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COMPANY RISK MANAGEMENT

– Case study

TURKU AMK
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MASTER'S THESIS | ABSTRACT

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The backround for this thesis was renewal of the ISO 9001 quality standard in 2015. According to the new standard, risk-based thinking should be incorporated into the quality management system rather than being separate component of the system. This case study focuses on current quality manual and risk management measures in a specialty chemicals and food ingredients distribution company, IMCD Nordic, and how to develop it further.

A case study was chosen as a research method to obtain the most accurate picture of the activity and the status of the case company and could be viewed against the theoretical background of the thesis. The theoretical framework consists of two parts, quality management and risk management.

In the results of the thesis, the case company's current risk management actions and their suitability for the company's processes were evaluated. Based on that evaluation suggestions concerning risk assessment and the use of resources were presented in order to improve risk management.

KEYWORDS:

Quality Management System, Risk Management, Leading, Processes

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YRITYKSEN RISKIENHALLINTA

- Tapaustutkimus

Tämän opinnäytetyön taustalla oli ISO 9001 laatustandardin vuoden 2015 uudistus. Uuden standardin mukaan riskipohjainen ajattelutapa tulisi sisällyttää osaksi laadunhallintajärjestelmää sen sijaan, että se olisi irrallinen osa järjestelmää. Tässä tapaustutkimuksessa keskitytään kemikaalien ja elintarvikelisäaineiden jakelijayrityksen, IMCD Nordic:n, nykyiseen laatukäsikirjaan ja riskienhallintatoimiin ja kuinka niitä voisi kehittää.

Tutkimusmetodiksi valittiin tapaustutkimus, jotta kohteena olevan yrityksen toiminnasta ja tilasta saataisiin mahdollisimman tarkka kuva ja sitä voitiin tarkastella työhön koottuun teoreettiseen taustaan verrattuna. Työn teoreettinen viitekehys koostuu kahdesta osasta, laadunhallinnasta ja riskienhallinnasta.

Työn tuloksissa kohdeyrityksen nykyisiä riskienhallintatoimia ja niiden soveltuvuutta yrityksen prosesseihin arvioitiin ja sen pohjalta esitettiin parannusehdotuksia riskien arviointiin ja resurssien käyttöön.

ASIASANAT:

Laadunhallintajärjestelmä, Riskienhallinta, Johtaminen, Prosessit

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LIST OF ABBREVIATIONS

CMT	Core Management Team
COSO	Committee of Sponsoring Organisations of the Treadway Commission
ERM	Enterprise Risk Management
HR	Human Resources
HSEQ	Health, Safety, Environment and Quality
KPI	Key Performance Indicator
NCR	Non-Confomance Report
PESTLE	Political, Economical, Social, Technological, Legal, Environmental
QMS	Quality Management System
SWOT	Strengths, Weaknesses, Opportunities, Threats
TQM	Total Quality Management

1 INTRODUCTION

1.1 Background

The subject of this thesis was selected because the ISO 9001 standard was revised from the 2008 version to a 2015 version. The case study company, IMCD Nordic, was certified according to ISO 9001:2008 so the Quality Management System (QMS) needed to be updated into version 2015. The main change in the new revision of the ISO 9001 standard was to establish a systematic approach to considering risk, rather than treating “prevention” as a separate component of a quality management system. The starting point for the thesis was to take a deeper look into risk management within IMCD Nordic.

1.2 Case study – IMCD Nordic

IMCD Nordic is part of a bigger corporation; IMCD group, which is a leading company in sales, marketing and distribution of speciality chemicals and food ingredients. IMCD group employs over 2,200 professionals in more than 45 countries. IMCD group’s mission is to lead sales, marketing and distribution of specialty chemicals and food ingredients and with a full-matrix structure deliver best-in-class performance by sector, both locally and across territories.

IMCD Nordic consists of offices in Sweden (head office), Finland, Norway, Denmark and Lithuania. Warehouses are located in Sweden, Finland, Norway, Lithuania and Estonia. Also in Sweden, IMCD Nordic has two technical centres; Food and Construction.

1.3 Aim of the project

The aim is to gain an insight of current risk management procedures and develop the risk management strategy within the company. The risk management strategy has been set at corporation level and subsequent actions are taken locally. This thesis also focus on how current risk management is applicable in process level.

2 RESEARCH METHOD

2.1 Case study

There are a number of research alternatives in qualitative research, Phenomenography, Grounded theory, Ethnography, Action Research, Case Studies, and Social Constructiology (Saaranen-Kauppinen, Puusniekka 2006).

The case study examines a single event, a restricted entity, or an individual. The aim of the study is to provide a systematic, accurate and truthful description of the characteristics of the object (Sjöberg, 2016). The object of a study may be a single case or a series of cases. Individual cases are explored in detail in their natural environment. For example, theses are typically case studies because they relate to a certain company or organisation (Saaranen-Kauppinen, Puusniekka 2006).

A case study can provide a wide range of knowledge. Pentti Routio (Routio, 2007) divides the purpose of a case study into four points:

" 1. Descriptive research desires to describe the object - not just its appearance but also its hidden structure or its earlier development.

2. An Explanatory Survey explains the reasons why the object is the one that it is or why it has become such.

3. A predictable study will determine the probable future of the object.

4. Guiding or normative research will try to improve the status of the object or to develop other similar objects in the future. "

A case study is often chosen as a research orientation when you want to understand the object deeply and take into account the related context (circumstances, backgrounds, etc.) (Saaranen-Kauppinen, Puusniekka 2006).

The weakness of the case study is its narrowness. The representative nature of the research and the generalisation of the results as only one case under review raises questions. However, careful examination of a single case can provide information beyond the individual case, although it cannot be generalised. As a strength, it can be considered that a case study does not limit the method used. Both qualitative and

quantitative methods can be used. Material for a case study can be collected by interviewing and searching for ready-made material (Saaranen-Kauppinen, Puusniekka 2006).

Theoretical framework of this theses consist of theory of Quality Management and Risk Management. Theoretical data was collected from literature and seminars. The most important research material is IMCD´s internal QMS documentation, which was used in order to gain a deep understanding of the research objective. In addition to that research, material was collected from surveys to external stakeholders.

Risk management in this theses is only investigated from IMCD's point of view and for this reason the results of the research are not directly generalised. On the other hand, the results can also bring ideas that can be used in other organisations such as IMCD sister companies.

3 QUALITY MANAGEMENT

3.1 What is quality?

Quality means different things depending on how we approach it. For example, oil companies say that they have two different oil qualities (grades); winter quality and summer quality. Other famous brands may state that “luxurious” is quality. In business it can generally be considered that excellent performance (business excellence) of what you do is quality. (Lecklin, Laine 2009, 16)

To understand modern quality perception, let´s take a quick overview of the history of quality. Quality-thinking was born after the start of the Industrial Revolution, when quality of products was not only in the hands of skilled crafts-people but also when products started to be manufactured with specially designed machine tools. In early days, quality was simply segregating bad products at the end of the process but in the 1920s, Walter Shewhart, Harold Dodge and George Edwards, amongst others, generated new ideas and methods to improve quality. Those methods (control charts, sampling techniques and economic analyses) formed the basis of today’s Quality Control. These methods also affected the thinking of Jospeh M. Juran and his colleague, Edwards Deming, who later influenced in many ways the “Quality Revolution” globally. (Evans, Dean 2000, 6)

After World War II, the USA was the leading global manufacturer of most consumer goods and the focus was mainly in marketing, production quantity and finance. At the same time, Japanese manufacturers started to follow Deming´s advice to concentrate on the quality. In the late 1970’s and 1980’s, Japan, amongst others, gained remarkable market share from the USA with high quality products. During the late 1980’s, the USA also awoke to the concept of quality-thinking. Finally, in the 1990’s, quality shifted from the manufacturing sector also into services. (Evans, Dean 2000, 6-8)

Nowadays we understand quality as customer satisfaction. We compare quality to customer needs, demands and expectations and a company has succeeded if customers are happy. In manufacturing and services it means different things. Determining the quality of manufactured products is easier than the quality of services since product features are more defined whereas services, control limits and definition

of deviations are more complex. Anyhow, manufacturing can also be seen as a set of services inside the company, between units (eg. production, sales, IT, HSEQ). The aim of Total Quality Management (TQM) is to gather all activities (including management and strategic planning) under the same principles, in order to create customer satisfaction while decreasing the real costs. "*..it works horizontally across functions and departments, involves all employees, top to bottom, and extends backward and forward to include the supply chain and the customer chain".* (Evans, Dean 2000, 13; Lecklin, Laine 2009, 17-19)

Quality is not only the quality of the finished product, it is also a quality of the whole operation process and therefore can be used also in service organisations. In all organisations there are several supply chains of customers and suppliers. These quality chains can be easily broken if one part of the chain is not filling the needs of the customer, wheather the customer is internal or external. Usually these failures to meet requirements of the customer in supply chains only shows when interfacing with outside customer. And persons working at these interfaces are the ones who experience the quality error. Therefor these customer-supplier chains form the core of the TQM. When creating a well-working quality system, it is important to make sure that the requirements are met in every stage and every time in the supply chain. (Oakland 2003, 7)

Joseph M. Juran defines quality simply as "fitness for use". Product does what it is expected to do and nothing more, everything else is so called over-quality. One example of this kind of over-quality is the television remote control. Sometimes a lot of additional functions are added even if very few are ever used. In these cases costs are higher but no additional value has been achieved. (Lecklin 2006, 19)

According to Pesonen (2007, 37) a good quality can be defined as following

1. To fulfil what has been agreed with the customer
2. Act and do as planned inside the organisation

3.2 Quality Management System

The management model known as the Deming Cycle or PDCA cycle (Figure 1.), was originally the perception of Walter A. Shewhart but after it was presented by Edward Deming it came known as the Deming Cycle. The cycle consists of four points; Plan,

Do, Check and Act. This management model is also the basis for ISO 9000 quality management system. To achieve good total quality it needs to be managed. (Lecklin, Laine 2009, 19, Manuele 2008)

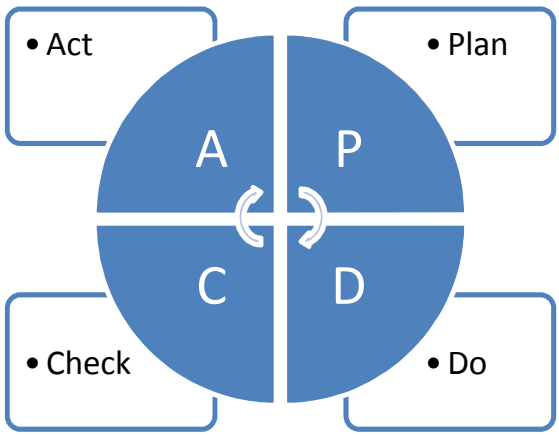

Figure 1. Deming Cycle.

Many companies have at least some kind of a quality management system in place. The best known and most used quality standard is ISO 9000, created by the International Organisation for Standardisation. (Lecklin, Laine 2009, 36) Unfortunately, many companies spend a lot of time and money to create the system only to show customers and partners that they have it. In real life it might only be a certificate on the wall if it is not managed well. A Quality management system has to be always created to serve the company and all processes designed to help the company work as effectively as possible. Processes need to be actively monitored and, most importantly, improved if necessary. In that way the hard work done by creating and updating the system pays dividends. A Quality management system can not be a loose part in an organisation; it needs to be an essential part of all activities and processes. (Silen 1998) Requirements need to be recorded and need to guide the company´s operations (Pesonen 2007, 50). A Quality management system enables better management of operations, monitoring the implementation of planning and controlling quality costs.

According to Pesonen (2007, 53) quality management and quality systems are a combination of three parts: descrption of operations (how should we act), actual action (to act as it is described) and evidence of the act (monitoring that it has been acted

upon as described). The aim is not to describe all activities but only the essential and important aspects that affect the functionality of the processes and the output.

3.2.1 ISO 9001 Quality Standard

ISO 9000 quality standards were developed by the International Organisation for Standardisation, which is an independent and non-governmental international organisation. There are over one million companies and organisations in over 170 countries certified to ISO 9001. (International Organization for Standardization 2017)

ISO 9001 standard describes seven principles to help organisations improve performance:

1. Customer focus
2. Leadership
3. Engagement of people
4. Process approach
5. Improvement
6. Evidence-based decision making
7. Relationship management

(Swedish Standard Institute 2015, vii)

Customer focus: The organisation is dependent on the customers. Customer requirements need to be understood as a whole. Also hidden needs have to be identified and everyone in the organisation need to know and understand these requirements. (Pesonen 2007, 79). Typical for successful organisations is identifying significant external and internal challenges. To identify these, one needs to take into account changes that affect the organization's goals, stakeholders' views and values, strategic priorities and policies, in addition to availability and prioritisation of resources. The organisation also uses the SWOT (Strengths, Weaknesses, Opportunities, Threats) and / or PESTLE (Political, Economical, Social, Technological, Legal, Environmental) analyses in the strategy process. Based on these, a quality management system and improvements can be planned. (Tuominen, Moisio 2015, 17) Stakeholders are, for example, direct customers, end-users, suppliers (manufacturers) and authorities. The above are persons or groups which add value to the organisation, are interested in the performance or which are affected by the organisations actions.

The organisation need to react to changes that affect the requirements or meet the requirements of these stakeholders. (Tuominen, Moisio 2015, 19)

Leadership: Leaders show the direction and goals of the organisation and create circumstances where personnel can succeed. Management needs to prioritise good quality. Management's work is planning, implementing, monitoring, guiding and improving. (Pesonen 2007, 79) Quality policy and quality objectives are not only operative work but also strategic work done by the Managing Director (Tuominen, Moisio 2015, 29). Quality Policy is the basis for all activities, it is clearly communicated to the whole organisation and it is also known by stakeholders. It is the most important message to stakeholders. (Tuominen, Moisio 2015, 33)

Engagement of the people: People are the core of this action. Personnel are one of the stakeholders and requirements need to be fulfilled. Only satisfied personnel create satisfied customers. (Pesonen 2007, 79). Also a lot of incidents (quality deviations) may happen as a result of human errors even if many operations are automated and where the personnel´s task is only to supervise that the system is working properly. The best way to avoid human errors is to have motivated, trained and competent personnel. (Lecklin 2006, 213)

Process approach: Operations and resources are controlled as a series of events not by functionality. That way the activity becomes more effective and the sense of territory is diminished. Processes can be monitored to see if they work as planned, guided in real time and improved long-term. (Pesonen 2007, 79) Process approach will be discussed in more detail later in this thesis.

Improvement: Continuous improvement is a permanent goal of a quality system. Small improvements and sometimes bigger leaps lead to the target that has been set. (Pesonen 2007, 80) In a successful organisation the risks affecting product and service quality are identified and eliminated. (Tuominen, Moisio 2015, 25)

Evidence-based decision making: Monitored data is based on facts, i.e. knowing the real situation of the activities. Decisions are not made based on feelings, but facts. (Pesonen 2007, 80)

Relationship management: Striving for partnership and win-win situations. This can be done by sharing information and being transparent. The aim is to encourage everyone

to promote quality, choosing partners and creating deep co-operation with them. (Pesonen 2007, 80)

3.2.2 Process approach in ISO 9001

ISO 9001:2015 is based on a process approach as all the previous revisions since 2000 have been. Process approach is also one of the principles mentioned above. The main advantage of process approach is the decrease of costs when resources are used more efficiently and lead times are shorter. In the ISO standard, the process is defined so that there are several actions that are somehow linked and affected by each other. The process changes the inputs (input) to the desired result (output). The standard also highlights the link between different processes so that inputs into the process are usually the outputs of previous or supportive processes. To achieve the intended results in accordance with the quality policy and strategic direction of the organisation, organisational processes are designed and implemented under controlled circumstances. (SFS 9000 2015, Swedish Standard Institute 2015)

ISO 9001 standard offers a process approach to PDCA cycle (Figure 2). ISO 9001 defines PCDA cycle as follows:

- *"**Plan**: establish the objectives of the system and its processes, and the resources needed to deliver results in accordance with customers' requirements and the organisation's policies, and identify and address risks and opportunities;*
- ***Do**: implement what was planned;*
- ***Check**: monitor and (where applicable) measure processes and the resulting products and services against policies, objectives, requirements and planned activities, and report the results;*
- ***Act**: take actions to improve performance, as necessary."*

(Swedish Standard Institute 2015, ix)

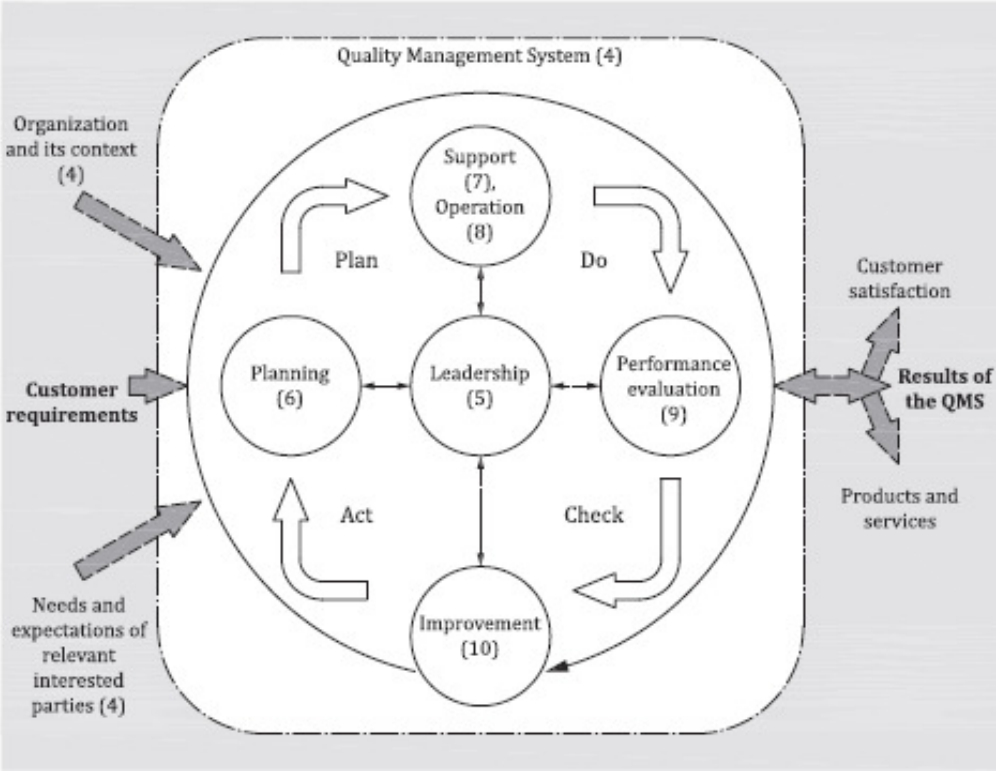

Figure 2. PDCA cycle in ISO 9001:2015. Numbers in brackets refer to the clauses in standard. (Swedish Standard Institute 2015, viii)

PCDA cycle enables organisations to guarantee that processes of the organisation are adequately resourced and managed, and that opportunities for improvement are determined and acted on. (Swedish Standard Institute 2015, vi)

Within the process approach it is essential to identify external customers, input, output and suppliers of the process. The basic principle for the definition of the process is that it starts from the supplier and ends with the customer. Another principle of process limitation is that the process starts from design (Plan) and ends with its evaluation (Check), if the output is in accordance with the design. However, in business process descriptions, planning and evaluation are generally not part of the process. Usually companies define core and supporting processes. Core processes create value for the company and have direct or immediate impact with external customers. Companies also need supporting processes, such as operational planning, human resource management, supplier co-operation and quality development. (Laamanen 2001).

3.2.3 Changes in new revision of ISO 9001

The main change in the 2015 revision was to establish a systematic approach to considering risks. Risks need to be considered in all aspects of a quality management system, as there are risks in all systems, processes and functions. Risk-based thinking ensures these risks are identified, considered and controlled throughout the design and use of the quality management system. In the previous editions of ISO 9001, risk-thinking and "preventive" actions had been basically separated from the whole. According to the new revision, risk-based thinking has to be integrated into the processes. It will become proactive rather than reactive. The aim of the new revision is to build risk-based thinking into the whole management system. "*In ISO 9001:2015 risk-based thinking needs to be considered from the beginning and throughout the system, making preventive action inherent to planning, operation, analysis and evaluation activities*." (International Organization for Standardization 2015).

Other significant changes in the new revision were that when implementing a quality management system, the organisation should understand the internal and external challenges which affect organisation strategy and mission. The organisation must take into account both the changes in the operating environment and the requirements and expectations of the stakeholders. Also the structure of the standard changed. ISO 9001:2015 now follows the same overall structure as other ISO management system standards. (International Organization for Standards 2015; Swedish Standard Institute 2015; Suuronen 2017, 15)

The organisation needs to identify what information and knowledge is needed to be able to create products and services that meet customer requirements and the required knowledge must be maintained. Requirement of the organisation's awareness means that personnel need to know and understand the company´s quality policy and objectives as well as the impact of their own actions. In addition, the revision highlights that management requirements such as quality policy and quality objectives should be in line with the organisation's strategy. Finally, the new revision of ISO 9001 standard does not require obligatory documentation as in previous revisions. (Suuronen 2017, 15)

The ISO organisation names several benefits of the new revision.

- *“Puts greater emphasis on leadership engagement*
- *Helps address organisational risks and opportunities in a structured manner*
- *Uses simplified language and a common structure and terms, which are particularly helpful to organisations using multiple management systems, such as those for the environment, health & safety, or business continuity*
- *Addresses supply chain management more effectively*
- *Is more user-friendly for service and knowledge-based organisations”* (International Organization for Standardization 2015)

4 RISKS AND RISK MANAGEMENT

This chapter will concentrate more on risk management as the theoretical framework for the thesis. SFS ISO 31000 standard “Risk management, principles and guidelines” defines risk as follows “*effect of uncertainty on objectives*”. (Suomen Standardisoimisliitto 2012, 225). In everyday life we understand risk as a danger or threat that something (accidental) can happen to a person or property. There are three factors which affect how we experience the risk; uncertainty of the incident, expectation regarding the incident and extent and significance of the incident. (Juvonen et al. 2005, 7, Kuusela et al. 2005, 17) According to Kuusela and Ollikainen (2005, 17) characteristics of factors affecting the risk experience include, for example, controllability and limitability of the risk, as well as a person's ability to evaluate, personal characteristics and voluntariness. Exposure to danger may be voluntary, such as smoking, or compulsive or as surprising as a natural disaster. A scientific basis for risk was defined by Kogan and Wallach in 1964. They stated that risk is two-fold; on one hand it includes danger but on the other hand it is also an opportunity. So in science, unlike in every day life, also opportunity of something good is seen as part of the risk. (Juvonen, 2005, 8) Only damage risk causes pure damage or loss when realised. It means that it always causes only a loss to the company and no opportunity is involved in any circumstances. (Suominen 2003, 12)

Opportunities and threats can be evaluated by experience, case study or computationally. When evaluating computationally, expectations of the incident are not taken into account. Therefore risk is defined by probability and severity.

Risk = probability x severity

This definition is commonly used. The probability of the risk is often assessed on the basis of a probability distribution and can therefore be accurately estimated when the risks are typical. For new and unknown risks, probability cannot be accurately estimated. For example, business risks are typically such. (Juvonen et al. 2005, 8)

4.1 Risk classification

There is a risk in all business activities. Typically, when the business risk is realised, the expected revenue, in addition to the loss, remain unrealised. Taking business risks is a normal activity.

We should consider risk appetite; It determines how much risk a company is willing to take. Ideally it is to optimise the balance between maximisation of business opportunities while managing the risks involved. When a risk is taken it is assumed that a productive solution is made but this is not necessarily achieved. In a positive case, it is noted that the risk which was taken was a good thing At that time it is not even mentioned the actual risk associated with the successful business. (Suominen 2003, 12)

There are several ways to classify risks. The Finnish Risk Management Association use the source of the risk and risk type as a base to the classification. Association divides risks to four classes: strategic, operational, economical and damage risks. Strategic risks are related to business environment, organisation structure, restructuring business and stakeholders. Operational risks are related to operational management, technology, business management, processes, personnel and know-how, projects, contracts and responsibilities and crimes. When looking at economical risks, liquidity, earnings, currency risks, credit management, tax risks, financial reporting, capital management, and commodities and resources are taken into account. Damage risks are related to personnel, operations, machines, equipment, vehicles, products, services and other activities as well as to the environment (Suomen riskienhallintayhdistys 2017b).

Juvonen et al. (2005, 44) puts strategic risks under business risks. According to Juvonen, business risks also include threats and opportunities in terms of cash flow, customer relationships, innovation activities and business environment. Juvonen states that the company's most significant risks are usually related to personnel. Such risks include, but are not limited to, recruitment, lack of professional skills, work climate, labour shortage, invalidity, ageing, death and resignation. The smaller the company, the greater the importance of personnel risks. Alongside the personnel risks, there are risks related to property. Property risks are typically fires, leakage, equipment, risk and transportation damages. In some cases personnel risks also affect property risks. For

example unqualified personnel with a lack of training or skills can cause a device to malfunction. Operational risks include liability risks, contractual risks and interruption risks.

Suominen (2003, 13) presents a classical risk philosophy, Gahin´s model (Figure 3).

In the Gahin´s model, the business and damage risks are not different, they are dependent on each other. The idea of the Gahin´s model is not to divide risks as damage and business risks. According to Gahin, all the risks arise from the company's activities.

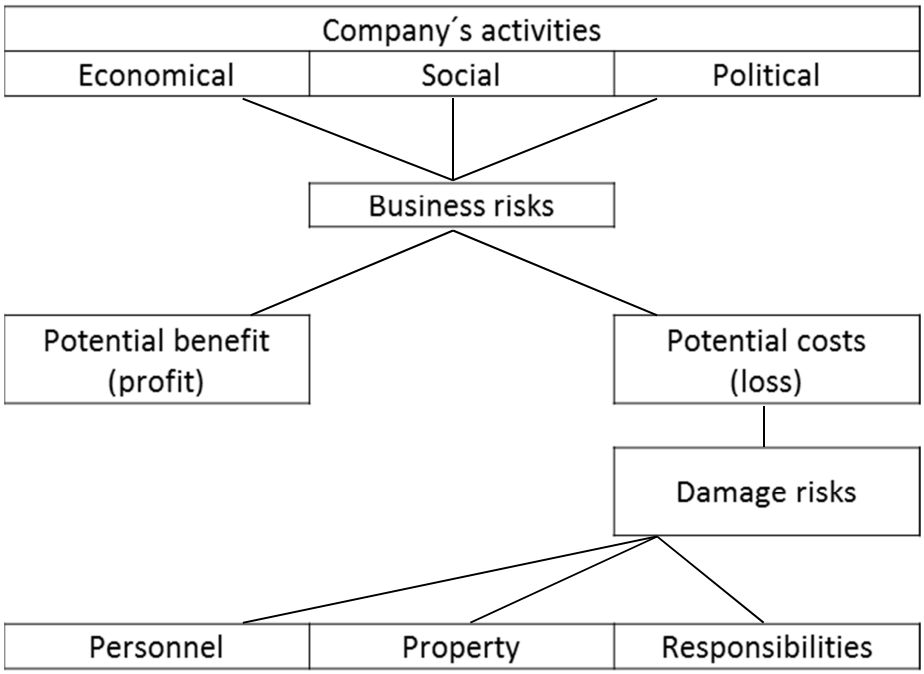

Figure 3. Gahin´s risk model (Suominen 2003)

So risks can be classified many ways and there is no right or wrong way. More important is to find a model that fits best for the company´s own organisation and business environment. (Suomen riskienhallintayhdistys 2017b).

4.2 Risk management

Risk management is defined in the SFS ISO 31000 standard, “Risk management, principles and guidelines”, as follows “coordinated activities to direct and control with

regard to risk". Risk management is making decisions and implementating actions that are based on risk assessment and calculation. Based on this, risk management is the identification and assessment of risks, making decisions and enforcing decisions. Risk management, therefore, is not necessarily the avoidance of risks, but the identification and control of the risks taken. (Juvonen et al. 2005, 18)

Risk management can be viewed as either a narrow or extended way of thinking and behaviour. The traditional, narrow definition is based on managing damage risks because the roots of a risk management are in protecting the damage risks. According to a newer, wider definition, risk management should be extended to cover all of the company's risks (Suominen 2003, 27). Risk management is a process which is implemented at all levels and in all activities of the company, starting with the company´s strategy. It is applied to all units, all processes, customer relations and so on and it has to be executed by top management and all employees involved (Suomen riskienhallintayhdistys 2017a).

There are many frameworks and guidelines for risk management, for example, the aforementioned ISO 31000 standard. Finnish Risk Management Association presents also an Enterprise Risk Management (ERM) – an integrated framework made by the Committee of Sponsoring Organisations of the Tradeway Comission (COSO), published in 2004. The basis for this framework has been COSO´s Internal Control – Integrated Framework. ERM concentrates more clearly and throughly on the organisation's risk management, but also handles internal control comprehensively. (Committee of Sponsoring Organizations of the Treadway Commission 2004) The purpose of the framework is to help entities better protect and enhance stakeholder value. Its underlying philosophy is *"value is maximized when management sets strategy and objectives to strike an optimal balance between growth and return goals and related risks, and efficiently and effectively deploys resources in pursuit of the entity's objectives".* ERM is not a function or department. It is a culture; capabilities and practices that organisations integrate with strategy-setting and apply when they carry out that strategy, with a purpose of managing risk in creating, preserving, and realizing value. (Committee of Sponsoring Organizations of the Treadway Commission 2017, 2-3)

Enterprise risk management manages the risks pursued from creating and maintaining the value (for stakeholders). According to the definition, risk management is:

- *“a continuous process for the entire organisation*
- *carried out at all levels of the organisation*
- *applied in the preparation of the strategy*
- *applied throughout the organisation at all levels and in all units, and the organisation is viewed as a whole*
- *purpose of risk management is to identify potential events, which, when implemented, affect the organisation and manage it risk according to the organisation's willingness to take risks*
- *enables management and government to reach a reasonable level of assurance on the organisation's goals*
- *has been developed to carry out objectives that are: grouped into separate but partly overlapping categories”*
  *(*Committee of Sponsoring Organizations of the Treadway Commission 2004).

Another standard that the Finnish Risk Management Association presents is a standard by the Federation of European Risk Management Association (FERMA). This standard is the result of work by a team drawn from the major risk management organisations in the UK - the Institute of Risk Management (IRM), the Association of Insurance and Risk Managers (AIRMIC) and the National Forum for Risk Management in the Public Sector (ALARM). The focus of good risk management is the identification and treatment of the risks. Its objective is to add maximum sustainable value to all the activities of the organisation. It marshals the understanding of the potential upside and downside of all those factors which can affect the organisation. It increases the probability of success, and reduces both the probability of failure and the uncertainty of achieving the organisation’s overall objectives. The standard highlights that most important is to recognise that risk has both an upside and a downside. (Federation of European Risk Management Association, (FERMA) 2003, 2-3)

4.3 ISO 31000 Risk Management standard

Figure 4 shows risk management principles, framework and processes as they are presented in the ISO 31000 Standard. The Standard presents 11 principles which need to be followed if a company wants risk management to work properly. These principles are:

- *“risk management creates and protects value*

- *risk management is an integral part of all organisational processes*
- *risk management is a part of decision making*
- *risk management explicitly addresses uncertainty*
- *risk management is systematic, structured and timely*
- *risk management is passed on the best available information*
- *risk management is tailored*
- *risk management takes human and cultural factors into account*
- *risk management is transparent and inclusive*
- *risk management is dynamic, iterative and responsive to change risk management facilitates continual improvement of the organization"*
  (Suomen Standardisoimisliitto 2012, 234-236).

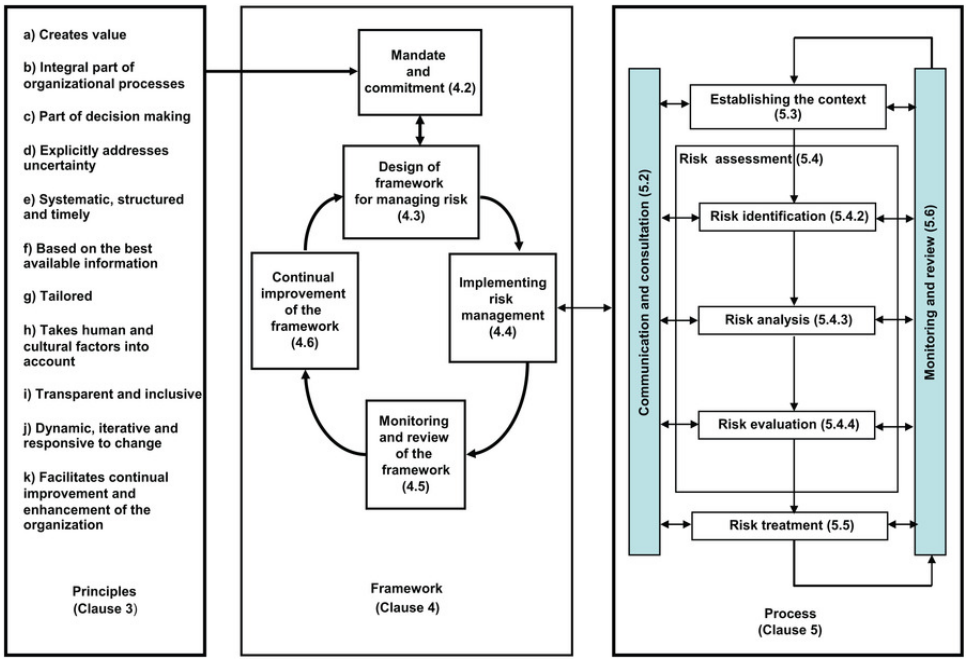

Figure 4. Risk management principles, framework and process in ISO 31000 standard (Suomen Standardisoimisliitto 2012).

"Risk management creates and protects value" - means that risk management helps to find solutions and assists with reaching goals and improve the performance in different areas of the business.

"Risk management is an integral part of all organisation´s processes", means that it is not a separate activity but should be part of all activities.

“Risk management is part of decision-making”, means that risk management is supposed to give the decision makers a possibility to make well-informed choices, prioritize actions and choose the best alternative to a whole organisation.

“Risk management explicitly addresses uncertainty”, means that the purpose of risk management is to understand the uncertainties of the information provided and how these uncertainties can be solved.

“Risk management is systematic, structured and timely”. With this, risk management results in efficiency and consistent, comparable and reliable results.

“Risk management is passing on the best available information”. The information can be taken from such channels as the organisation’s own history, stakeholder feedback or expert judgement. However, the management should understand that there might be differences between internal and external data.

“Risk management is tailored”, means that it is specific to each organisation with its specified external and internal context and risk profile.

“Risk management takes human and cultural factors into account”, means that it is also a tool that can clarify the different human and cultural factors that organisations might have.

“Risk management is transparent and inclusive”, means that it should be open and thorough. Different stakeholders should be involved appropriately and timely in order that risk management remains relevant and up-to-date. The involvement of stakeholders also ensures that their views have been taken into account when defining the risk management plan.

“Risk management is dynamic, iterative and responsive to change”, means that it is continuously assessed and updated. When any external or internal incident happens, context and knowledge change, monitoring and reviewing of risks take place. New risks may be identified and old ones change or disappear.

“Risk management facilitates continual improvement of the organisation”, means that the organisation needs also to develop risk management alongside developing other activities of the organization. (Suomen Standardisoimisliitto 2012, 234-237)

The framework follows the Deming cycle where the stages of design, implementing, monitoring and review and the developing the measures alternate and complete each other, creating a process of continuous improvement. The design of the framework, the

implementing of risk management, the monitoring and review of framework, and the continual improvement of the framework constitute a separate process that improves the organisation's risk management and assists to allocate resources needed. Risk management should always bring added value to the company and support the continuous improvement of the entire organization. Risk management must be integrated into the organisation's processes and management system as a systematic and coordinated part of the organisation. (Suomen Standardisoimisliitto 2012, 238-245)

The above described Standard was updated 2009 but as with all ISO standards, this is reviewed every five years and revised when necessary, so ISO 31000 was updated in February 2018. The new revision includes a total of nine principles. The main change is that new revision provides more strategic guidance and places a greater focus on creating value as the key driver of risk management and features other related principles such as continual improvement, the inclusion of stakeholders, being customized to the organisation and consideration of human and cultural factors. Also the revised standard now recommends risk management to be part of the organisation’s structure, processes, objectives, strategy and activities. (Suomen Standardisoimisliitto SFS ry 2018)

4.4 Risk management process

In order for the company to benefit from risk management, it must be monitored and evaluated many times during the year. Risk management is easily forgotten when it comes to other things (personnel issues, production, marketing, finance, taxes, IT) that are often considered more important. Risk management works best when it is in connection with these issues as a way of thinking and working. Genuine risk management moves forward as a planned, step-by-step operational process (Suominen 2003, 31).

Different risk management frameworks may define alternative risk management processes. Process flow according to ISO 31000 is presented above in Figure 4. Within the COSO ERM framework, risk assessment (Figure 5.) follows event identification and precedes risk response. Its purpose is to assess how big the risks are, both individually and collectively, in order to focus management’s attention on the most important threats and opportunities, and to lay the groundwork for risk response. Risk assessment is all about measuring and prioritising risks so that risk levels are managed

within defined tolerance thresholds without being over-controlled or foregoing desirable opportunities. (Deloitte, Touche 2012, 2)

Figure 5. Asses risks process flow Diagram (Deloitte, Touche 2012, 2).

According to ISO 31000 standard risk management process should be an integral part of management, included in the culture and practices, and tailored to the business processes of the organisation. Communication between external and internal stakeholders should take place in all stages of the process. (Suomen Standardisoimisliitto 2012, 247)

The first step of the process in ISO 31000 is establishing the context. By doing this, the organisation clearly indicates objectives, defines the external and the internal parameters which need to be taken into account when managing risk, and sets the scope and risk criteria for the resulting process. The main part of the risk management process is risk assessment. ISO 31000 states: "*Risk assessment is the overall process of risk identification, risk analysis and risk evaluation"*. COSO ERM (2004, 1) states that risk assessment is the way how enterprises get a handle on how significant each risk is to the achievement of their overall goals. The risk assessment process needs to be practical, sustainable, and easy to understand.

4.4.1 Establishing the context using PESTLE and SWOT

The company should establish objectives, strategies, scope and parameters of the activities of the organisation, or the parts of the organisation where the risk management process should be applied. Management of the risk should be undertaken with consideration of the needed resources used when carrying out risk management. (Suomen Standardisoimisliitto 2012, 251) Conducting risk assessment requires knowledge of the organisation, the market in which it operates, the legal, social, political and cultural environment in which it exists, as well as the development of a sound understanding of its strategic and operational objectives, including factors critical

to its success and the threats and opportunities related to the achievement of these objectives. (Federation of European Risk Management Association, (FERMA) 2003, 6).

Companies can use for example the PESTLE model (Figure 6) when analysing the context. It takes into consideration how all above mentioned factors affect the business. The results of the analysis can assist with investments and help to understand national and/or global competition and its threats and opportunities. (Suuronen 2017, 35)

After PESTLE analysis is completed, the company can use SWOT analysis to help to identify the strengths and weaknesses of the current business, but also the threats and opportunities which will follow from the changing environment. It is a simple analysis that can be used to grasp the most important factors affecting the company's activity in a discrete four-field form. It takes into account both the current and future state of the company and is therefore a good starting point for planning and development of the strategy. SWOT analysis is performed by management and key personnel of the organisation. In addition, usually external evaluators are used in order to expand perspective. When establishing context, these findings (strengths, weaknesses, opportunities, threats) can be evaluated and actions defined as to how strengths and opportunities can be of benefit, whilst on the other hand how to prepare for or to predict threats and avoid weaknesses. With SWOT analysis, the risk identification and evaluation work starts naturally. (Suominen 2003, 55-57, Koskinen 2006, 74-76)

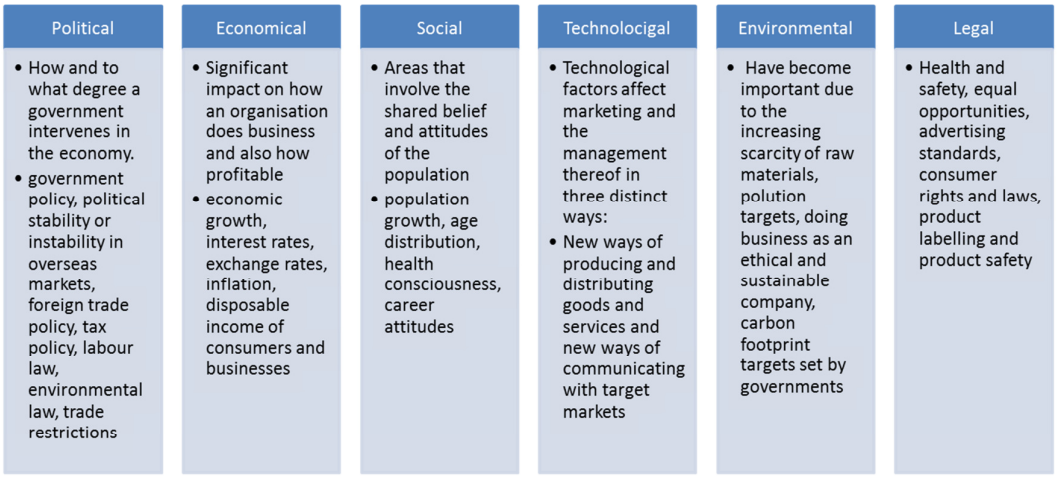

Figure 6. PESTLE analysis factors. (Professional Academy 2017)

	Useful	Harmful		Strength	Weaknesses
Internal	Strength	Weaknesses	Opportunities	Benefit	Fix/develope
External	Opportunities	Threats	Threats	Prepare/predict	Avoid/tackle

Figure 7. SWOT analysis (Koskinen 2006, 74-76).

4.4.2 Risk identification and risk analysis

Risk identification is the first step of the risk assessment. Aim of the identification is to get a comprehensive list of risks. The organisation should identify the source of risks, areas where risk affects and causes and potential consequences. Risks need to be identified at this stage otherwise they are not included in later parts of the risk assessment process. (Suomen Standardisoimisliitto 2012, 252) There are several techniques to identify risks. For example brainstorming, questionnaires, business studies which look at each business process and describe both the internal processes and external factors which can influence those processes, industry benchmarking, scenario analysis, risk assessment workshops, incident investigation, auditing and inspection and HAZOP (Hazard & Operability Studies) (Federation of European Risk Management Association, (FERMA) 2003, 15). Specifically for small and medium sized companies, there are different kind of questionnaires to identify the key risks. The Finnish Risk Management Association has created risk maps for small and medium size companies to help identifying risks. One of these is vulnerability analysis which gives a rough overall picture of vulnerability ie the risks associated with the company's continuity. Vulnerability analysis takes into account the risks relating to operating conditions, human resources, property and interruptions, stakeholder groups, organisation of operations and the economy. (Juvonen et al. 2005, 24, Suomen Riskienhallintayhdistys) The technique to be used is also related to the type of context. For example, when identifying risks concerning transportation, a simple technique is a questionnaire. It is quite effective is to ask three questions: “what, where, when?” What

is transported? The value of the goods and how easily it could be damaged. To and from where it is transported (import, export, domestic, subcontract etc.) and how it is transported (by road, air, sea, railway). Then it need to be considered what can happen if that risk would be realised. To help identify and classify possible risks, the assessor need to use statistics of accidents in history and how insurance companies clasify occurred transportation accidents (Suominen 2003, 35-43).

To manage risks, also the source of risks need to be perceived. According to Juvonen et al. (2005, 25) there are three sources for risks: Lack of control (the natural forces, human, resources, knowledge, time), lack of knowledge (only uncomplete or unreliable, unknown data available; the future is not predictable) and lack of time (decisions are made without knowledge or control). Once the risk and the source are identified and known, it can be prepared to the risk.

When the risks are identified they need to analysed. Risk analysis is one of the most important part of risk management. Purpose of the risk analysis is to estimate the magnitude and likelihood of the identified risk. Risk analysis does not eliminate or reduce risks but it can be used to decide how risks are handled and managed and how to prepare for them. (Juvonen et al. 2005, 25) Ettala (Ettala 1986) sets three objectives by which risk management is clearly linked to the company's decision-making process. First of all, risk analysis should bring to the management's consciousness the risk that has a significant economic affect for business. Secondly, the analysis should provide an adequate basis for decision-making on insurance solutions. Thirdly, the analysis should increase the risk awareness of the company's employees and propose improvements to prevent and limit damage. The purpose of the risk analysis is to facilitate the practical risk management work of the organisation. The company should, through analysis, find more points where risk management is needed and allocate resources properly. From the perspective of risk management, it is important to identify weak points in advance. (Suominen 2003, 40)

Often, when analysing risks, only the risks that have potential to cause damage in a company's own premises, such as fire, breakdown or accident risks are taken into account. However, the company itself is a part of a larger system. The operations of the company can also be affected by interruption in water and electricity distribution, delays in supply of raw materials, difficulties in subcontracting, damages during supply and product liability issues. Therefore it is important to systematically review all areas where risks can be present. (Juvonen et al. 2014, 20)

4.4.3 Risk evaluation

Once risks are identified, their scope and consequences can be estimated. By evaluating risks, the company gets an overview of how likely and severe each risk is. Risk evaluation is used to make decisions about the significance of risks to the organisation and whether each specific risk should be accepted or treated. The company should also establish risk criteria (these may include associated costs and benefits, legal requirements, socio-economic and environmental factors, concerns of stakeholders, etc.) When defining risk criteria, the company should consider factors like nature and types of causes and consequences that can occur, how likelihood is defined, the timeframe of likelihood and consequence (meaning how fast the risk can arise, how fast it can be responded to or recovered), how the level of the risk is to determined and also whether combinations of multiple risks should be taken into account. (Federation of European Risk Management Association, (FERMA) 2003,10; Suomen Standardisoimisliitto 2012, 252)

One way to define risk level is to calculate risk number using different calculating formulae. As described earlier in this thesis, the risk value can be calculated by determining the numerical value for the consequences and likelihood and multiplying them with each other to give a numerical and comparable value to the risk. However, it is often more important for an organisation's risk management to assess risks with major or serious consequences than those whose consequences are small, even if the likelihood of low risk consequences would be higher. Also the speed of an unwanted event might have a huge impact as to how severe the risk is. Often worse, unlikely events occur with surprising speed. Therefore likelihood and consequences do not alone paint the whole picture. (Deloitte, Touche 2012, 3; Karhunen et al. 2015, 27-28)

Usually organisations scale rating-risks in terms of consequences, likelihood and other parameters. Scales should allow meaningful differentiation for ranking and prioritising risks. Five point scales yield better than three point scale. On the other hand ten point scales might result in only wasting assessors' time when trying to differentiate between rating six or seven when difference is incoherent and useless. Illustrative scales can be provided for consequences, likelihood, vulnerability and speed of onset. Every company is different and therefore scaling should be customised to fit the industry, size and complexity of the organisation. Companies may define impact scales for opportunities as well as risks. (Deloitte, Touche 2012, 3)

Calculation can be done simply by multiplying numerical rating for consequence and likelihood: “consequence x likelihood”. Sometimes this calculation gives same value for the risk where likelihood is high and consequence is minor and for risk where likelihood is low but consequences might be very severe. This can be corrected by putting more weight to consequences in the formula by squaring the value: “consequence^2 x likelihood”. To differentiate and prioritize risks after calculating risk numbers, they can be viewed in a risk matrix or risk map. In Figure 8 is presented COSO ERM´s risk map where also opportunities are presented.

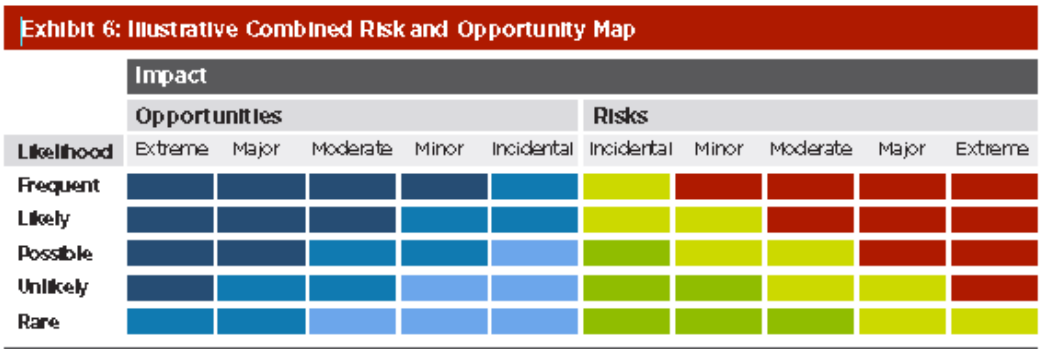

Figure 8. Combined Risk and Opportunity Map (Deloitte, Touche 2012, 15).

Often risk assessment is performed as a two-stage process. An initial screening of the risks and opportunities is performed using qualitative techniques followed by a more quantitative treatment of the most important risks and opportunities lending themselves to quantification (not all risks are meaningfully quantifiable). Qualitative assessment consists of assessing each risk and opportunity according to descriptive scales when quantitative analysis requires numerical values for both consequence and likelihood. Likelihood of the risks can be defined in a qualitative way, verbally (frequent, likely, possible, unlikely, rare) and also with numerical values (every month, year, decade, century). Consequence refers to the extent to which the occurred risk might have an effect. When evaluating consequences, criteria may include financial, reputational, regulatory, health, safety, security, environmental, employee, customer, and operational impacts. Companies may define consequences using a combination of these types of impact considerations, given that certain risks may have financial consequences while other risks may have a greater impact to reputation or health and safety. (Suominen 2003, 43-44; Deloitte, Touche 2012, 3)

There is a variation between the techniques, in particular how much and how detailed information is needed. Quantitative assessment requires accurate numerical values and implementation of practical data of consequences and likelihood. The risk level should be defined beforehand and it should be engaged within the risk management framework and context. The unit may be for example a monetary value, a customer number, or a time limit. The human factor is difficult to estimate by quantitative risk assessment. The quantitative risk assessment is suitable for cases where the magnitude and probability of the consequences of a risk can be determined accurately and numerically. Most companies begin with qualitative assessments and develop quantitative capabilities over time as their decision-making needs dictate. (Deloitte, Touche 2012, 8; Karhunen et al. 2015, 34)

When evaluating risks it also needs to be decided whether to assess the risk at its current level, taking into account the existing management methods or whether to consider inherent risk is, ie risk level without any risk management actions. The risk that remains behind the hallmarks, is called residual risk. The advantage of using inherent risk in the risk assessment process is that one may obtain a picture of the level differences between the inherent and the controlled risk. This can provide information on the effectiveness of the company's risk management and the effectiveness of existing risk management tools. The evaluation of inherent risk can, in principle, be useful as it helps to identify critical risk management tools needed, but it is difficult to evaluate it at a reliable level. When evaluating the risk at the level created by the current management methods, there is a risk that risk management methods are expected to function consistently and equally efficiently. In simpler processes it is easier to implement and in some organisations and activities it may be more useful to assess the risk at its current level. (Deloitte, Touche 2012, 7; Karhunen et al. 2015, 29)

5 CASE STUDY

Confidential

6 CONCLUSIONS

Confidential

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Appendix 1

CUSTOMER QUESTIONNAIRE

1. What industry does you company belongs to?
    1. Coatings
    2. Plastics
    3. Pharmaceuticals
    4. Food
    5. Advanced

2. On a scale 1-5, how do you rate the following in terms of importance when choosing a product (5 = Very important, 1 = not important)
    1. Price
    2. Product quality
    3. Consistent prod. quality
    4. Lead time
    5. Easy to contact

3. According to you, which ones of the following best characterizes IMCD
    1. Market knowledge
    2. Market coverage
    3. Technical expertise
    4. Wide product range
    5. On time deliveries
    6. Customer orientation
    7. Availability of samples
    8. Innovativeness

4. On a scale 1-5, how satisfied you are with (5 = very satisfied, 1 = very unsatisfied) cooperation with sales support
        a. Order confirmations
        b. invoicing
        c. response time
        d. informing
        e. attitude

5. On a scale 1-5, how satisfied you are with Cooperation with product/sales manager (5 = very satisfied, 1 = very unsatisfied)

    a. Technical knowledge
    b. market knowledge
    c. proactiveness
    d. response time
    e. attitude

6. On a scale 1-5, how satisfied you are with Deliveries (5 = very satisfied, 1 = very unsatisfied)

    a. on time
    b. flexibility
    c. lead times

7. On a scale 1-5, how satisfied you are with Quality (5 = very satisfied, 1 = very unsatisfied)

    a. Notification handling
    b. Documentation
    c. QAs

8. On a scale 1-5, how satisfied you are with Product portfolio (5 = very satisfied, 1 = very unsatisfied)

    a. Current product range
    b. Sourcing new products

9. On a scale 1-5, how satisfied you are with Supplier management (5 = very satisfied, 1 = very unsatisfied)

    a. price negotiations
    b. samples
    c. documentation
    d. QAs

10. Please let us know if you have any comments or suggestions on IMCD's performance.

Appendix 2

SUPPLIER QUESTIONNAIRE

1. How satisfied you are with IMCD in general?
    a. Very satisfied
    b. Satisfied
    c. Neither satisfied or unsatisfied
    d. Unsatisfied
    e. Very unsatisfied

2. According to you, which ones of the following best characterizes IMCD
    a. Knowledge of local markets
    b. Well-qualified and well-trained sales force
    c. Growth potential
    d. Good communication
    e. High level service
    f. Long-term partner

3. How satisfied you are with (5= very satisfied, 1= very unsatisfied)

    a. Sales and marketing capabilities
        i. sales force,
        ii. selling skills,
        iii. technical capability

    b. Knowledge of market sector
        i. competitors,
        ii. prices

    c. Knowledge of local markets
        i. forecasting,
        ii. identifying changes

    d. Cooperation with sales supports
        i. order handling,
        ii. informing,
        iii. response time

e. Cooperation with product/sales managers
    i. tech/market knowledge
    ii. proactiveness,
    iii. communication

Appendix 3

RISK ANALYSIS TEMPLATE

PROCESS
SUBMITTED BY
DATE

Risk	Source of risk	Likelihood	Consequences	Risk number	Actions needed	Responsible	Check