MEANING AND USAGE OF A CONCEPTUAL ENTERPRISE RISK MANAGEMENT FRAMEWORK – A CASE STUDY

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Abstract
Enterprise Risk Management (ERM) includes processes and methodologies for organizations to manage companies' risks. Due to an increase in the environmental complexity, a standardized approach of managing risks and opportunities is not only useful, but absolutely essential for business continuation – the way organizations deal with such risks is the key role for success and can be seen in the company's overall performance. In a previous paper the authors suggested a model for ERM assessment. In order to proof this model, this paper presents a case study of a production company with a working ERM to evaluate the model, based on a real example.
The results demonstrate that a suggested model to assess ERM and its performance is practically useable by organizations and might be further extended in future studies.

Key words: *risk management, ERM, sustainability, performance measurement, risk management framework.*

JEL Classification: *M10*

I. INTRODUCTION

Organizations as such and their business success are determined by the way risks and opportunities are managed (Global Corporate & Specialty SE, 2016). Organizations have to deal with various risks and their associated uncertainties for company outcomes, which might as well influence overall objectives and their achievement. Therefore, the management of risks and opportunities should be an integral part of the companies' activities. To identify possible risks which might occur, a sustainable risk management framework, in regard to efficiency, effectiveness and adequacy should be implemented within the companies' structures (Hopkin, 2014). Enterprise Risk Management (ERM) shall provide a framework for integrated risk management to meet legal obligations, ensure risk awareness and sustainable management of identified risks within the companies' organization and process landscape (Liangrong Zu, 2013).

Risks, their management and an elaborated framework for enterprise risk management are described and analyzed within this paper. Therefore, a case study of an exemplary company's ERM process has been conducted. These gained insights are combined with literature findings in regard to the implementation of ERM in a company. Based on these finding the authors verify the applicability of the suggested framework and risk management in the context of sustainability.

II. RISK AND RISK MANAGEMENT

2.1 Meaning and impact of risk and its management

In the context of this paper, risk is seen as a circumstance that could adversely affect the achievement of business objectives for the organization in scope and as such be used to signify negative consequences (Anderson, 2005).

Risk taking and its proper management is crucial for growing and developing an organization. Proactive risk approaches might lead to improvements in strategical, as well as tactical and operative areas, because options and possibilities are analyzed in more depth (Hopkin, 2014). Therefore it is important to identify and manage risks to minimize their threats and improve their potential (Institute of Risk Management, 2006). Thereby, risk is measured in regard to likelihood of the occurrence and impact, e.g. to the process-effectiveness and efficiency of an organization. But also the individual risk attitude of the company should be considered and it is important to analyze risks in the context they might occur in (Lehner, 2013).

2.2 Principles, aims and approach

As mentioned before, risk management is important for business success, also by supporting decision making and improvement of efficiency and effectiveness of processes and organization and consequently delivers value to the organization – in general it can be stated, that sustainable risk management should support towards achieving the best possible outcome and reducing uncertainty of outcomes for the organization (Hopkin, 2014).

Besides fulfillment of mandatory obligations like the necessity of implementing a risk detection system according to § 91 par. 2 of the German Companies Act, various principles and aims for risk management are described in literature. It can be generally stated, that sustainable risk management, in regard of effectiveness and success, is adequate to the level of risk, but shall also be aligned with other activities within the organization. Risk management should not be isolated, but embedded within a structured approach which also allows flexibility for iterative development.

The risk management approach for every company is determined by market, size and the complexity of the organization and the risk it faces, but in general risk management is a process that is based on several common steps, such as identifying, analyzing, evaluating, treating, monitoring and reviewing (Lioa, 2012).

Taking this into account, the company risk management process itself and the framework that implements and supports it, can be separated. Nevertheless, the process and framework are necessary for the management of risks within an organization, which is an integral part of ERM.

2.3 Sustainability within risk management

Due to the increasing impact of social and environmental issues on business success as well as the upcoming European regulation regarding non-financial information on sustainability and social responsibility (EU directive 2014/95/EU), companies pay attention to sustainability. Therefore, sustainability should also be integrated in management, risk approaches and practices (Liangrong, 2013). Sustainability covers political, economic and social aspects, whereby sustainability-related risks should be part of a company's core risk analysis due to the potential financial impact (Kaye, 2014).

The approach for taking sustainability within risk management into consideration is described in literature within sustainability risk management (SRM). The reconciliation of these long time effects and changes with impact on finance and overall business success is a challenge which also influences risk management (Smith, 2003).

III. ENTERPRISE RISK MANAGEMENT (ERM)

3.1 Approach and strategies

In general, and also mentioned before, ERM aims at identifying and responding to opportunities and risks, which might affect the achievement of business objectives in an effective and integrated way (Anderson, 2005). An effective ERM is based on a high transparency regarding risks and their evaluation in terms of their qualitative and financial impact. For a broad understanding of the risks, a detailed description should ensure a common understanding of the risk and identify responsibilities. The identification und description is the basis for classifying and further handling, whereby different classification approaches, e.g. such as attributes of the risks, nature of impact or magnitude of the risk, might be possible. A risk assessment should also cover qualitative dimensions, as e.g. effects on a company's reputation (Poser et. al., 2012).

The literature suggests to use a risk matrix to show the inherent level of the risks in terms of likelihood and magnitude and also to indicate the likely risk control mechanism which might be applied. Various risk management approaches are established, whereby it is important to emphasize the distinction between a risk management standard, the risk management process and a risk management framework.

The risk management standard sets out the overall approach to the successful management of risk and as such covers the risk management process itself as well as the framework.

Within this paper, a framework for risk management covers the purpose, vision and mission of the organization and its integration within risk management. Also measurement-dimensions, as well as legal requirements and overall performance indicators are important factors to consider. The framework shall implement and support the risk management process of the organization itself (Hopkin, 2014).

Generally, it is important for an organization by setting-up their risk classification and management system to determine which risks might occur to ensure that the selected risk classification system is relevant to the individual organization's belongings and requirements (Poser et.al., 2012). The risk management process itself and the risk management framework should consider the current state of knowledge, but also grant individual organizational adjustments and enhancements.

3.2 Assessment of ERM in companies

Seeing ERM as a collection of a very large amount of different risks of an organization (including risks in the context of sustainability) it seems logical to measure the outcome not only in financial figures but also in other aspects. Therefore, besides quantitative, also qualitative approaches are needed to understand the meaning of ERM for every company. Within the analysis of ERM, the individuality of each company has to be taken into account. Also quantitative, as well as qualitative approaches and dimensions should be considered. Therefore, not only KPIs, but also e.g. strategic goals, the organization and all applied processes in regard to the sustainability topic are relevant. In general, ERM has to be seen in connection with the organization and its risk culture, whereby the companies risk management should cover all different kinds of risks, also within and with regard to sustainability (Gates et.al., 2012). For the evaluation of the effectiveness of ERM, actual literature findings suggest using an enhanced Balanced Scorecard approach which analyzes ERM features and their contribution to achieving financial and non-financial goals (Saeidi et al., 2014). It is stated, that ERM should be evaluated in regard to "performance", whereby the measurement can be based on the Balanced Scorecard method and include the use of economic value added (EVA[4]) (Hawawini et. al., 2003). The balanced scorecard method is a management tool which measures the organization's progress toward achieving strategic goals and assesses the progress in various dimensions (financial performance, customer satisfaction, internal processes, learning and growth for employees) and with a focus on strategy, similar as the categories suggested by COSO[5].

Taking literature findings and the approach for sustainable ERM into account, the authors elaborated a model for assessing ERM and measure the performance of companies risk management (Kopia et.al., 2016), based on the above mentioned research results and limitations. It is based on existing methods and should help to identify approaches for assessing ERM in practice as well as research:

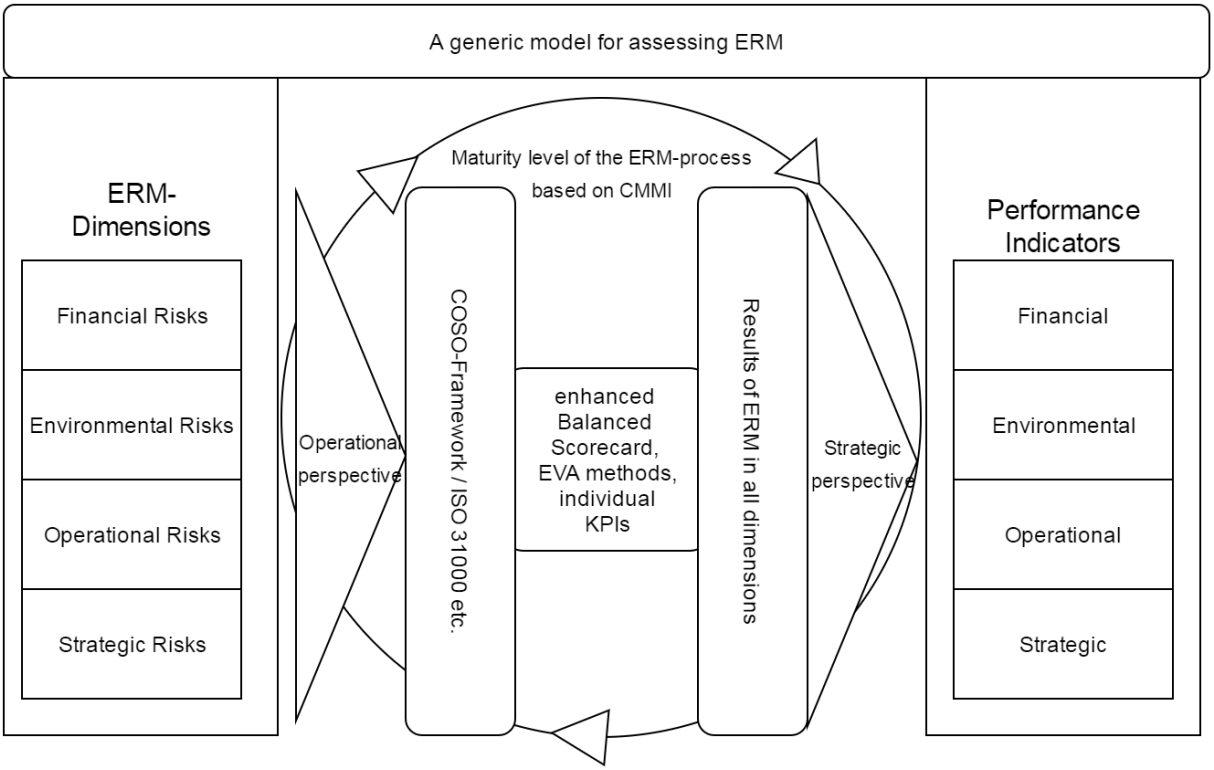

Figure 1: Generic model for ERM-assessment (Source: Kopia et.al., 2016)

It is necessary to create a clear understanding of identifying and assessing risks as well as monitoring and measuring the process individually for each company. Frameworks provide essential methodologies for ERM, whereby the improvement of the risk management processes is an essential part. It can be stated, that many recent studies try to measure the impact of ERM by solely using financial figures, but mostly ERM is not analyzed in depth due to the complexity of this topic. Therefore, the authors elaborated a case study to gain insights into the complexity of ERM within an organization. This case study shows the adaption and implementation of theoretical aspects of risk management, but might also serve to evaluate the usefulness of the suggested measurement framework for ERM.

[4] EVA® is a trademark of Stern Stewart & Co. (US consulting firm).

[5] The Sponsoring Organizations of the Treadway Commission (COSO) divides risks into different categories, e.g. strategic, operations, reporting and compliance.

IV. CASE STUDY

ABC is a big global operating company in the manufacturing business. They produce goods in 5 different countries and have offices in 16 countries. ABC is also involved in logistics dealing with thousands of deliveries every day.
Risk management is a vital component for ABC in many different areas. ABC established risk management practices at an early stage during the foundation of the company. Risk management was considered as integral part within the strategy process.

4.1 Risk management in the company's environmental management system

Since its intensive use of machinery and heavy equipment including diverse kinds of chemicals, environmental risk were always extensively considered (closely followed by financial risks). In order to be compliant with environmental laws and regulations, the company established an internal team (called E-Team and subordinated to the environmental risk committee) which was responsible for the following points:

- Establishing internal rules and regulations in accordance with the existing law
- Auditing in regard to rules and regulations
- Defining and establishing internal best practices and standards (ISO 14001 etc.)
- Reporting status and incidents to the management board

The E-Team created an environmental policy document which became mandatory. All new processes had to be evaluated against the policy and the linked documents and checklists. This policy document became the lead document in the later ISO 14001 environmental management system (EMS) certification. The integration of an EMS and the certification were not forced by law, but suggested by the E-Team as a widely used and practical basis for their own work. ISO 14001 mainly provides the management with all information needed to create a successful and sustainable development. The ISO 14001 requires a risk management approach within the operational processes. The team defined a risk management approach which fits the norm, but is adapted to the organizational processes. Risk management in the company always involved the following steps:

1. Identify risks
2. Calculate the respective impact, depending on internal and external impact
3. Communicate to stakeholder
4. Involve top management

The E-Team calculated the risk based on the likelihood and the impact to evaluate actions in the format of a risk matrix (see figure 2), whereas all teams uses different matrices depending on the area they are working in.

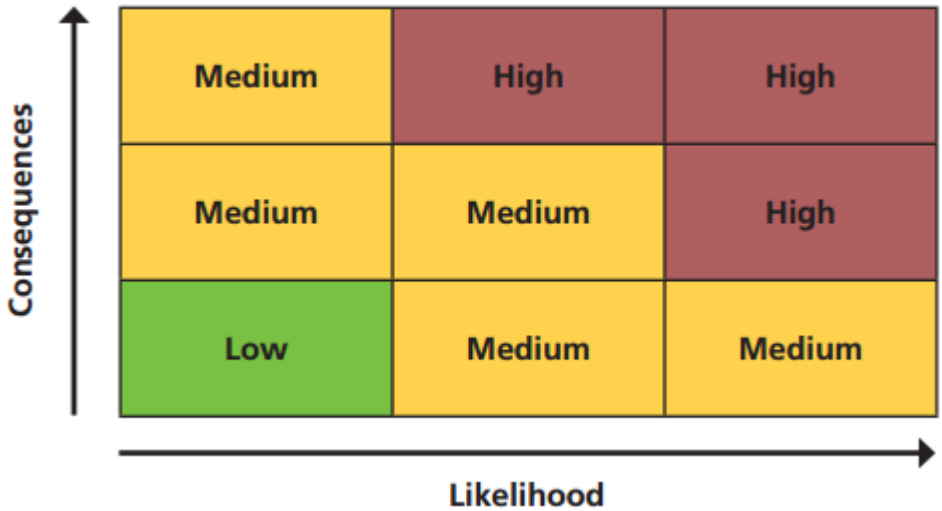

Figure 2: One example of a risk matrix used by ABC's E-Team (Source: ABC)

Every risk which fell into the medium or high category had to be treated in some way. The risk management process was a continuous process so that new production facilities, methods, projects and other new incidences were assessed on a regular basis. The final responsibility of the environmental risk laid on the top management. The management was informed on a monthly basis, using the following KPIs:

- Generic KPIs included the emission rate of certain substances over a period of time. There was a maximum level of emission for each substance, so that every problem incidentally raised an incident. The maximum emission rates were regulated by law.

- Two KPIs showed the average usage of certain resources
- Two financial KPIs showed the environmental expenditures and fines
- One KPI demonstrated the status of the environmental risks of the last period

4.2 Risk management in other company's areas

Risks in other dimensions were mostly part of professional teams in the respective departments and generally underestimated when compared to environmental risks. The financial risks management is part of the accounting department which includes controlling. Internal financial audits are assisted by an external consulting company which included a risk assessment of the financial risks (mainly credit risks, risk on liquidity, and marked based risks). Financial reports are generated on a weekly basis. A more detailed report is generated every 4 weeks which involves more Stakeholders. Further effects of market forces on financial assets are further outlined below.

Another typical risk management process takes place within some parts of the production process of the supply chain. The internal quality management system requires the definition of risks and mitigation measures, as well as a continuous improvement process. A quality management policy defines several facts and figures and controls what level of quality has to be reached (including number of defects etc.). Generally, everyone is involved in improving the quality on a daily basis within the production line, enabling all employees to constantly improve their work. ABC makes that possible by living a very open communication where everyone is invited – even required – to suggest improvements. This holds true for every employee, but in particular for the people working closely with product parts, machines etc. or those who are involved in the design of the products. There is an internal competition between teams (either by certain topics or by countries etc.). ABC is engaged in a very close communication with customers in order to get a quick feedback. Supplier are strongly integrated into the processes and strictly controlled in regard to quality (the supplier management process also involves a regular supplier audit in other dimensions such as financial stability, information security, compliance to laws etc.). Local quality managers are responsible for the risk management process. In the assembly lines, risks are calculated on a frequent basis. If the defect rate or the precision of a certain tool is not in accordance with the set standard, hundreds of products might be lost. Decisions need to be made very quickly in order to operate profitably. Therefore, a direct link from every quality manager to the enterprise risk management committee was established where incidents are handled very quickly. For the normal daily business, quality related key performance indicators (defect rates, customer involvement, separated by countries and productions assemblies, the improvement rate in three different categories etc.) are reported on a monthly basis to the top management which puts these figures into the operational risk category.

4.3 The company's Enterprise Risk Management process

Other reports like that exist for sales and marketing figures, including reports of market development from different perspectives (social, economic, political) as well as customer communication (especially feedback, complaints, and praises), employee related topics, technical assets etc. ABC developed a standardized reporting format for all areas which is structured as follows (see table 1):

Department X

Table 1: Header of the reporting template to the risk committee (Source: ABC)

General goal	KPIs	Last period	This period	Estimated future development	Measures

ABC uses qualitative and quantitative measurement methods for the KPIs which are assessed on a yearly basis in order to check whether the method and the KPIs are still useful and appropriate for the desired result. The process of identifying measuring points and creating an indicator is usually done using workshops (annual ERM workshops) where different departments (the professional departments, the risk committees, and the leading officer of the team (quality manager etc.) agree on KPIs and the way and intervals to measure them. Besides metrics, the general risk appetite and risk tolerance levels are defined and communicated internally and externally to 3rd parties with the risk statement. Tolerance levels are inputs not only to employees, but also to existing early warning systems.

The top management and board members are usually involved since critical risk decisions are the responsibility of the top management (Board, see figure 3). ABC generally sees the management of enterprise risks as a strategic process with top management responsibility. After the workshops, the board presents the current risk status to the employees which also includes the presentation of the "risk culture" of ABC. Together with risks and threshold values, current status and future goals are also presented and defined, such as liquidity and cash flow, product quality, regulatory compliance, information security breaches etc. The ranges and

acceptable deviations from the norm are presented as well as deviations that would require an incident report and the attention of the risk committee. A special focus is put on product quality and customer communication.

ABCs ERM consists of many different aspects - three of them were mentioned before as an integral part of the enterprise risk management process. The risk management processes and procedures in the departments describe the operational level. ERM on the other side is seen as the strategic level where the operational reports are aggregated and these aggregated risks are calculated in terms of likelihood and impact, determined in the sense of defined a response strategy, and monitored regarding progress.

Risks resulting from strategic decisions are assessed within the strategic focus group of the risk committee of the company. Another two focus groups assess financial risks and environmental risks whose measures are mainly made within the corresponding teams on the operational level (see figure 3).

The resulting ERM is a collection of various risks and measurements on different levels coming from the operational level (buttom-up) and from the strategic level (top down). Decisions based on the collected values are prepared within the general risk committee and made by the management, the executive level resp. (see figure 3).

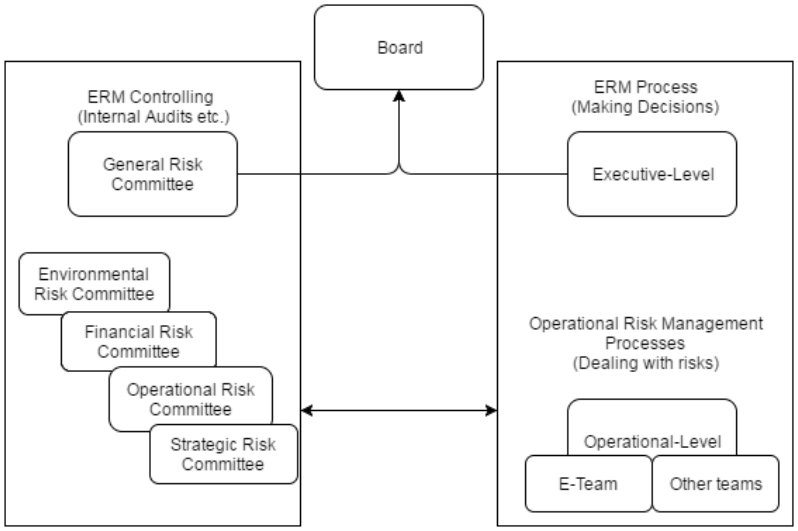

Figure 3: organizational ERM governance structure within the company (Source: ABC)

The ERM methodology used by ABC involves an ISO 31000 related risk management process, consisting of the risk assessment process with the steps risk identification, analysis, and evaluation, and the risk treatment process (surrounded by monitoring and communication of risks). Generally they use a risk rating matrix to define the category of the risk (see table 2). Since ERM includes many topics with complex interactions between each other, other rating methods are used for detailed assessment.

Table 2: The general risk rating matrix of ABC (Source: ABC)

Probability \ Impact	Low	Noticeable	Significant	Threatening	Massive
Very often (daily)	II	II	II	III	III
Frequently (weekly)	II	II	II	III	III
Occasionally (monthly)	I	II	II	II	III
Infrequently (yearly)	I	I	II	II	III
Rarely (once in ten years)	I	I	I	II	II

Table 2 shows a translation matrix from risks of different topics. A risk in the social category could be rated with a medium level (calculated by a risk score), a risk with a similar value but in the technology category would be rated as high level risk.

Table 3: risk translation matrix of ABCs ERM (Source: ABC)

Category / Risk Level	Social	Technical	Political	Environmental	Financial	Operational	Infrastructural	Legal
Level 1	Low	Low	Low	Low	Low	Low	Low	Low
Level 2	Low	Medium	Low	Medium	Medium	Medium	Medium	Low
Level 3	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium
Level 4	Medium	High	High	High	High	Medium	Medium	High
Level 5	High	High	High	High	High	High	High	High

Based on the ISO 31000 methodology, the risks are assessed with respect to the context of the organization (based on the strategy). In regular intervals the risk committee evaluates the aggregated risks based on the levels of table 3 in the following way:

1. The input from the operational level and collected information of the subordinate risk committees are used to summarize risks of different types and areas of origin (e.g. department). The standardized template (see table 1) is used for the purpose of comparing different risks.
2. The aggregated values from the operational level are added to the summarized risks, resulting in a risk value (based on likelihood and impact) which can be used to define the risk level of each of the rows of table 3.
3. A standardized incidents report and measure-register is also evaluated in order to identify further risks. Other risks, which might not be visible on the operational level are identified and assessed in the same way as above (e.g. strategic).
4. If necessary, further analyses of risks are undertaken. The result is a more precise view of the likelihood and impact (using diverse techniques) of the risks.
5. Depending on the risk-level, the mitigation strategy is formulated for each risk if possible. If not, further tasks are defined to get a clearer understanding of the problem.

Existing risks are reevaluated and new risks are calculated and put into an enterprise risk catalogue. This catalogue which includes risks from the previous periods as well (and therefore has over hundreds of entries) also includes an overview of active clustered risks (see figure 4) where each risk is put in the matrix including the way it is dealt with (mitigated, transferred, accepted, etc.). Figure 4 shows examples of several clustered risks of ABCs. E 121 (M) is an environmental risk with the ID 121. It has a high impact but low likelihood and is therefore in a yellow category which forces the executives to define and implement the measure of mitigation.

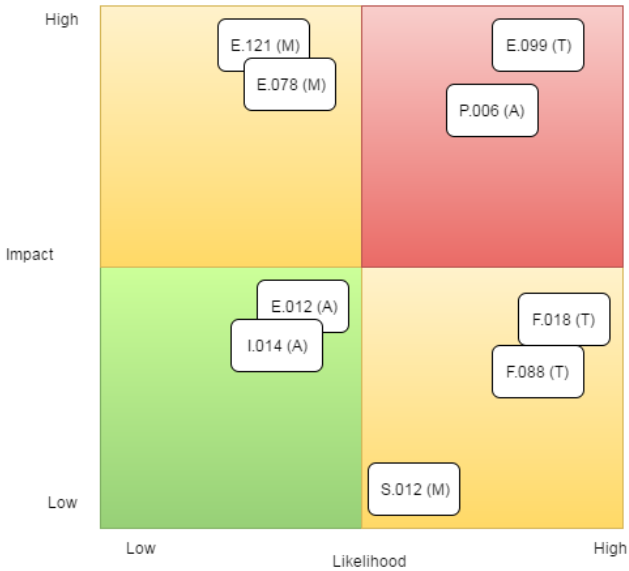

Figure 4: Clustered overview of risks (excerpt) at ABC (Source: ABC)

All control activities are reviewed on a regular basis, depending on the severity of the risk by the risk committee. The risk catalogue is an input to the yearly ERM workshops mentioned above as well as one to the business continuity planning of the organization.

4.4 *Application* of the generic model for assessing ERM

ABC shows an excellent example of the generic model for assessing ERM (see figure X). The company assesses enterprise risk on different dimensions and even defines separate teams and committees for each dimension. Here the operational perspective is generated. The entire ERM-process is based on an ISO 31000-risk management approach which itself is a cyclic process of constant improvement of the process itself. The maturity of the risk management process is not measured directly, but the ISO-based continuous improvement process is management by a statistical measurement of the certain values as the amount of risks in a period of time, response time to critical risks, response time from risks raised by ERM-teams until the final measure is scheduled, cost for the ERM in general etc. Different KPIs are used to evaluate risks (no information were found within research that the company uses a balanced scorecard or the EVA-method for this purpose). The strategic perspective is generated with two separate processes: in a first step the strategic perspective is based on the ERM-process on the operational level and in a second step by a separate strategic risk assessment which evaluated risks that are not present on the operational level alone. The result of the ERM-process is a list of risks and measures and a clustered risks view which holds a most recent status of historic and recent risks.

ABC itself does not measure the performance of ERM. A general raise of enterprise risks identified and mitigated is not a performance indicator, nor is it the invested budget for ERM. The response time to critical risks and the time between identification and mitigation efforts decreased within two years. But these values can also be hardly used to measure performance for a company. Compared to the historic development ABC had two times more critical environmental events 5 years ago than within last year. The raised awareness and the reaction time to environmental risks can therefore be seen as one performance indicator: Through ERM the company was able to half its environmental risks. Several risks on the operational level including a critical error in a production facility did not create any directly visible performance improvement but prevented defect productions, expensive repairs and customer communications processes. These aspects within the last 7 years were guessed saved almost 10 million euros – cost savings which were generated by a constant ERM process. These cost savings can be a financial performance indicator for ERM if the reason is really the ERM process or at least part of it. The same way the gain or loss of a strategic decision which went through an ERM cycle can be accounted to ERM partially and indicate ERM-performance.

V. CONCLUSION

The management of risks resulting from various sources is not only described in literature, but considered within companies risk management approaches. Due to this, ERM should also cover risks associated with sustainability and therefore integrated topics regarding sustainability in risk management approaches and practices (Liangrong Zu, 2013). Thereby, sustainability might consider political, economic and social dimensions and as such sustainability-related risks should be part of a company's core risk analysis regarding a possible financial impact (Kaye, 2014). As possible influencing factors on finance and overall business success, risk dimensions of sustainability shall be aligned with company's approach of risk management (Smith, 2003).

The authors considered within their generic model of assessing ERM dimensions and indicators also the thought of sustainability.

In order to evaluate this, a measurement framework for ERM using the presented case can be concluded as follows:

1. The manufacturing company ABC did not follow any general existing best practice, but rather chose its own methodology of assessing the topic ERM. Instead, the company uses a dedicated reporting system, based on quantitative and qualitative indicators
2. The company established management system standards (as ISO 14001 Environmental management system) to use best practice approaches in specific areas and defined individual key performance indicators to assess the ERM-system.
3. ABC established an individual integrative quality management system with an open communication.
4. They integrated their management systems (as the quality management system and the ISO 14001 EMS) into the ERM processes by linking them on the basis of key performance indicators which present the risk status of the business area.
5. The regular KPI-report from different departments is assessed by the enterprise risk committee generating a regular risk status for the organization, based on risk impact and risk likelihood using a standardized method (ISO 31000). The sources of these risks are based on the work of certain within different departments. They are derived from financial values, but also product quality, information

security compliance etc. The results from the ERM-perspective is a generalized risk status of the entire organization - the performance of the company seen from a risk management perspective.

To summarize the findings, the case study demonstrated that ABC makes use of most of the generic approach presented by the authors. Sustainability and accompanied risks should not be analyzed isolated but identified, evaluated and monitored within the risk management processes of companies.

The ERM-assessment model can be practically used in in all organizations which face the challenge to integrate several different risks coming from many different areas into a company-wide ERM framework.

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