
**APPROACHES REGARDING THE MANAGEMENT STRATEGY IN THE
GLOBAL GREEN INDUSTRY**

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Abstract: In the global context, the Green Industry Initiative's objective – launched by UNIDO in 2012 - is to consider the environment and the social factors in the process of the organizations from all countries and regions by using effectively and efficiently the energy, raw materials, innovative practices and the new technologies. The concept of green industry is a generically one, because it may be found in any industry or economical and social domain of activity whether the organizations are considering the „friendly with the environment” principle when they are acting. This type of organization is called „the green organization”. Nevertheless, the aim of this paper is to underline the main approaches in the green industry organization management, being focused on: management strategies, the strategies evaluation, the risk and uncertainty and some methods to evaluate the environment risks. Finally, a graphical conceptual model for the management system of the green organization is proposed.

Keywords: *green industry, green organization, management strategy, risk and uncertainty, evaluation*

Introduction

The global economic environment is becoming more and more complex and volatile (Doval, 2008), being influenced by both the political environment and, especially, the natural environment, which is subject to the negative effects of pollution and wasteful use of resources, threatening the very future of the planet. The 2012 Rio Summit highlighted the need for sustainable development, based on the green economy. The green industry has many opportunities for development as a component of sustainable development.

On the outskirts of Rio + 20, the United Nations Industrial Development Organization (UNIDO) has launched *the green industry initiative*, having the objective the consideration of the environmental and social factors in the enterprises operational process in all countries and regions by the efficient use of energy, raw materials, innovative practices and application of new green technologies¹, consisting in high level global multi stakeholder partnership as the *green industry platform*.

The green industry is briefly defined as an environmentally friendly industry². In other words, the green industry is characterized by:

- the manufacture of products that protect the environment and those that improve environmental conditions;
- production processes that cause minimal environmental damage;

¹Conferința de la Manila, 2009; Conferința de la Tokyo, 2011

²http://wiki.answers.com/Q/What_is_green_industry

- recycling materials and waste energy (heat energy resulting from production processes);
- focussing on eliminating or significantly reducing emissions of greenhouse gases.

An organization that operates according to the "friendly environment" principle, regardless of which socio-economic field belongs, can be termed as a green organization.

In order to achieve the strategic objective of being included in the green organization category, any organization management will work for (Negulescu, 2015):

- the adoption of the most appropriate green strategy;
- periodic assessment of the strategies adopted;
- identifying risks and uncertainty in the entire activity;
- periodic assessment of risk and uncertainty;
- the adoption of measures for prevention, correction and continuous improvement of the activities related to the environment.

In this context, the aim of this paper is to highlight the main approaches in the green industry organization management, respectively the green organization, regarding: the management strategies, the strategies assessment, the risk and the uncertainty and assessment methods of environmental risks. Finally, we propose a conceptual graphic model for the organization management system in the green industry.

Management green strategies

Management strategies in the green industry are not much different from overall strategies, but they have a definite purpose, namely, to contribute to greening the environment.

The strategies that realize this goal are defined by UNIDO (2011), including:

- production and sustainable consumption strategies;
- integration strategies of people education, health, safety and science in productive activities;
- cooperation and investment strategies;
- forecasting the infrastructure eco-efficiency strategies (water, industrial water, energy, recycle materials and waste recovery, etc.);
- using eco labeling and certification strategies;
- greening the lifecycle and supply chain production strategies;
- accelerate the diffusion of green technology in the world strategies;
- strategies for increasing the accountability of the organizations and of the people towards the environment;
- green credits, loans, grants etc. financing strategies;
- strategies to promote environmental management system and the use of environmental standards;
- strategies for monitoring and reporting carbon emissions and other environmental indicators;
- strategies of integrating environmental policies with corporate social responsibility, including volunteering.

In Europe, the OECD green development strategies, launched in 2011, propose a flexible policy to suit different levels and circumstances of developing countries, including the implementation strategy of green vehicles (Beltramello, 2012). The report developed highlights the need to move to a green transport system and presents market research policies for developing alternatives to traditional fuel vehicle technologies.

Among the management strategies, those related to the life cycle and to the green logistics chain, are current concerns. These are focused on green resources and highlight the following types (Simpson, 2008):

- *Risk-based strategies*: consist of minimizing the risk on inter-organizational investment in resource development for organizations that have recently introduced the program for greening the supply chain or which retain minimum internal resources.
- *Strategies based on efficiency*: are based on eco-efficiency or 'lean-and-green' approach. This type of strategy derives from the benefit out of environmental performance for the supply chain before asking the suppliers to meet operations efficiency targets. More performance expressed in benefit arises from production practices.
- *Strategies based on innovation*: it is a strategy distinct from the efficiency approach because the performance obtained is much more specific to the environment. Once the supply chain takes into consideration processes, technologies or the complex of specific performance standards for suppliers, the exchanged knowledge level or the relational investments begin to change.
- *Closed loop strategies*: are the reverse logistics strategies, including breeding materials recovery (at high value) or recycling (at low value). These materials may occur during production as goods returned, or at end of life. This type of strategy integrates environmental performance per entire logistics chain.

Environmental management system strategy

The advent of ISO 14001 in 1996 made possible a new approach to environmental issues, based on the EMS implementation, and their certification by accredited organizations.

The Environmental Management System (EMS) as defined in ISO 14001 standard, is part of the general management system which includes organizational structure, planning, the practice, the responsibilities and resources for developing, implementing, achieving, reviewing and maintaining policies environment. From a legal standpoint, ISO 14001 perfectly aligns to the existing EU legislation on environmental issues. His main aim is however more than a theoretical level compliance, targeting particularly the organization achievement and practical demonstration of high environmental performance through continuous monitoring of the consequences of their processes, services and products on the environment. Introducing EMS is related to the complexity of problems increasing related to pollution, requiring a different approach to environmental protection; EMS implementation according to ISO 14001 standard became an integral part of the company's business strategy.

Many organizations in Romania switched to promote this new approach of environmental issues. EMS implementation is facilitated by creating the environmental

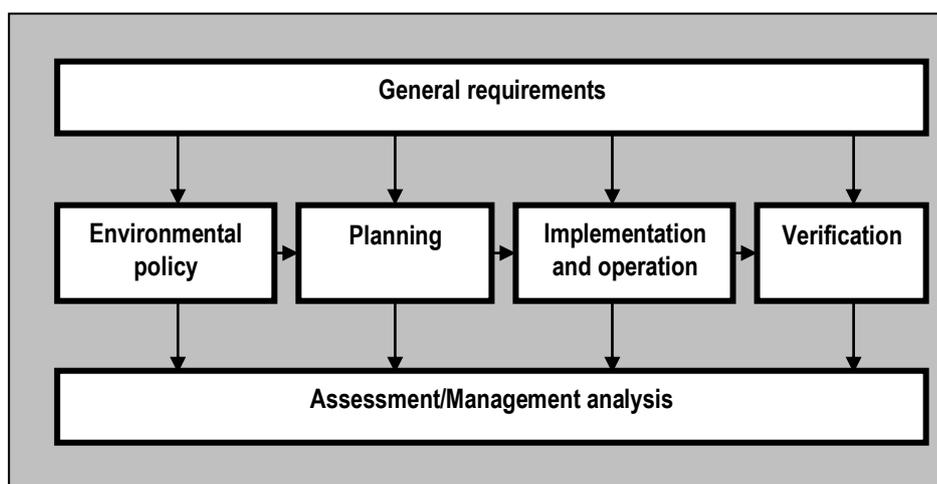
national legislative and organizational framework, since 1990, when the first Ministry of Environment was established and a number of requirements for Romanian legal persons were settled, regarding the creation in organizations of structures for the surveillance, control and information regarding the pollution and environmental factors quality. In 1997 the standards belonging to the family ISO 14000 have been adopted.

Currently, the economic organizations in Romania pay an increased attention to the implementation of some EMS after the ISO 14001 model and to their certification. Creating EMS provides a systemic approach to environmental requirements by integrating the company's business strategy. The advantages arising from this process must be judged not only economically, but also having in view the risks of inappropriate approaches to environmental issues: it provides control and mitigate the impact of the organizations activities on the environment.

An environmental management system has as main objective to help a company:

- ✓ identify and control the environmental aspects, the relevant impacts and risks in the organization;
- ✓ meeting environmental policy objectives and targets, including compliance with environmental legislation;
- ✓ define a set of basic principles to guide future activities aiming the environmental responsibilities;
- ✓ setting the company's environmental performance increases, based on a cost-benefit balance;
- ✓ determine the resources necessary to achieve goals;
- ✓ define responsibilities, authority and procedures to ensure the involvement of each employee of the company to reduce the negative environmental impact;
- ✓ implementing an efficient communication system within the company and ensuring staff training.

The components of environmental management system (EMS) included in the standard 14001: 2004, adopted in Romania under SR EN ISO 14001 from 2005, are summarized in Figure 1 - Environmental standard components ISO 14001:2004



Both quality management, according to ISO 9001 standard, and environmental management, according to ISO 14001 standard, are structured on the concept of continuous improvement based on the PDCA (plan, do, check, act) of Deming (Popescu & Paleriu, 2001). The concept of continuous improvement, according to ISO 14001 standard, consists in a process of developing an environmental management system in order to improve global environmental performance in line with stated environmental policy of an organization. This concept is based on the cause-effect relationship, which logic involves:

- a system that works on the basis of objectives and targets to be achieved, for which determinations and evaluations of results are made;
- if these results are lower than those proposed, we proceed to identify and analyze the causes that led to the failure of the objectives set;
- causes once identified corrective actions are proposed in order to remove them and prevent their recurrence;
- based on the experience gained from the analysis of the causes that led to the failures, preventive actions are established to prevent the occurrence of similar events. This last stage is the element that closes a cycle of improvement and ensure transition to another cycle, situated at a superior level of performance to previous.

The environmental management strategy, according to ISO 14001:2004 standard (p.14.), provides that the organization management at the highest level to analyse the management system at planned intervals to ensure its continuing suitability, adequacy and effectiveness. Managerial analysis should include the opportunities for improvement and the need for change in the system of environmental management, including the environmental policy and the environmental objectives and targets.

Strategy assessment approach in green industry

The literature provides a series of strategy assessment methods in the green industry, mostly focused on the entire life cycle or the production or services logistics chain. Among the methods used in different studies we illustrate the following:

• *Multi-criteria analysis for the green suppliers assessment* (Falatoonitoosi et al., 2014). The model introduces the main factors in the supply - logistics chain as environmental attributes offering an evaluation framework for selecting the most eligible green suppliers. Criteria of importance and influence on the two components are examined: green logistics and environmental protection and 10 factors are identified, after which the dependency relationships between factors are examined. Finally the relations map is sketched and the influence factors which may improve the green supply chain are determined.

• *Simulation for the green production assessment* (Zhou et al., 2012). The green production strategies selection and assessment are affected by dynamic and uncertain conditions. Simulations are used to capture real production flow and the decisions logic, but also to illustrate the best solutions based on simulations replication.

• *Fuzzy sets in management strategy assessment and selection for the logistics chain in green industry* (Odeyale et al., 2014). In the study, the authors used the multi-criteria decision analysis, considering five criteria to assess four strategies in the cement industry. Top management or experts have the opportunity to consider what type of green management to

apply and to objectively assess the importance of each activity by paired comparisons, to prioritize the criteria and finally to cast fuzzy numbers in a triangular function. The method is implemented in two levels: first the fuzzy weights for the decision criteria and second the strategies weights for each decision criterion yield fuzzy scores.

- *The method of the multi-level self-regulators agents* (Gagliardi et al., 2014). There are explored the possibilities offered by agent-based modeling techniques to assess the impact of an alternative set of innovation policies on the system in which is implemented and on the actors used in organic agriculture industry, food manufacturing and distribution of these sectors.

- *The sustainable innovation cube* (Hanzen et al., 2009). This model is structured to generically present the innovations in sustainability effects in order to decide how to minimize the risk of environment-oriented innovations. The model includes three dimensions: the target, the life cycle and the type of innovation.

- *The scoreboard for performance and management strategy assessment* (Hsu & Liu, 2010). The scoreboard structure is used in the automotive industry to understand the relationships between internal and external factors, financial and non-financial factors, results and factors that lead to the proactive environmental strategies. These relationships are leveraged to design a map of the environment strategy and to assess the strategy in terms of feasibility of the performance.

Risk and uncertainty in the green industry

Environmental risks relate to the entire ecosystem of the planet and although some are natural risks and others are caused by various activities (endogenous risks), they are predominantly the responsibility of people as individuals or organizations.

Compared to the general risks faced by organizations, in the green industry risks are mostly caused by the organizations management taking wrong decisions on protection and restoration of the natural environment. Decisions that lead to risks in the green industry can be grouped into:

- decisions on air, water, soil;
- decisions on pollution parameters control;
- decisions on irrational use of natural resources;
- decisions on waste management.

In order to reduce and/or eliminate these risks there have been developed specific standards in Romania:

- ISO 31000: 2009 and ISO 31000 SR: 2010 (adapted by ASRO) on Risk Management - Principles and guidelines (it creates and protects the value, it is part of all organizational processes and decision-making, and explicitly approaches uncertainty);
- SR BS 31100: 2013 on Risk Management. Code of Practice and guidance to implement SR ISO 31000.

- The implementation of ISO 31000 series standards and other standards specific to various geographical regions (USA, Australia-New Zealand, South Africa etc.) as well as the strategies and policies to reduce pollution in the world, at European level and nationally, leads to reducing harmful factors and to ecosystem restoration.

Methods of assessing the environmental risks

Environmental risk assessment is the analysis process of the environmental impact caused by the exposure to one or more stressors, such as chemicals, diseases, invasive species, changing earth and climate change (source: http://www.epa.gov/risk_assessment/ecological-risk.htm). The mission of understanding the potential effects of stressors mentioned and of managing risks to protect the health of the natural environment and the resources on which life on earth depends is regulated in many countries and is known as environmental auditing or environmental risk assessment.

The International Chamber of Commerce defines environmental audit as "a management tool", comprising a systematic, documented, periodic and objective evaluation of how the organization, management and environmental equipment support environmental protection by facilitating management control of environmental practices and assessing compliance with company policy, including legislative regulations.

Most of the methods for assessing environmental risks is based on scoring and on the comparison with the average of the variables considered. Depending on the directions of analysis each method has applicability in a certain geographical area or country.

The most known international methods of risk assessment (according to Gentile et al., 2004, p. 28-103) are: AGAPE (Germany), B.W.M. (Baden-Wurtemberg Method) (Germany), D.R.E.A.M (Dundee Risk Evaluator Assessment Model) (UK), S.R.A. (Simplified Risk Assessment) (France), GTK (Finland), A.R.G.I.A (Italy), RI.SI.CO. (RIsk of COntaminated SItes) (Italy), C.S.S.M. (Contaminated Sites Screening Model) (Italy), H.R.S. (Hazard Ranking System) (USA), N.R.S. (Numerical Ranking System) (USA), A.H.R.M. (Alaska Hazard Ranking Method) (Alaska, USA), R.S.S. (Risk Screening System for contaminated sites) (New Zealand) and others.

The comparative analysis of these methods of risk assessment reveals the following:

- common elements:

- They have as objective the classification of the contaminated sites potential based on the priorities of intervention;
- The calculation of the risk assessment is based on scores method and arithmetic or algebra calculation;

- specific elements:

- A model that does not provide a maximum score but only a reasonable one, if there is no information available (A.H.R.M.- Alaska Hazard Ranking Method);
- A model whose values are fixed a priori (between -1.5 and +1.5) and the analysis is made on levels and influencing factors. The method is based on previous investigations (B.W.M – Metoda Baden-Wurtemberg);

- A model that defines a range of variation for each score parameter, which is assessed by experts or by reasoning (C.S.S.M - Contaminated Sites Screening Model);
- A model that calculates an overall index score of the Site (SIS), which represents the sum of the correlation between five individual pollutants. The maximum global score is 500 fixed a priori. Also, the contaminated sites may be inspected only after approval approved (D.R.E.A.M - Dundee Risk Evaluator Assessment Model);
- A method that considers nine factors which are evaluated by scoring based on the influence of each factor on the overall risk potential and it is used in mining (GTK);
- A numeric system that takes into account environmental targets where the human health is affected (H.R.S. Hazard Ranking System);
- A system that evaluates the risks due to oil products (N.R.S – Numerical Ranking System);
- A system that focuses on uncontrolled and abandoned areas (R.I.S.I.CO.- RISK of CONTAMINATED SITES);
- A system which is based on probability - exposure direction - receiver (R.S.S. – Risk Screening System for contaminated sites);
- A model that calculates the level of the final risk and which is based on a simple algorithm of assessment for each use and exposure direction (soil/water) (S.R.A – Simplified Risk Assessment).

The process of risk assessment has to be integrated into the green industry management system, specifically to the green organization.

The management system in the green organization

By summarizing the main issues presented above, we can say that a green organization must incorporate a specific management system. The change process needs to enclose at least the following five steps to be realized successively: planning, investing, data base creation, knowledge management setting and the new culture development (Doval, 2014).

A management system model specific to the green organization is proposed in Figure 2 - The management system in the green organization

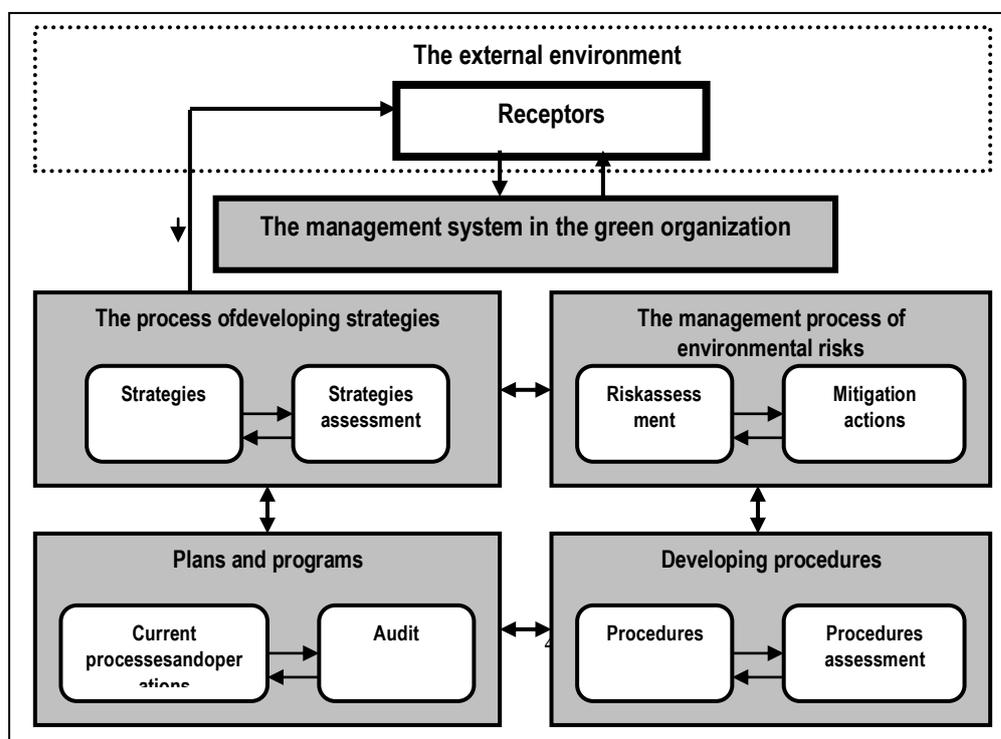


Figure 2 The management system in the green organization

Such a management system would include four blocks of processes: the strategy drafting process, the management process of environmental risks, the procedures drafting process and the drafting process of current action plans and programs.

The process of developing strategies

The organizations' strategies, developed to support the strategic objectives (to increase market share, to continuously improve strategic capabilities in the market struggle with competition, the renewal or change targets etc.) should include either clear elimination objectives or at least the reduction of the negative impact of the environmental activities or objectives related to the traditional targets, which do not affect in any way the natural environment. These strategies should be regularly evaluated and made necessary amendments.

The management process of environmental risks

The consideration of environmental risks in the strategy is a real proof of effective management in green organization. The management process of environmental risks includes:

- identifying processes and operations that may represent potential environmental problems;
- identify potentially sensitive environmental receptors;
- identifying possible pathways of contamination;
- the risk assessment involved by various activities;
- ranking by priorities of its mitigation and management actions.

The process of developing procedures

Making all activities on standardized bases by clear procedures leads to the strategic objectives of the green organization's success. The process includes:

- developing procedures, whether they are own or they rely on recognized standardized systems, integrated or not integrated (such as integrated management system comprising quality, environment and safety and security, in accordance with the requirements of international standards ISO 9001:2008; ISO 14001:2004 and OHSAS 18001:2007);
- the evaluation of environmental management procedures for solving the identified issues.

The process of preparing plans and current programs

Medium and short term plans and programs for current activities are consistent with the strategic objectives and take place based on developed procedures. The permanent audit the embodiment of all the activities, but also the results achieved, actually contributes to fulfilling the goals of a green organization.

The whole management process of a green organization is done in correlation with the natural environment of the geographical area related to the activities, but also with the national and international socio-economic environment, as the negative consequences of a natural environmentally unfriendly activity spread sooner or later at the global level.

Conclusions

In current conditions of continue amplifying of the natural environment pollution and of irrational exploitation of natural resources, the management strategy must be adapted to new global requirements of sustainable development based on reconsidering the organization as a green organization, environmentally friendly.

The literature offers a variety of opinions and solutions on reconsidering strategies, how to assess their approach to risk and uncertainty management in management decisions related to activities impact on the natural and socio-economic environment, of which few are exemplified in the work.

A specific management is important for any green organization or for one who wants to become green. Therefore, we propose a green organization management model based on four main processes designed to integrate the traditional activities and the sustainable development ones.

The proposed model can be a useful tool for managers in any field falling in the industry, generically named, the green industry.

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