

INTEGRATING MANAGEMENT SYSTEM TO MANAGE ENVIRONMENTAL RISKS AT OPERATIVE AND AT STRATEGIC LEVEL

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Abstract: *Quality, safety at work and environmental protection are the main challenges for the management systems at the beginning of the 3rd millennium. Using standardized (e.g.: ISO, BS) management systems could be a good solution, but using more subsystems parallel can cause conflicts and redundancies between the organization's strategy and the operative management. Kaplan and Norton developed a new management method - the Balanced ScoreCard – that can fill this hole. The original Balanced ScoreCard model is not suitable to support hazardous chemical companies, because the importance of the risk management efficiency is more significant, than it could be treat as a part of the Balanced ScoreCard's view of process. The aim of this research is to develop an advanced management method based on the Balanced ScoreCard especially for companies operating with high environmental risk.*

Keywords: *Balanced ScoreCard, risk assessment, management, strategy.*

1. THREE LEVELS OF THE MANAGEMENT

Each company has its more or less different organizational structure, but there are enough common elements to describe general model. The actors of this model are the three-levels management of the company, the owners and/or investors, the employees, the customers and the environment of the company including the natural and artificial environment and also the inhabitants living near the company. These actors are in strong relationship with each other as in chapters 1.1., 1.2. and 1.3. is demonstrated. The levels differ in the term of decisions, in the source of information and the actors they are related directly.

Operative decisions are made on the first level, which directly manage the processes and the employees. On the 2nd level long term decisions are made by the special management subsystems. These decisions apply to the whole organization, but from different point of view. These special management subsystems

focus on the needs of the costumers, on the environment, that includes also the health of employees.

Strategically decisions are made on the on the top management level. This level focuses on the needs of the owners.

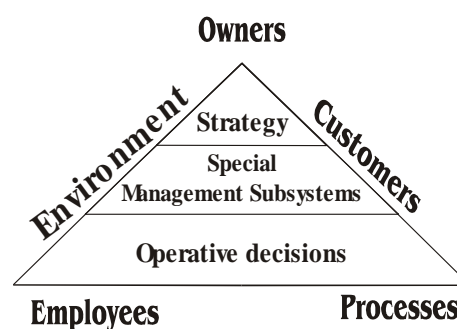


Fig. 1 Management levels and stakeholders

1.1. THE LEVEL OF THE OPERATIVE DECISIONS

This is the basic level of the management, which has a direct control to the processes and has a direct contact to the employees. The main task of this level is to assure the

continuously operation of the processes. Through this level can the special management subsystems control the processes. This management level is responsible to measure and gather all basic information that the higher management levels need directly from the processes.

The everyday work is defined by job descriptions of the different subsystems.

1.2. THE LEVEL OF THE SPECIAL MANAGEMENT SUBSYSTEMS

The decisions made on this level apply to the whole organization in different aspects. The main aspects and subsystem models are the next:

- quality (QMS), (e.g.: ISO 9000 QS 9000, HACCP);
- environmental protection (EMS) (e.g.: ISO 14000, EMAS);
- safety and health at work (SHMS) (e.g.: BS 8800).

The special management subsystems are set up under standards (ISO 9000, ISO 14000 etc.), national, international law or other regulations (e.g.: EMAS).

This level is responsible to analyse the information measured by the operative level, which is the base of the company's strategy. In the strategy the goals of each subsystem have priority under the principles of the Balanced ScoreCard.

One of the main tasks of this level is the preparation of decision-making, which means to analyze all information gathered from the processes and convert them into financial indexes for the top management.

1.2. THE LEVEL OF THE STRATEGY MANAGEMENT

At this level the top management lays down to strategy of the company and communicate it to the lower levels using the causality context of the Balanced ScoreCard. At this level the decision makers focus on the requirements of the owners and investors. The top management uses the less direct information.

2. ENTERPRISE RISK MANAGEMENT

As the Table 1 shows in the last decades the focus of the management changed, in our days the companies try to set up integrated management systems, which means using parallel quality, environmental and safety management subsystems.

Table 1 Development of the management conception

Target group	Capital	Customers	Employees	Suppliers	Society
Period	70's	80's	early 90's	90's	these days
applied methods	follow up inspection	ISO 9000	TQM	Joint venture	integrated system

Companies using special management subsystems with at least three management levels have a very complex hierarchy: everyone has one directional and some functional supervisors and – if the company has project oriented hierarchy – employees can have temporary supervisor for each project. By this complex hierarchy the company can respond to hazardous situation, but the communication lines will lengthen, therefore information flow will slow up, which will spoil the effectiveness in long term.

The solution is to separate the common information analysing and controlling functions of the special subsystems as stand alone integrating systems with a suitable IT support. This system will analyze and prepare the information from the processes for the special management subsystems.

These common functions are in the most cases management review, education and risk management (see Figure 2). This chapter describes the risk management system, which can be the most effective management tool for the companies with high level of environmental risk.

The difference between the RMS and the safety and/or environmental management systems is that the EMS and the SHMS are stand-alone management systems and they operate as a part of the traditional directional

system. These are process oriented systems, continuously operating, and their task is to prevent catastrophes – e.g. storing and registering hazardous materials –, to assure the legal conformity, monitoring.

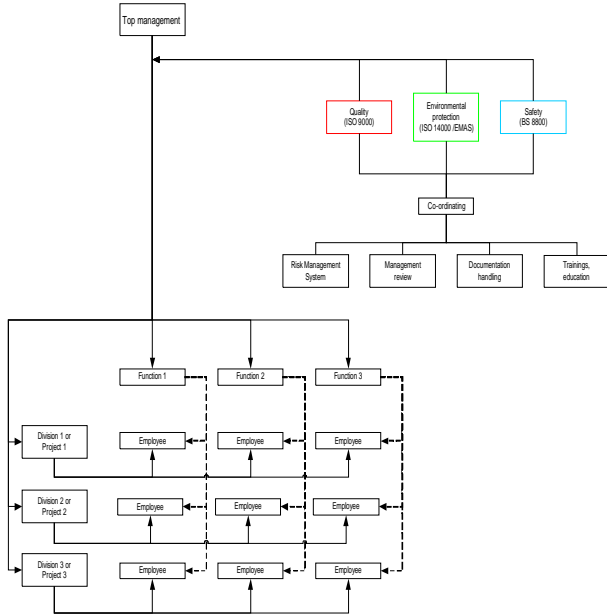


Fig. 2 General risk organization schema

The RMS works in a different way: it is collection of case oriented processes in order to support the strategical planning by evaluating the investment alternatives in the point of view of safety, to minimize losses in case of catastrophe and to manage the recovery after catastrophes. The RMS is not a part of the traditional directional system, because even it works like a project. This means that combination and the responsibility of the RMS team depends on the situation, even it can happen that the RMS temporary takes over the control on the company.

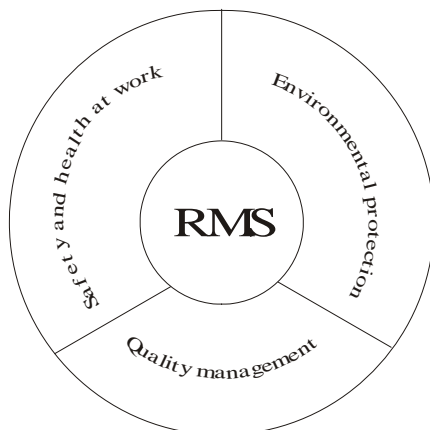


Fig. 3 Risk management system

The basic task of the RMS is to keep up-to-date the “Red Book”, the database of the risks at the company that includes all possible risks with the relevant preventing, loss-minimizing and emergency recovery strategies. This database is based on quantitative and qualitative risk analysis (HAZOP, HAZAN studies, fault tree analysis etc.). The “Red Book” has to contain also the company’s insurance policy that determines which risks can be “sold” to insurance companies beside and/or instead of preventive actions, investments.

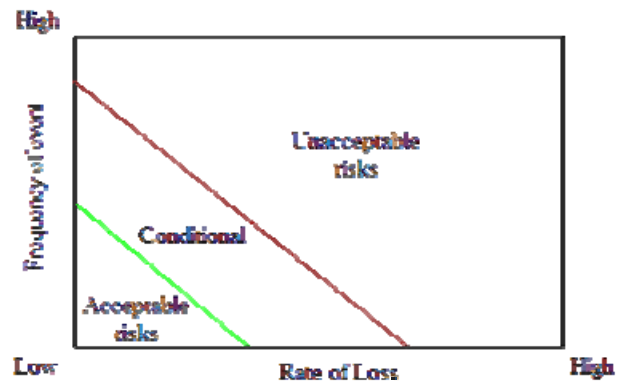


Fig. 4 Risk typology

Acceptable risks: events that have negligible effects and are rare.

Conditional risks: risk to handle, events that cause significant losses and/or happen often, and the company itself can decrease the risk with short term investments and in case of catastrophe can act without external help.

Risk to insure: event that cause significant losses and/or happen often, but the company itself is not able to decrease the risk with short term investments and in case of catastrophe can act only with external help. Unacceptable risks: processes that must be eliminated.

3. THE EXTENDED BALANCED SCORECARD MODEL

The RMS will give an environmental view to the Balanced ScoreCard using indexes like the loss ratio, the ratio of insurances costs and the losses can be an important index in the Balanced ScoreCard.

For enterprises working with high environmental risks it is useful to analyse the

effect of the environmental achievement and investments on the strategy. This can be done from the main processes perspective and from the customers perspective, but in some cases, when the company's strategy is innovative (see Figure 3) the importance of the environmental protection is so high that it could be useful to extend the Balanced ScoreCard with an environmental perspective.

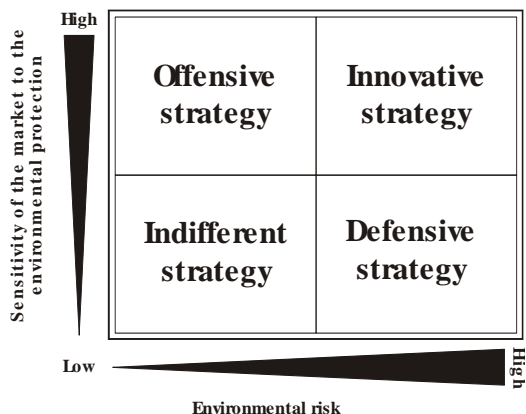


Fig. 5 Risk strategies

The environmental perspective can be integrated as the 4th figure shows. The environmental achievements depend directly on the results of the processes, because the technology, the quality management processes can rise or decrease the environmental risks. On an environmental sensitive market the customers require environmental friendly products and services.

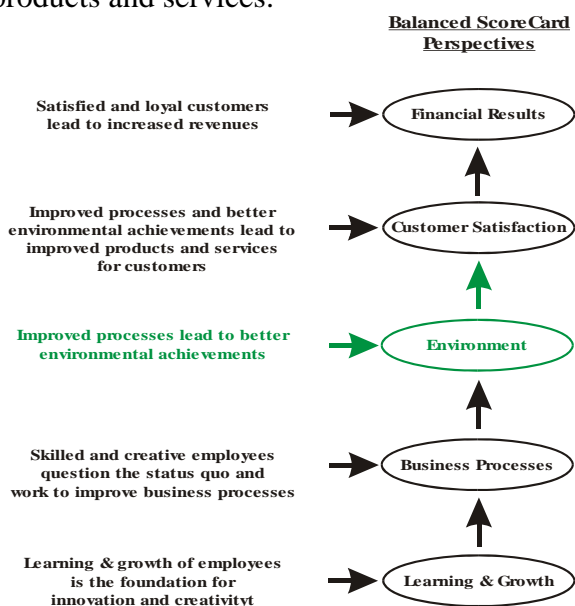


Fig. 6 The causality context of the extended Balanced ScoreCard model

The indexes of the environmental perspective are from the RMS, which transforms the measured data from the operative management level into financial indexes for the strategy.

These indexes describe loss ratio, the effect of the environmental investments, and the return of these investments. A very important index is also the return of the costs of insurances.

4. IT SUPPORT WITH THE IRISK AND QRISK SOFTWARES

iRisk and the qRisk softwares developed by the author of this article helps to collect, store and analyse the indexes for the environmental aspect of the Balanced ScoreCard.

The iRisk software is used to specify the indexes for the processes. In the iRisk database can be stored financial and non-financial information about the risks, which will be used in the process, financial and the environmental view.

The qRisk software is used for the environmental view only. In the qRisk database are stored the exposure information about the workers, inhabitants, animals and flora in and around the factory.

5. OVERVIEW

This essay shortly describes a management model for companies operating with high environmental risks.

This management model has three levels: the operative management level, the special management subsystems and the strategy. On the operative management level are collected and measure all data that the higher levels need.

The special subsystems analyse and transform these data into financial indexes used in the strategy. Because of the importance of the environmental risks a new subsystem is required, the risk management subsystem. The strategy management can harmonize the operation of the subsystems through an extended Balanced ScoreCard system, which has five perspectives: financial, customers,

processes, employees and environment. With the help of this extended Balanced ScoreCard model the companies with high environmental risk can have a good control of their environmental achievement.

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