STRUCTURED IMPLEMENTATION OF A RISK MANAGEMENT SYSTEM ON THE EXAMPLE OF A MEDIUM-SIZED INDUSTRIAL ENTERPRISE

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Abstract: *Risk management is not always an intentionally controlled process. There are basic structures considering some of the obvious risks but those structures are often lacking proper documentation and implementation. As the scope for risk management has widened more and more during the last 10 years, it is absolutely essential that SME's, the same as distinguished private companies, large private companies and public companies, run a modern structured and fully implemented risk management system. According to § 91 II of the German Stock Corporation Act, it is a part of the care obligations of the members of the Management Board (analogous to Limited Companies' managing directors, see § 43 I and II of the German Limited Companies Act) to establish an appropriate risk management system and an internal monitoring system. An additional actual demand for risk management is stipulated in the new ISO 9001:2015 quality management standards.*

On the example of a company, which is a SME involved in the chemical industry, the requirement for risk management, which is codified in the described regulations, has so far been taken into account only to a limited extent. The goal of the paper is therefore to build options for implementing a risk management as an integral part of monitoring and control system on the existing structures within the corporate planning. It must also be ensured that the identification and proof of all of the measures in this respect should be carried out in a manner that is comprehensible for the auditors, because „... the auditor must support the Supervisory Board by examining the risk-early warning system as a part of the audit of the annual financial statements and, in the context of the management report, the disclosure of risks to the future development of the company and reporting on the outcome of the audit" (Wirtschaftsprüferhandbuch, 2000). Within the framework of the presented paper, basic structures will be created in order to subsequently enable a gradual refinement of risk management as the result of an exploratory process.

Keywords: *management, risk management, quality management, medium-sized enterprise, chemical industry.*

1. INTRODUCTION

The company in which the risk management system was analyzed is an enterprise involved in the chemical industry situated in Thuringia / Germany. Especially, it is mining for various kinds of salt through solution mining and subsequently processing and refining these into solid and liquid end-products.

The current status of corporate management of the example company has already been explored in recent surveys for existing approaches to risk management and a systematization and categorization of risks already identified [1]. As a result of a subsequent analysis of strengths and

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weaknesses of the existing risk management system, previously unrecognized risks have been addressed.

Subsequently, solutions are to be developed to enable the integration of living risk management as part of a corporate governance. After all of the relevant risks have been analyzed and described, a risk aggregation is carried out in order to assess the overall risk.

For the risk management to be understood as a control cycle, it is essential to install and operate a related controlling function. At the end of the article, focus is on creating a risk manual, combined with further recommendations for action points in the future.

In a critical appraisal, the results described in this article are examined for their possible scope of realization in the example company and open issues are addressed.

2. METHODOLOGY

In a preceding literature study, about 60 books and articles about potash industry have been reviewed regarding approaches to risk management and its specialties in the solution mining industry. Authors found out that at present, there is no specific literature on these disciplines in the field of solution mining and its special requirements.

In the context of this article, the topic should be intensified on the basis of an example company in the form of a case study. Goal is to find out, how the existing basic risk management of the example company can be approved considering the special risks of solution mining operations.

3. RESULTS

Standard controlling, risk management, and early warning systems have already been explored at a fairly high level [2], [3]. The available literature in the field of potash mining reflects the entire development of potash mining from the beginning. In addition, there are scientific papers dealing with partial aspects of this discipline. Although the extraction of carnallite by leaching has already begun to be explored in the late 1970s, especially the technical feasibility has established itself as a research object. Geological risks have been identified in part, but stringent interdisciplinary risk management has not yet been taken up as a research object. In summary, it can be stated that in the literature evaluated by the authors, only basic theoretical approaches to risk management have been found, but not in the field of solution mining of potash salts. Therefore, these basics need not be further investigated. As a result, there is a need to scientifically approach the management of specific risks to solution mining.

To involve risk management, first, the responsible managers must be identified. Due to the profit center organization of the company, the risk management should be assigned to the senior management (managing directors) and operated centrally from there. It makes sense to use the controller as the chief risk manager and chairman of a risk committee [4]. The risk committee reports to management and supervisory board. It should consist of the following group of persons in the sample company:

- Controller (Chairman),
- Chief Operations Officer (COO),

- Head of personnel & organization,
- Head of IT,
- Head of Accounting,
- Head of profit center A,
- Head of profit center B.

The committee should meet at regular intervals. During the meetings, minutes should be filed out of which dates, measures, and responsibilities emerge. At the same time, this has the advantage of providing auditable documents which enable evidence of living and evolving risk management. The minutes have to be archived chronologically and taken to other risk related documents.

In the run-up to risk identification, the Risk Committee should obtain corresponding literature and checklists [5]. These checklists are usually printed in the corresponding literature and require adaptation and supplementation to the respective company situation. In order to adapt, supplement, and structure these checklists, a meeting of the Risk Committee is necessary. In the course of deriving the typical risks for the named industry it is necessary to simulate combinations of risks which may correlate. For this, individual employees from the special departments are to be called in. In workshops, the checklists should then be coordinated and refined in areas using creativity techniques.

At the end of the adjustment process, the adjusted checklists should be reviewed critically in the plenum of the Risk Committee and are then being approved. They serve as the basis for the derivation of the risk fields in the next process step. From the answers to the questionnaire of the checklists, it is basically clear whether or not the requested subject is potentially risky. At this stage, the potential extent of the risk is not yet to be addressed.

In the next step, the identified risks should be assigned to the main categories which is a state-of-the-art procedure. The basis for this can be taken from the in-tabular form established result of the survey of the current state. Here, too, the literature offers a rudimentary solution [4] that only needs to be adapted to the circumstances in the company. The goal is not to develop as many subcategories as possible. However, a certain differentiation is needed in order to arrive at an individual risk profile for the company.

After the risks have been first identified neutrally and assigned to the categories, the next step is to determine the potential threat of each individual risk and combination of risks. For this, the risks are to be seen gross, i.e. without assessing the impact of potential controlling measures. In order to enable such a rating, it is recommended to set up tables per risk category. The probability of occurrence is rated on a scale from 1 (very low) to 5 (very high). This scale should be backed by ratios between 5% and 95%. In addition, the probable extent of damage is estimated with the same scale. These scale values should be underlaid with value-in-Euro ranges, e.g. scale value 1 corresponds to the range of 1,000 - 5,000 euros, etc. In the third column, a loss factor is then determined by multiplying the first two columns (sample is shown in annex 1). In this way, a priority list is drawn up, which determines which of the risks pose a particularly high risk and which are initially or completely negligible.

Risk management aims to bring each individual risk below the risk threshold set by the company. For the example enterprise, this threshold must first be defined. Of course, a risk threshold can be arbitrarily defined at any time as a desired value. However, it is better to first plan risk

management measures in such a way that the risk is reduced to a minimum, with reasonable non-excessive use of these measures. The aggregation of the individual risks by measures results in a provisional target value, within the framework of which the risk control measures have to move. If this value is divided by the number of identified risks, the result is the alternatively average threshold per individual risk. This average should then be extended to a corridor, giving the following picture:

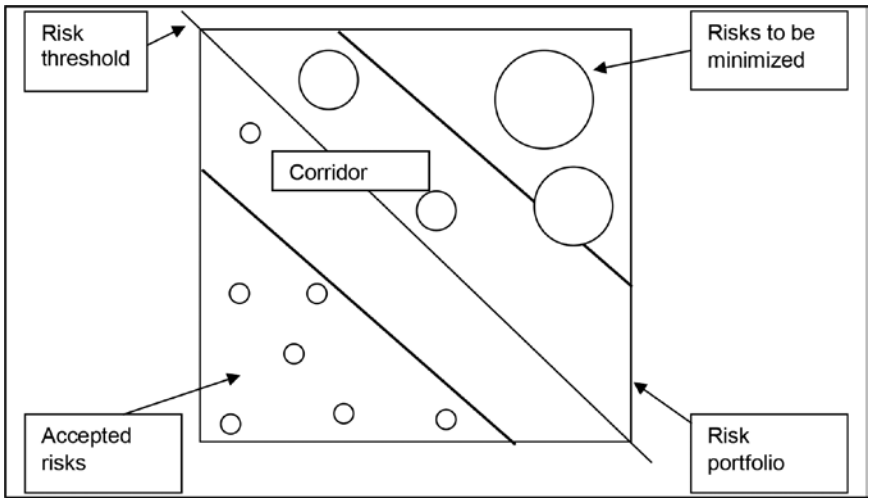

Figure 1: Risk portfolio *(Source: authors)*

The risk control itself is determined by the measures:

- Risk aversion,
- Risk reduction,
- Risk transfer, and
- Carrying the risk.

Subsequently, the risks have to be reassessed taking into account the planned measures with regard to probability of occurrence and extent of damage. For all risks / values above the target corridor, active control measures are to be evaluated and described in their impact. It is important to keep an eye on the costs of these control measures and also to properly document them. Only in this way it can be ensured that a reduction measure is not overcompensated by its high costs and reduced to absurdity. All control measures should be precisely documented and included in the risk manual.

Risk transparency is an important prerequisite for further development of the risk management system. Further research needs to be carried out pointing to unique areas of the business and possible interdependencies between those areas.

The risk manual should be designed as the "brain" of risk management and be the most important tool and working document. Auditors will dutifully ask for documentation of risk management efforts as part of their audit of the annual financial statements. This alone makes it necessary to keep the handbook as a central supporting document and constantly updated if necessary. The risk manual could have the content like shown in ANNEX 3. Of course, the manual may also consist of several folders. On the basis of the risk manual, a filing system is also to be organized which records documents that are no longer needed (old minutes of meetings, etc.). With increasing complexity, the manual would no longer fulfill its intended purpose. Again, a current occupation with the risk manual as such is indicated to keep this always up to date.

4. CONCLUSION

The complexity of the matter shows that risk management cannot be realized „just like that". In addition, this case is an open-heart surgery. The business cannot be stopped and yet existing structures must be partially broken up, changed and expanded. It is expected that this will certainly not happen without resistance.

First, the project should be presented to the company in general, for example in the context of a company meeting, and the reasons for the introduction of risk management should be explained. For this purpose, an absolutely positive use-conveying presentation is to be chosen, so that the ground is prepared for the future that every employee thinks „in risks", at least as far as his own job is concerned. At the same time, the Risk Committee should be introduced as a contact person in risk matters. Thus, the workforce is prepared and no one is surprised if examinations may be carried out at his or her workplace. Each of the described measures of the introductory phase requires intensive preparation. Committee staff should be largely exempted and substitution must be organized. This additional burden will be reflected in overtime for many employees. This fact must also be largely planned in advance so that the employees also have the opportunity to adapt to it.

The start of the project should be clearly defined and initiated by a constituent meeting of the Risk Committee. This ensures that everyone involved knows that the introductory phase is now irrevocable. First measures are to be decided immediately, such as the procurement of literature, etc. for the initial information. A network plan should already be drawn up and decided upon, which will phase out the planned time frame of the project at first. In order not to waste time, it makes sense to first set the period for the entire project to half a year. The network plan has to be constantly updated and checked for its temporal feasibility. Each individual measure should be underlaid with the start and end time. The goal is not to get done in shortest time possible but simply to bring a certain amount of tautness into the processes. Thus, the time argument is secondary only. Primarily, problems should be dealt with and periods should be extended if necessary. In doubt, accuracy precedes speed. All phases of the project should run one after the other in the order described above as they build on each other. Only when you can be sure that you can complete a phase with a clear conscience you should do so. The approval of each phase should take place during a Risk Committee meeting after a final session. This psychological moment ensures that one mentally abandons the old phase and deals with the next phase from now on. The risk manual as the most important document for future risk management should be kept from the beginning and be a constant companion. Initially an empty folder, it will fill up and absorb the results of the progressing phases. The manual grows in parallel with the increasing expansion of risk management. Thus, the current state of the project is always documented and allows a comparison with the goals set by the network plan in the context of project controlling. Under no circumstances the risk manual should be perceived as an annoying side effect and only be created after completion of the introductory phase.

5. CRITICAL APPRAISAL

The realization and the success of the project initially depend essentially on the attitude of everyone to really want to operate a risk management. The legal „must" is no guarantee for a positive attitude of the protagonists to the risk challenge. There is at least a risk that the introduction of risk management will only be seen as a supplier of additional work. Ultimately, this

could in turn have an impact on the risk identification phase. Since the risk inventory created, for the first time forms the basis for all risk management, a possible demotivation of the parties involved could lead to friction and partial failure of the project. This must be achieved by a comprehensive education and positive motivation (not with raised index finger!). The risk management inherent risk lies in the initial apparent overweight which it is operated with. Since it is an innovation in the company, it is automatically dealt more with than with the functions that are already in routine use. This can lead to a hedging „risk prevention management" because risk in mind is usually anchored as something bad and threatening. This attitude leaves no room for the use of opportunities.

A practiced risk culture is desired and essential for the further success of risk management. But safety thinking should not be overstated here. The extent of the risk culture in the company cross-sections, however, will remain an imponderable. Further and constant research on the industry-typical unique risks is absolutely necessary.

One question that could not yet be clarified was the risk to the company from risk aggregation. Adding up the static risks of all risks identified in the company, one arrives at a value that the company can no longer bear and certainly drives it into insolvency. Since it is unlikely that all risks will occur together at one time, it will probably not come to this incident.

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ANNEXES

ANNEX 1: Risk Assessment List
ANNEX 2: Description of risks, category "Marketing & Sales"
ANNEX 3: Risk Manual (Index)

ANNEX 1

Risk Assessment List

Risk description	Probability of occurrence	Probable extent of damage	Loss factor
Risk A	4	5	20
Risk B	3	4	12
Risk C	3	2	6
Risk D	1	2	2
…	…	…	…
.	.	.	.
.	.	.	.
.	.	.	.

(Source: authors)

ANNEX 2

Description of risks, category "Marketing & Sales"

Risk	Cause	Impact	Extent of damage	Probabiliy of occurence	Non-quantifiable impact
Acquisition of new customers	Market data not sufficiently known	Wrong reaction to market and competitors	5 Mio. Euro (related to planned gains in turnover)	40% because the market is explored at 60%	Loss of image
New product is missing first customers	Competitor appeared faster in the market place	Revenue target jeopardized	10 Mio. Euro	50%	Ommitting follow-up orders
Recoverability of receivables	Risk of default in retail business	Liquidity, P&L result	25 Mio. Euro	5%	-
…	…	…	…	…	…
.	.	.	.	.	.
.	.	.	.	.	.

(Source: authors)

ANNEX 3

Risk Manual (Index)

1.) General information

2.) Fundamentals of Risk Management
- 2.1) Risk management goals
- 2.2) Risk identification
- 2.3) Risk categorization
- 2.4) Risk assessment
- 2.5) Risk management
- 2.6) Risk control

3.) Organization
- 3.1) Development of organization
- 3.2) Process organization
- 3.3) Risk committee
- 3.4) Risk owners
- 3.5) Reporting

4) Risk Data Sheets
- 4.1) Risk checklists
- 4.2) Risk assessment lists
- 4.3) Risk documentation
- 4.4) Measures for Risk Control

5.) Other
- 5.1 Minutes of Risk Committee Meetings
- 5.2 Resolutions of the Risk Committee
- 5.3 Ongoing controlling reports
- 5.4 To-do list / notes
- 5.5 Review and Update Notes