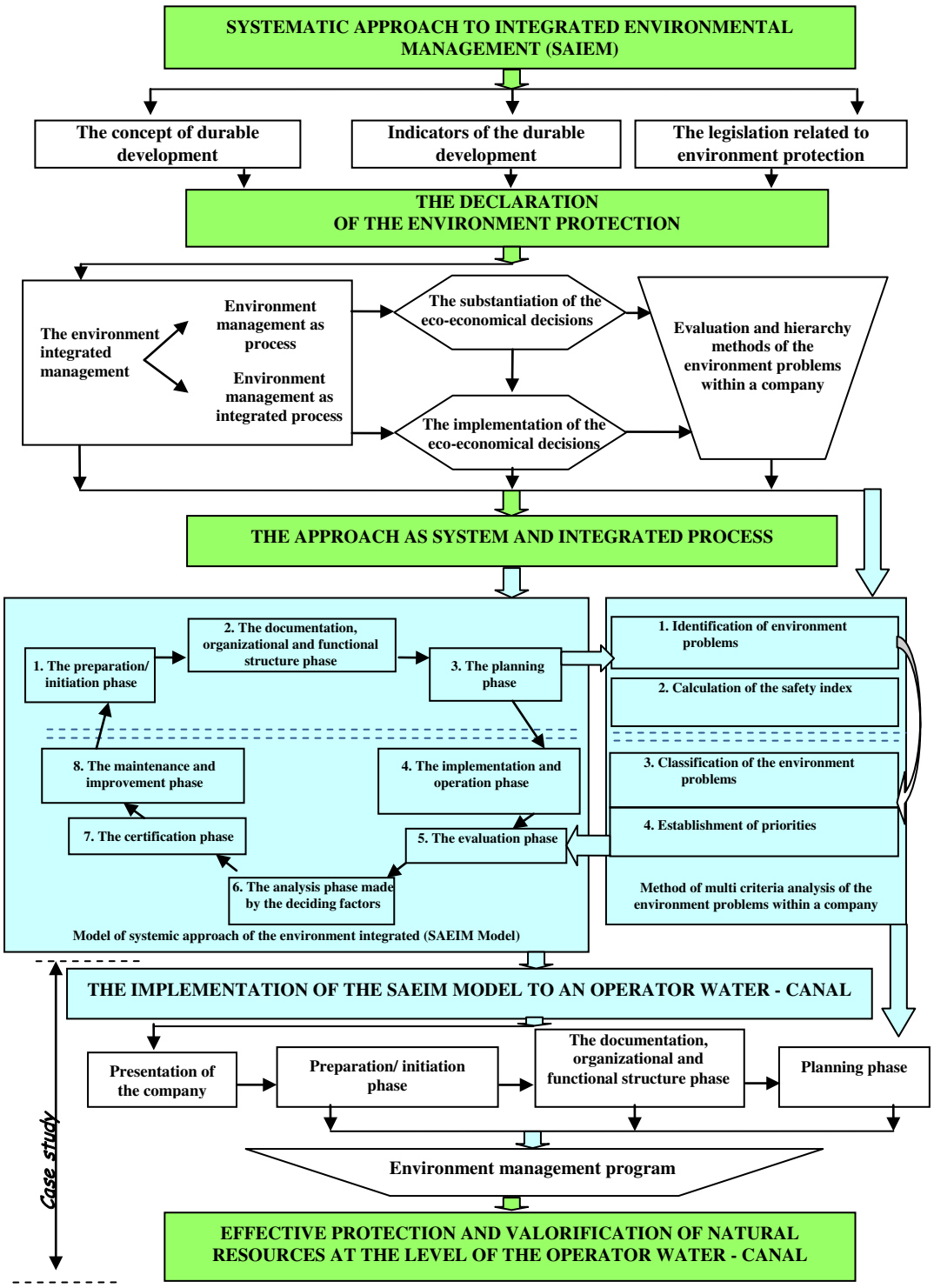

Fig.2 - Definition of SAIEM concept

SAIEM model describes the stages to be followed in the decision making moment for the implementation of the model and at the certification moment, maintaining and improving of the environmental management system.

In all types of organizations the management process is represented by all the phases and work processes that make the objectives and it's subsystems of the organization, the work processes needed and foreseen in order to reach these goals, as well as the people appointed to execute the measures as efficient as possible.

Including numerous operations, grouped in stages, the ecological management process has a specific content. Studying the content of this process implies the understanding the way it can influence the personnel while resolving the ecological issues of the organization.

Multi-criteria qualitative analysis of environmental issues in an organization

The increase in dimension and complexity of the eco-economical system, the present environmental issues exigencies as well as the complex manifestations of the pollution result in difficulties in solving the analysis of this system by tradition deterministic methods.

Depending on the random nature of the activities, products or services of an organization that can interact with the environment (environmental aspects), the scientific study of the eco-economical system requires knowledge of probabilities and statistical calculus.

For this reason, we will present a contribution to the extension and thorough study of the utilization of statistical and probabilistic methods in the knowledge of the mechanisms of the eco-economy viewed as a system.

By using and processing a quantity of statistical data regarding the eco-economic characteristics, the legal, administrative-institutional, economical-technological and environmental risk components we can base certain decisions related to environmental protection at organizational level.

We have to specify that the following qualitative multi-criteria analysis method for environmental issues is applied to a water-wastewater company in order to highlight the ways to establish the significant environmental aspects.

Establishing the significance of the eco-economical system characteristics in regards to the real filed measured status and the theoretical one.

A very large amount of information is needed in order to reply to the requirements of identification of the field in which the location or equipments that can have a significant impact on the environment.

The Matrix for the establishment of the environmental aspects with significant impact is filled in by means of relating the environmental aspects to a series of evaluation elements.

As a result of the evaluation, the environmental aspects receive the grades: 0 – unimportant, 1 –important.

The *informational correlation* notion for distance evaluation between a real measured characteristic and a (theoretical) characteristic whose values allotment corresponds of a major impact upon environment has been introduced in the project.

If the correlation between AM_i characteristic statistical (real) evaluated and AM^* theoretical characteristic, which expresses the impact upon environment is *1,* it means that for the presented eco-economical system the studied characteristic has the biggest danger.

If that characteristic is *0*, it is obvious that the measured values do not represent any danger for the eco-economical system.

$$R_{(j,*)} = \frac{1}{\sqrt{n \times E_j}} R_{(j,*)}.$$

The safety index ***(I_{SG})*** of the characteristic *AMj* is:

$$I_{SG} = 1 - R_{(j,*)}$$

Where:

- $R_{(j,*)}$ – is the informational correlation multiplier between a real measured characteristic and a (theoretical) characteristic
- E_j - j characteristic informational energy
- n – is the number of the noticed values (*10*)

The matrix of evaluation of the environmental aspects

Table 1

PROCES	Activity, product, service	Environment aspect (AM) COD aspect	Influenced environment factor	Elements of beginning the evaluation										TOTAL	I_{SG}
				Legal frame			Periodical inspections	Emissions/ exhaustions	Level of consumption of raw materials and materials	Environment risk					
				Conditions	Restrictions	Compulsory rapports				Toxicity	Volume and mass	Frequency	Gravity		
				EV1	EV2	EV3	EV4	EV5	EV6	EV7	EV8	EV9	EV10		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
OB_{-2}	Used waters purification	AM11 Water release in the natural receptor	Surface waters pollution	1	1	1	1	1	0	1	1	1	1	9	0.0513
...															
P_n															

In order to estimate the safety indexes 61 characteristics were researched.

For the interpretation of theoretical average value of the correlation coefficient (M) a trust interval was constructed corresponding to the trust coefficient α=0,95.

In the analyzed case, the trust interval is:

$$0{,}1893 - 1{,}96 \times \frac{0{,}0099}{7{,}81} < M < 0{,}1893 + 1{,}96 \times \frac{0{,}0099}{7{,}81}$$

sau 0,1868<M<0,2143

Considering the limit value of trust intervals we need to consider as significant for the eco-economical system those safety indexes that are smaller than the superior limit of the trust interval (figure 3).

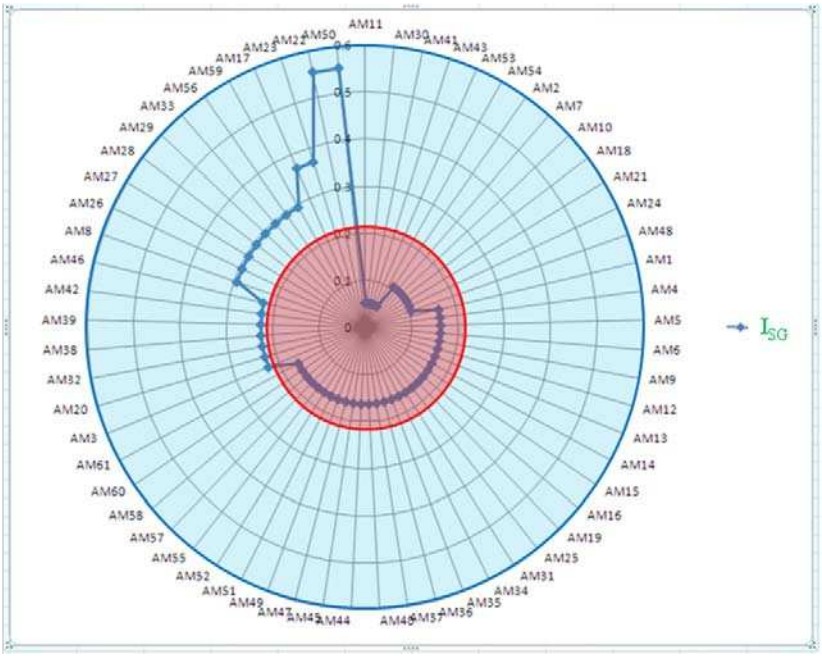

Fig. 3- Hierarchy of the safety indexes
- Significant safety indexes
- Non-significant safety indexes

The environment aspects are sorted ascendant, based on the resulted safety index (table 2).

Listing of significant environment issues

Table 2

No.	Process	Activity, product, service,	Hierarchical environment aspects			
			Environment aspect	Code	Environmental Impact	**I_{SG}**
1.	OB-2	Used waters purification	Water release in the natural receptor	AM11	Surface waters pollution	0.0513
…	……	……	……	……	……	……
…	……	……	……	……	……	……
61.	S3, S4	Heating (thermal central)	Methane Gas consumption	AM50	Waste of the natural resources	0.5528

The environment issue with the lowest value for the safety index, generates the greater impact and for that, has the maximum priority.

3. Conclusions

It is obvious the interest of the businesses, including those based on general public services area, as well as the water and wastewater services, for ISO 14000 „Environment Management Systems,, certification.

It is considered that the integrated approach model may be extended to the level of an economical organization, in view of the certification in accordance with the management of quality – environment – health and occupational security.

Among the main current preoccupations are:

- *THE QUALITY* of the products and services in order to increase of trust and satisfaction in these;
- *THE HUMAN BEING* which has the right to a healthy life in a proper environment;
- *THE ENVIRONMENT* with its natural resources, which must be protected and exploited as efficient as possible.

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