

Abstract

In the economic language, we frequently speak about inflation risk, interest rate risk, currency exchange risk, psychological risk, credit risk. Over the last decades, the environmental risk has come to the attention of specialists and managers and has gained an increasing importance. Companies focus their attention on risk management as a key element in ensuring the success of the objectives. Environmental risk management provides a set of formal processes underlying environmental decision-making and supports the decision maker in its efforts to minimize the level of uncertainty.

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Introduction

In the economic language, we frequently speak about inflation risk, interest rate risk, currency exchange risk, psychological risk, credit risk. Over the last decades, the environmental risk has come to the attention of specialists and managers and has gained an increasing importance. Risk can be generated by an event, action or lack of action, its consequences ranging from the beneficial to the catastrophic ones.

In terms of probability, in the real world, events with 100 % probabilities of occurrence do not exist (in other words, $p = 1$). There are always a number of known and unknown factors that have an effect on the event assumed, so that it is very possible that its finality is completely different than originally expected or estimated. Thus, any activity involves a certain degree of risk, the activities with zero risk, the so-called zero risk myth, being just a prejudice. The risk is determined by the possibility of an event's occurrence that will have a result on certain objectives.

Companies focus their attention on risk management as a key element in ensuring the success of the objectives. The risk is the uncertainty of a result or event, either positive, in the form of an opportunity, or negative, as threats or hazards, which may cause changes during the achievement of the real objective, with positive or negative effects on the expected economic results. Thus, the risk refers to the possibility that an adverse event occur, an event that will change the expected revenue.

Theoretical considerations regarding the environmental risk

The environmental risk results from the human-economy-environment interaction. The environmental risk can be defined as the probable level of damage to the environment or to certain environmental components, on the one hand, and, on the other hand, the damage to assets and human property and economic activities by a natural phenomenon or a group of natural phenomena called environmental events, or by human activities in a certain area and time period.

Risk sources can be both natural and human related. If a natural phenomenon causes damage, it is considered to be a natural accident that can go up to a natural catastrophe, depending on the damage caused, or an anthropogenic risk, when human activities are those that generate negative consequences.

Ecological risk management implies the knowledge of the past evolution of natural, human and industrial systems and the forecast of their future evolution. Risk management consists in identifying and quantifying existing and potential ecological risks that may appear as a result of human activities (e.g. the consequences of a river course improvement works) and minimizing the possibility of occurrence of environmental events and, in case of occurrence, diminishing their negative effects.

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For a series of natural events, the society reduces their effects by dispersing them at the individual or business level with the help of the insurance systems.

The environmental risk can not be considered an isolated event. Given the existing scale production, local events can have regional or global consequences, thus appearing the phenomenon of dispersion or transfer of the risk between different areas.

Between the level of risk and the costs needed to reduce it there is an inversely proportional relationship, namely reducing the risk to a very low level involves high costs, and a zero risk, as shown, can not be reached, since there is always a level of acceptable risk. Environmental risk management must maintain a balance between related costs and expected benefits.

The cost of risk management is the sum of all expenses related to the alleged risks. For the insured risks, the insurance premium is also a cost.

Preventive measures allow for the reduction of risk cost and limit event occurrence and repeating. Provisional measures determine the reduction of consequences, but, in this case, predictable consequences of risk reduction can be avoided, so the cost is high. The transfer of risk effects determines a cost increase, but it also allows an almost total reduction of the consequences of risk occurrence. The objective of risk management is to ensure framing within the limits of risk tolerance - lower consequences at the maximum possible limit - at a reasonable cost.

A risk matrix is created based on the probability of risk occurrence and the probable impact, and risks identified must be addressed in the following order: risks with high impact and high probability; risks with high impact and low probability; risks with low impact and high probability; risks with low impact and low probability;

Decision makers need to examine risks with high impact or high probability in order to determine, for each of them, either to reduce the likelihood of occurrence or to reduce the impact, or both.

For each risk that needs to be managed, decision makers must identify the countermeasures to be adopted and their costs. Risk reduction means reducing the likelihood, the impact or both. Risk reduction is an important strategy that may be expensive or not. In most cases, risk reduction is cost effective if compared to occasional costs incurred by risks' manifestation.

Risk acceptance is a strategy of the project manager, who is in charge with the review of the situation from time to time during the project. The manager manages risks by monitoring the situation and controlling it when it occurs. Risk monitoring can be associated with reference stage or events monitoring, regularly reserving the time required for the analysis of the most likely and most damaging risks, adopting the required remedial measures.

Ecological risk management is a component of environmental risk management, dealing with the risks posed by human activities on the flora, fauna and ecosystems.

Environmental risks can be classified into two categories:

- Risk to the natural environment. This type of risk admits that an organization's activities can result in some form of environmental change. Environmental risk may concern: flora and fauna, health and welfare of the people, social and cultural welfare of the people, environmental resources (water, air and soil), climate.

- Risk to the organization: the risk of non-compliance with existing or future law or criteria. This category includes company losses as a result of an inadequate management, decline in the company's reputation, litigation costs and difficulties in ensuring or at least maintaining the possibility of carrying out their own activities.

Environmental risk management provides a set of formal processes underlying environmental decision-making and supports the decision maker in its efforts to minimize the level of uncertainty.

Environmental risk management facilitates a structured and systematic approach to the process of environmental decision-making, combining various techniques of evaluation and consultation, uniting them into a whole that gives consistency to the decision-making approach.

Environmental risk management can lead to direct benefits to any organization, by improving the information available. Thus, environmental risk management can reduce costs and add value, can

minimize the organization's exposure to risks or increase the likelihood of business continuity under normal conditions and of obtaining new permits and authorizations.

Environmental risk management differs significantly from other risks' management, due to the complexity of the environment. The large number of ecosystems and organisms, how they interact with each other or with neighboring systems generate both a high degree of complexity and a significant level of uncertainty. In most cases, decisions relate to long periods of time and are based on multiple hypotheses about the potential impact. Due to the difficulty of formulating specific hypotheses, decisions are often taken under scientific uncertainty over the possible consequences.

The implementation of environmental risk management is aimed at achieving certain specific goals:

- adopting informed decisions;
- planning the management system based on the prioritization of environmental risks;
- efficient use of resources;
- increasing the organization's ability to cope in a competitive environment;
- achieving a level of transparency in the decision management and implementation process;
- providing increased flexibility for alternative actions based on risk;
- ensuring compliance with the legislation;
- substantiation of an approach regarding the uncertainty management method;

The benefits of the risk management system in the long term include:

- achieving a sustainable management;
- efficient planning, as a result of knowing and understanding the key factors of risk exposure;
- reducing costs, as a result of adverse effects forecasting and adopting appropriate preventive measures;
- highlighting the positive consequences;
- ensuring an effective communication between organizations and affected or interested parties (stakeholders), in order to design priority action programs;
- improving audit processes and higher capitalization of internal and external review results;
- better results in terms of efficiency, effectiveness and adequacy of the programs; for example, improved environmental management and better allocation of available (human, financial and material) resources.

Environmental risk management is affected by a number of factors, among which the most important are: the absence of data or the existence of a small amount of data; the need to formulate hypotheses; the natural variability; use of new concepts, techniques and methods that come from underdeveloped scientific fields and that are the subject of many disputes and controversies regarding the actions to be taken; larger periods of time (for example, although future generations must be taken into account, ecological changes may occur slowly, due to lag between causes' action and effect materialization); potential effects on the environment and economic welfare at local, regional, national, international and global level and the possibility of irreversible consequences; absence of a clear and direct link between certain causes and the effects on the environment.

The conduct of risk management process requires both the top management's commitment and decisional energy, but is never the sole responsibility of the top management or of the organizations providing consultancy on risks, also requiring the involvement of the employees, since the latter are the first to identify an incident, a potential threat or an opportunity for improvement. Also, stakeholders may be involved in this process.

Standard stages of risk management are the following:

- establishing the context: determining the strategic, organizational and risk management context, and establishing analyzes' structure and criteria against which risks will be assessed; identification of the stakeholders and defining the communication and consultation policies;

- risk identification: identifying what can happen, including the related hazards and the consequences;
- risk analysis: risk analysis in terms of probability and severity; possibilities of control and the effect of control measures on the severity of the consequences; likelihood of occurrence and severity may be combined in order to estimate the level of risk;
- risk assessment and prioritization: comparing risk levels estimated against pre-defined criteria; further on, risks can be ranked in order to identify priorities; risks identified as having low priority can be accepted without being treated, being only subject to monitoring and review;
- risk treatment: development and implementation of a management plan, which must include considerations on the allocation of financial and other resources, and action deadlines;
- communication and consultation: consultation and communication with the stakeholders, internal and external, at each stage of the risk management process;
- monitoring and review: risk monitoring and review and the assessment of the risk management system performance and of the changes that can affect it.

The stages referring to communication and consultation, as well as monitoring and review involve activities and concepts that comprise the management process in its entirety. At each stage of the process, as well as during the risk management process, appropriate communication and consultation mechanisms must exist and operate both within the organization and between the organization and external parties.

Each stage of the risk management process must be documented. The documentation must contain data on the hypotheses, methods and information sources used, and the results obtained.

Environmental risk management can be implemented at all levels of an organization, including at the strategic and operational level.

Implementation at the strategic level. In general, environmental risk management at the strategic level involves addressing environmental issues in terms of how they may affect business and the activities of the organization, namely the risk to the organization induced by environmental issues.

Environmental risk management implementation at strategic level includes:

- Creating or updating the environmental policy of the organization and of the management systems by including in them risk management objectives and principles;
- Achieving the organization's strategic planning, using a risk-based approach;
- Incorporating risk management concepts and processes in the environmental management system;
- Establishing criteria of risk acceptability, in accordance with the requirements of law in force;

Environmental risk management at the operational level involves focusing on specific environmental risks. Environmental risk management implementation at operational level can include:

- Determining the level of risk to an ecosystem where certain activities and operations are carried out; the use of risk management principles for the assessment of environmental impact;
- Determining the compliance with risk acceptability criteria and standards;
- Providing the information required for environmental reporting.

Environmental risk management should be an integral part of the global management system. The determination of the methods for risk management system integration or interaction with the environmental management system and other management systems implemented by the organization should not lead to an increase of the resources needed for this process.

The analysis and assessment of the risk management aspects allow the identification and prioritization of risks that the organization can control. This prioritization supports both the process of making decision on treatment options and the planning of ways to achieve continuous improvement of environmental performance, in conjunction with the environmental management system.

The preliminary analysis will allow us to check whether there are sufficient data for the evaluation and management process to be deepened. In other cases, the preliminary analysis provides

enough information to allow the making of informed decisions (for example, by identifying risks that are unacceptable only to a certain particular location). Sometimes, it is possible to determine whether a risk is acceptable only based on a preliminary qualitative analysis.

Since few environmental risks are not static in nature, the entire risk management cycle should be repeated at different time intervals. The resumption of the process based on acceptance criteria that are more and more rigorous ensures the continuous improvement of environmental risk management.

Conclusions

Environmental risk management differs significantly from other types of risk management, because its features are derived from diversity of environment with high number of systems that interact with each other and generates both a high degree of complexity and a significant level of uncertainty.

Due to the difficulty of specific circumstances, decisions are often adopted as scientific uncertainty about the possible consequences.

Risk management covers culture, processes and structures dedicated effectively to the management of potential opportunities and adverse effects.

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