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Non-financial risk assessment in mergers, acquisitions and investments

Identifying sources of business risk in the ICT industry

Bachelors thesis
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Abstract

The number of company mergers and acquisition activities has increased dramatically the last two decades. The reasons for conducting these activities are many and the uncertainties of their results are high. To reduce the uncertainties when making an investment, merger or acquisition it is vital to do a thorough assessment of the risks involved with the activity. This thesis focuses on a specific part of this risk assessment, namely the non-financial risks.

Mergers and acquisitions are done in almost all industries around the world and the reasons for and benefits of these activities can vary between industries. We have chosen to investigate the risk assessment of non-financial risks in the Information and Communication Technology (ICT) industry.

The thesis aims at investigating what business characteristics, for companies in the ICT industry, that give rise to non-financial risks that must be assessed when doing investments, mergers or acquisitions. Further on we present a risk pattern that points out what business characteristics that are the most important when conducting a risk assessment of non-financial risks on companies in the ICT industry.

From a literature study we find evidence that ten different business characteristics are of key interest when targeting companies in the ICT industry. These ten characteristics are *firm size*, *business phase*, *governance*, *market strategy*, *funding*, *innovation process*, *network dependencies*, *outsourcing*, *product properties* and *geographic location*.

Out of these ten we are able to distinguish four that are of most importance since they give rise not only to the highest amount of risks but also affect parts throughout the entire company. The four characteristics that are of particular interest in the risk assessment process are: *governance*, *innovation process*, *network dependencies* and *outsourcing*. The common denominator for these four business characteristics are that they are all connected to uncertainties that a single company itself cannot completely control, but stem from its interaction with other actors. The four characteristics all deal with the interaction between a company and its eco-system and all risks can hence only be identified after a thorough risk assessment. We see clear connections between the importance of the four business characteristics and the strong globalization process that characterizes the ICT industry, and we propose that the risk assessment process is modernized to fit with the current corporate environment.

This Bachelor thesis is conducted at the School of Business, Economics and Law in Gothenburg on behalf of Bearing Consulting Ltd. Bearing Consulting Ltd is a London based consultancy firm with presence in UK, Sweden, Spain and South Africa. Bearing's core competencies consist of financial and management consultancy including the due diligence process in investments, mergers and acquisitions.

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Chapter 1

Introduction

Back in the year 1990, the Swiss-Swedish electronics conglomerate ABB, one of the world's largest electrical engineering companies, bought the American engineering firm Combustable Engineering. The acquisition went through despite Combustable Engineering's pending law suits from former employees that had been harmed by the company's asbestos lined boilers produced in the 1970s. In 2002, ABB was on the brink of bankruptcy due to the over 100,000 claims that had cost the company approximately five billion USD in total. All this due to an acquisition where risks were neglected and responsibilities not being taken seriously.

1.1 Background

The number of corporate mergers and acquisitions around the world has increased dramatically the last two decades, both in number of transactions and in total value[74]. The reasons behind mergers and acquisitions (M&As) are several, among them to reduce costs, capture new technology, enter new markets or to create synergies with existing business functions. Companies proudly announce M&As as great possibilities that will take the businesses to a new level, but it is not often mentioned that a large part of such activities fail to bring value to the buyer. Common estimates say that only about half of the total transactions are profitable to the buyer, that the total earnings of all M&A activity average to zero [13].

With this background, a drastic increase in M&A activity but with a high failure rate, there is of course great interest in methods increasing the probability of merger success. Therefore, the buying company normally conduct a so called due diligence process to thoroughly assess the properties' of the targeted company. In this process either the company itself or an external consultancy firm decide whether the proposed merger should go through or not and to what price. Among other things, various kinds of risks connected to the target company are evaluated. It is common to separate financial risk, the risk that a company does not have adequate cash flow to meet financial obligations, from non-financial risk. In this thesis we will focus on the non-financial risks involved in mergers and acquisitions.

While financial risk easily can be quantified and accessed through the accounting documents, non-financial risk can to the largest extent only be assessed subjectively and is almost impossible to quantify. Examples of non-financial risks range from losing key personnel, theft of intellectual

property, exposure to corruption, environmental law suits and loss of good will, to name just but a few. It is argued that a combination of financial and non-financial factors need to be considered to increase the ability of predicting business failure[75].

This thesis will focus on the information and communication technology (ICT) industry, a global industry characterized by a high pace and a dynamic market place where handling of technical knowledge and inter-actor dependencies are vital to survival. In such a dynamic and emerging market a company can go from being market leader to leave business in a very short time, thus it is of great importance to detect possible risks in time and have a plan on how to handle them.

1.2 Aim

The original base for our work was a task description by Bearing Consulting. The task description was very "open" and dealt with constructing mean risk profiles for various industries. It became obvious that in order to be able to contribute in this field of work this task needed to be interpreted and defined more narrowly. Discussions with Bearing Consulting and further research into the subject helped formulate a more narrow and applicable aim that this thesis then was based upon.

The basic aim of this thesis is to improve and support Bearing Consulting in their work with due diligence and risk assessment in mergers, acquisitions and investments in the ICT-industry. This is to be done by analyzing and mapping what the main sources of risk in businesses in the ICT-industry are. When those main sources are known, hopefully the identification process of risks in a specific company is simplified.

The thesis aims at giving a holistic picture of the risks involved in M&A activity. The span is very wide, something that we look upon as the purpose of the report. We do not in this thesis want to conduct research with a very narrow and limited scope about a certain phenomenon, but instead look at the big picture and try to examine the main risks and possible pattern between risks in the ICT industry. This holistic approach is in our view the strength and purpose of the thesis and the reader must keep this in mind when following our work.

1.3 Research questions

With the aim of this thesis formulated as above, two research questions were constructed to create a possible way to approach the huge world of business risks:

1. What general *business characteristics* are the sources of risks that arise in mergers and acquisition activities in the information and communication technology (ICT) industry?

With business characteristics we mean common factors that can be used to describe and categorize companies. This could be for example their size, age or geographic location, but also more operational characteristics that relate to how companies work and organize their day to day activities. Our idea is that risk sources must be dependent on specific business characteristics, or risks would be equal in all businesses. If it is possible to identify the business characteristics

that trigger most risk, this information can be used as a focus point in the due diligence risk assessment process.

2. Based on the answer from the first question, is it possible to create a *risk pattern* that identify the *most important sources* of business risk in mergers and acquisition activities, and how would such a pattern look like?

If it is possible to answer the first question, we want to use this information to dig further into business risk. The idea here is to try to find a pattern that is unique to the ICT-industry. We are interested in investigating if there are certain characteristics that are more important than others and if they have anything in common.

1.4 Limitations

By request from Bearing Consulting the acquired organizations to consider are limited to their present customers' area of interest: small and medium sized enterprises (SME) within the information and communication technologies (ICT) industry. We use the European Commission's[19] definition, which define SME as enterprises with a staff force lower than 250 people and an annual turnover of 50 million euro or less. We will only consider non-financial risks, meaning that we will not look into financial nor legal risks. This is because financial and legal risks are not normally assessed by Bearing Consulting, but instead made by external partners. We have no limitations regarding the acquiring companies.

1.5 Thesis justification

As mentioned earlier in this chapter, there has been a drastic increase in M&A activity the last decades. Despite that, there is not much literature or analyses of what makes M&A activities successful[28].

In a highly competitive and dynamic industry such as the ICT industry companies can not afford to neglect projects with high risks. Reichardt[79] states that there is good evidence to expect that companies that take on high risks are also those that become the most successful. This is under the condition that they work active with evaluation and assessment of the risks involved to be able to make decisions on a reliable decision base. The same author claims that risk assessment of non-financial risks are particularly important when investment costs are high, when market actors place little focus on non-core activities or if relationships exists with actors in geographic locations with less respect to environmental, health or safety legislations. All of those terms are highly characteristic for the ICT industry and non-financial risks should therefore be considered important.

Although non-financial risks can be considered important they are rarely targeted for closer investigation in the due diligence process. When working with financial risk assessment there is often guiding principles of what result that is expected, that is however not the case with non-financial risks. There are currently no standards in which results can be measured and evaluated and therefore further research in the subject is necessary[79]. M&A teams are specialists in

conducting M&A activities by identifying possible acquisition targets based on financial data. M&A teams are rarely equipped to identify or value non-financial risks. The result is often that non-financial risks are excluded from the risk assessment process which results in decisions based on unreliable bases. To be able to accurately assess business risks for targets to investment, merge or acquire both financial and non-financial risks need to be evaluated[75].

1.6 Thesis outline

In this short introduction chapter we want to give the reader an initial insight into the subject as well as explaining the purpose of our report and what questions we want to answer. The next chapter describe the basic concepts that the reader need to have knowledge about before entering the field that this thesis deal with. We use this chapter do define words and expressions that we will then use throughout the remainder of the report. The following chapter describe the method of how we have conducted our work and how the material, which is presented in the subsequent chapter, is gathered and structured. In the last three chapters our findings are published. First the analysis, where the material is reviewed and used in order to answer our research questions. After this we have a discussion where we take one step back to view the subject in a broader perspective. Lastly the conclusion shortly presents our main findings.

Chapter 2

Conceptual explanations

In this chapter we will go through the most relevant concepts and terms that are used in practice in the field of risk assessment in investments, mergers and acquisitions. The purpose of the chapter is to give the reader an insight and understanding of the world that this thesis takes place in, and to convey what basic assumptions and framework that this thesis is based upon. We start with describing the risk expression and then move on to describing how risk is looked upon in business and how it is treated in the due diligence process in mergers and acquisition activities. Then the ICT industry and its characteristics are described, followed by a section that describe the tool that Bearing Consulting use in their risk assessment process. In a typical thesis disposition this chapter would be called theory, but we have chosen not to use that label since the content is more of an explanatory nature not used as a tool for the analysis.

2.1 Risks from a corporate perspective

Every company in every industry is exposed to risk [23, 26]. However, there are several similar concepts that are easily confused with risks, such as uncertainty and probability. The reference work when it comes to financial risk and uncertainty is Knight [50]. He makes a clear distinction between risk and uncertainty. Risk is according to his definition calculable, where the risk equals the product of the probability and consequences of occurrence. For example, you may calculate that there is a 15 percent probability that something will go wrong, and that if it happens will cost you approximately 100 euro. Uncertainty, on the other hand, occur when the likelihood of future events are indefinable or incalculable. There is no way of determining the probability that an uncertain event will happen.

There is often confusion between the three concepts of risk, uncertainty and probability. Probability is mathematical likelihood that something will occur [61], for example the probability of losing money in an investment opportunity is 15 percent. It is, with the definitions we have chosen, not correct to say that there is a probability of losing money. This way of using the probability term is often found in literature where answers concerning probability sometimes are descriptions of the possible problem [51]. There is also a common confusion between risk and uncertainty, where uncertainty means that we do not know what the exact probability or consequence of an occurrence will be [51].

Risks do not always have negative meaning but can also express a positive scenario. An example of a positive risk is the risk of lowered interest rate on a company's debt. What also has to be taken under consideration is that a single risk can have negative impact on one company while the same risk can have positive impact on another company. Evaluation of risks therefore needs to be considered from a single company's perspective. Whether or not the risk concept can be expressed in positive terms or not is debated among writers[51].

From a corporate perspective it is easy to make decisions concerning situations that are certain to occur. Complications set in when situations suffer from uncertainties, a situation when it is not possible to forecast the future within reasonable misjudgment. These complicated uncertainties arise when situations are not known, certain, measurable or controllable[38]. The uncertainties of which managers or investors have no influence on are numerous, including global economic instabilities, shifting governments, weather hazards or terrorist acts.

Risks and uncertainties do not have to come from such extraordinary events but can arise from the business environment in which the company serves. These risks concern variations in competition conditions, technology requirements and types of relationships within the company's network of actors and resources [20].

To be able to use the concept of risk in a practical manner throughout the thesis we make no distinction between risk and uncertainty and we exclusively regard risk to be related to occurrences that have negative impact on companies.

2.2 Due Diligence in investments, mergers and acquisitions

One definition says that due diligence is "a process of enquiry and investigation made by a prospective purchaser in order to confirm that it is buying what it thinks it is buying" [41]. When conducting the non-financial risk assessment in a due diligence process, the usual procedure is simply to interview key personnel in the target company with the intention to create a good picture of the company and reveal any hidden concerns. Due diligence has become norm in decision making regarding joint ventures, investments, mergers and acquisitions [85] and is carried out by or for the investor or acquirer on the subjected company after reaching a preliminary agreement but before signing a binding contract [9]. The purpose is to assess the benefits and the liabilities of a proposed investment or acquisition by looking into the relevant aspects such as, but not limited to, finance, legal, commercial, HR & culture, management, environment, intellectual property, operational and technical [41]. This is done with respect to the company's past, present and future[54] with the following objectives[41]:

- verification of assets and liabilities
- identification and quantification of risks
- protection needed against such risks
- identification of synergy benefits
- post-acquisition planning

In this thesis we are interested in the second point: identification and quantification of risk. Some authors claim risk assessment to be the primary reason of the due diligence process [77, 54] and its aim is simply to reduce the risk of unpleasant surprises occurring post-purchase and to use as leverage when negotiating the price for a possible acquisition or investment, where the possible cost of a probable risk can be deducted from the end price.

2.3 Risk Assessment

The way of looking at risks that expose businesses has changed during the last decades. From a mindset that risks are inaffectable and governed by fate to a mindset that risks are a part of the day-to-day business process. Risk assessment used to be conducted to evaluate a business transaction that had gone wrong, but is today instead conducted before the business transaction as a mean to prevent transaction failure [1]. What differs these mindsets is therefore the ability to recognize risks, being able to evaluate them and to take appropriate measures with the purpose of minimizing the risk of occurrence and its consequences [20]. Risk management is today a hot topic in the business world, and many companies realize the benefits of a continuous risk handling framework also when not involved in merger and acquisition activities.

2.4 ICT industry characteristics

The purpose of this thesis is to look into non-financial risks in the ICT industry. In order to understand what risks that effect this industry and how the nature of the industry create certain types of risk it is necessary to understand some characteristics of the industry. As earlier mentioned, ICT stands for information and communication technologies, and includes a wide range of companies ranging from service providers to manufacturers of physical goods [70]. Products such as software, mobile phones, IT-systems and communication network providers all fall under the wide ICT industry. The industry is characterized by its fast growth and studies show that it alone on average has contributed with about 0.5% of the total economic growth annually [18]. The total economic growth in the European Union and in the United States typically range between 1-3% [30], meaning that the ICT industry alone the last decades has contributed for a sixth up to half of the total economic growth in those countries.

Another characteristic typical for the ICT industry is that it is very international and that the manufacturing processes often are outsourced globally. The business is seen as one of the most globally dispersed of all and this development seem to continue [3]. Production of both goods and services are outsourced from European and American companies to low-wage countries such as India and China. This type of outsourcing, or contract manufacturing, is in many cases inevitable to keep costs down and most western ICT companies instead focus their efforts on marketing, sales and research and development, instead of the actual production processes [7]. The industry is also very fragmented, meaning that no company produces a complete product with all its components. Instead different companies produce sub-components that are then assembled [3]. This makes some companies very dependent on other companies, since they can not sell their products directly to the end consumer. As an example is a company that produces small color LCD-displays dependent on the mobile phone manufacturers' success in selling their products.

One last important characteristic for the ICT industry is its heavy reliance on constant innovation and product development. This could be done either internally, through utilizing the knowledge of the personnel, or externally, by acquiring technology from other organizations. This pressure on innovation, along with the need to go global, explain the strong tendency of ICT companies to be involved in merger and acquisition activities [12]. This is also confirmed when studying the 60 ICT companies on the Global Fortune 500 list, where we have found previous merger and acquisition activities involving 59 of them.

2.5 Bearing Risk Analysis Model

As the above text describes, the purpose of the due diligence work performed by Bearing Consulting and others is to give a comprehensive picture of the target company in an investment, merger or acquisition. This due diligence model includes several business aspects where one is risk assessment. In the risk assessment also the company's environment, such as customers, suppliers, competitors and authorities, are included. The assessment is made on the complete target company in relation to the investor. An example of the result from a risk analysis is shown in figure 2.1 below where different risk categories are located in the horizontal axis and the severeness of those risks are presented on the vertical axis. The different risk categories are based on a company's functions and its surroundings. The risk assessment process consists of two parts. The first thing that is done is an estimation of what risk levels that can be expected for each risk category, shown with the dark bars in figure 2.1. The lighter bars are the final risk profile made by Bearing Consulting and are specific to each company assessed. To be noted is that the specific risk profiles, made by Bearing Consulting, are defined subjectively based on available information about the company and the quantification is not based on mathematical probability theory of risk propensity and effect.

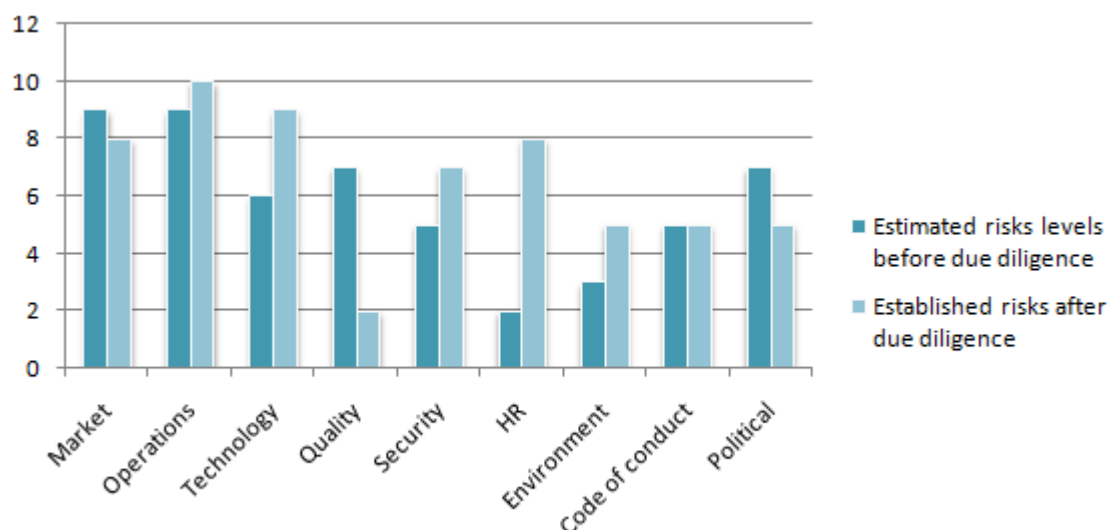


Figure 2.1: Example of a risk assessment by Bearing Consulting

In our work we have decided to use the same risk categories as are shown above to make our research comparable with Bearing Consulting's model. Literature suggest similar models, for example Howson[41]. Our meetings with Bearing Consulting and a review of their material used in the due diligence interviewing process have lead us to the following definitions of the different risk categories:

2.5.1 Market

This category contains risks that are linked to the market in which the target company interacts. These risks could include such things as market characteristics, market trends, product portfolio fitness, major competitors and their development and company strategy.

2.5.2 Operations

Under this category fall risks that can be associated to the everyday operations in the target company. It includes activities such as knowledge sharing and decision making and the quality and validity of decisions, but also production techniques and the performance and reliability of those techniques. Other factors included in this category are dependencies on other actors, such as suppliers and other cooperative partners.

2.5.3 Technology

In the highly competitive and changing ICT-industry technical knowledge is vital to a firms success. There is always a risk of losing technological knowledge through leaving personnel and inadequate patent rights. ICT companies are often acquired because of their technical knowledge which makes it important for the acquirer to verify that it is buying what it think it is and that it has the right to use it.

2.5.4 Total Quality Management

This category contains all risks about the quality of a company's products, operations and suppliers. Quality deficits can be costly both in terms of time and resources, but also through lawsuits caused due to low quality products that have reached the consumer. Supplier quality cooperation is also important to look into since supplied goods and services directly influence the quality of the firm's products.

2.5.5 IT, Security and Support Systems

Since technological knowledge is of great importance to most companies in the ICT industry it is important to make sure that knowledge does not leak to other organizations. Sufficient knowledge about data protection in IT- and support-systems and security routines are examined, as well as the company's ability to keep know-how and trade secrets within the organization.

2.5.6 Human Resources

Aspects concerning the human resources and how they will react to the merger or acquisition are dealt with here. Key personnel are identified to make sure no vital knowledge is lost. Employee expectations on the upcoming business transaction are assessed to reduce the risk of losing disappointed staff members. The quality of the management teams and strength and weaknesses are noted. The organizational culture of the targeted firm is examined and the impact of cultural differences to the buyer is discussed. Motivation and commitment among all staff is also of concern.

2.5.7 Environment

Liabilities arising from production sites of the target company, and its suppliers, are examined with regard to the environmental risk they might pose. All production facilities and assets that the company is responsible for have to be investigated so that no local environmental regulations have been challenged. Conditions at close suppliers are also important.

2.5.8 Code of Conduct

Any activity that might break against the code of conduct, such as child labor and union issues, are assessed in order to minimize the risk of unpleasant surprises that can be costly to the acquiring company's brand and financials.

2.5.9 Political

The political risk varies to a great extent with the country of origin of the acquired firm and includes factors such as government stability, corruption, socioeconomic conditions, internal and external conflicts and religious and ethnic tensions. Such factors are not directly related to the targeted company but do play a big role in how it is affected by its surroundings.

We hope that the explanation of the above concepts will help the reader to understand the remainder of this thesis. Those concepts are vital and common practice in the world of investments, mergers and acquisitions.

Chapter 3

Method

There are two purposes of this chapter: to explain to the reader how work has been conducted to simplify understanding of the thesis, and to describe why the authors believe the work is reliable and valid and that conclusions may be drawn that can be used to describe the reality of business risk in a meaningful way.

3.1 Method outline

Figure 3.1 describes the general steps that have been taken when writing this thesis. The large white boxes with labels to the right denote which thesis chapter that contains the corresponding part. The filled areas contain short information about the work that has been carried out in this step. At this stage the reader is supposed to already have read the introduction and the conceptual explanation chapters, why further explanation of those chapters will not be made. This chapter instead mostly deal with how material has been collected and what inclusion and exclusion criteria we have applied. Lastly, we shortly describe the analysis model.

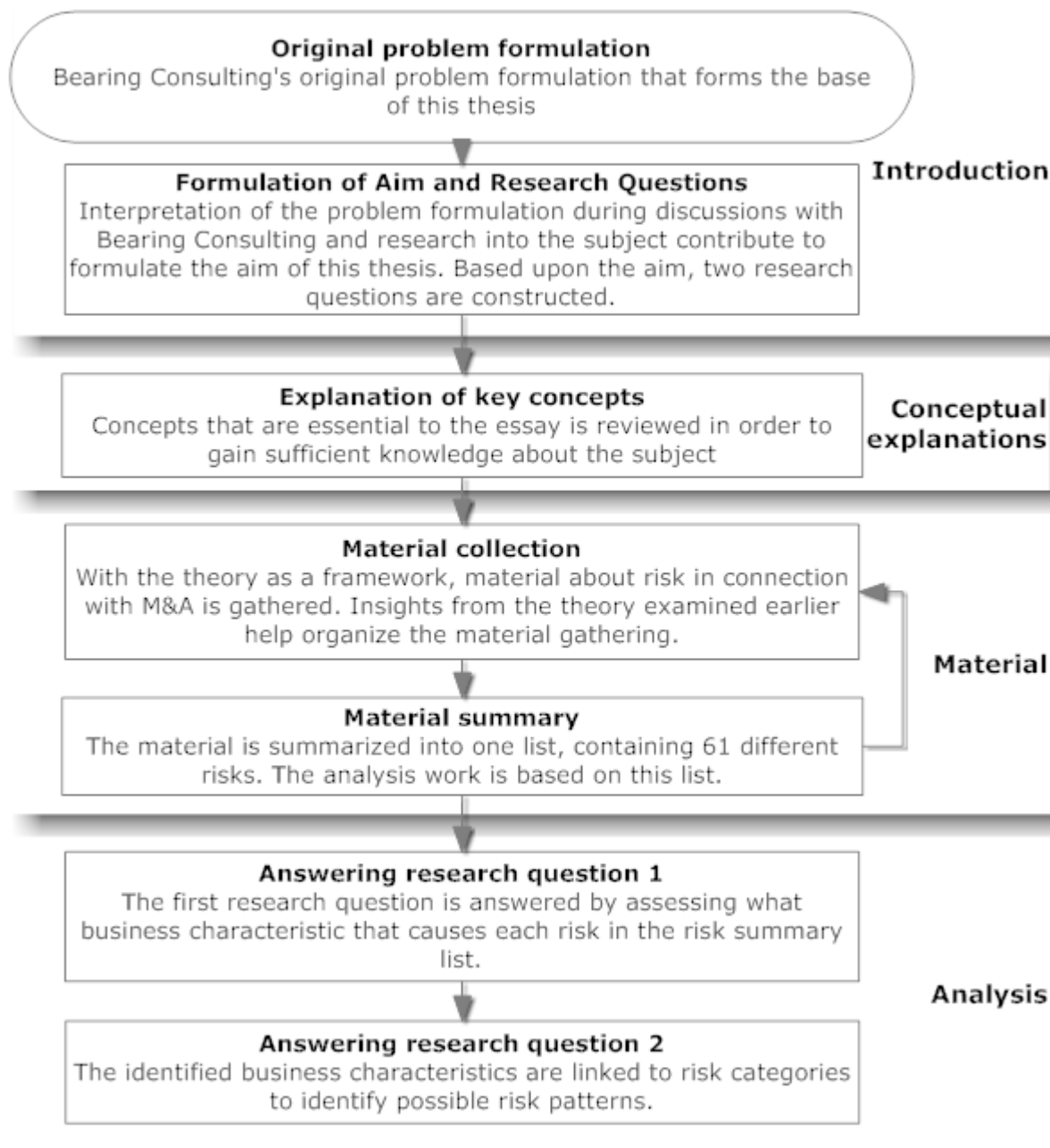


Figure 3.1: Thesis working procedure

3.2 A literature study

Already from the beginning of our work it was clear that we were to conduct a literature study. The wish that the thesis should be based on earlier research was clearly expressed from Bearing Consulting in the original task description, and we had no reason to question this. We decided to use scientific articles that we could access through various electronic databases. Primarily we were interested in aggregated studies based on real business case studies or statistical information, and we believed this kind of information would be easily found in articles from various scientific journals. In addition, the latest and most up to date research is seldom yet published in books, but only through journal articles[71]. Beforehand we were quite confident that relevant material would be easy to find, something that were only true to some extent. Corporate risk management itself is a popular subject, but it became obvious that research on risk in connection with mergers and acquisitions is not as common. During our extensive literature study and material collection we did not stumble upon a single article trying to do the same thing as us; summarizing non-financial risks for a whole industry in connection to M&A and investment activity. This perceived lack of research on the subject has been confirmed in a number of articles and in contact with researchers in both Sweden and abroad. Because of this, we were forced to use quite some creativity and flexibility during the material collection phase since earlier research rarely completely covered our field of interest: non-financial risks in M&A and investments.

3.3 Qualitative or quantitative method?

Our original plan when we started this study was to make a quantitative study leading to a clear quantifiable result. We wanted our results to be presented mathematically, where risk and effect could be calculated for different cases in different situations. The idea was to create a risk profile that expressed different risks' probability of occurrence and effect of occurrence in absolute terms. These two should then be multiplied, so that a number for the total extent of the risk could be obtained and used to compare different risks. With this quantification method we intended to create a risk pattern. This method would have been a simplified version of a quantitative meta-analysis, where data collected from earlier studies should be quantified and made inter-study-comparable[69].

But as work progressed we realized that this method was not possible. It is in the nature of non-financial risks to be hard to quantify, and hence also hard to compare or put in relation to other risks. The only possibility of comparing different types of risks to each other would be to translate their outcome to monetary terms, something we quickly gave up due to its complexity and many sources of error. Instead we decided to move the thesis towards a more qualitative approach. Jansen and Petersen[46] expresses the importance of a qualitative approach by saying: "How to assess the success of mergers precisely cannot be determined with scientific adequacy, because all methods employed so far to measure it show systematic weaknesses and take into account only quantitative criteria."

The subject of this thesis is in the borderland between the classically quantitative field of financial economics and the classically qualitative field of organization analysis. Åsberg[78] claim that there is no strictly quantitative or qualitative research; instead this is dependent on the

phenomenon you have chosen to study. Also Patel [71] has similar ideas describing quantitative and qualitative method as two extremes on the same scale, where research very rarely is conducted on any of the extremes but instead somewhere in between. Some material that we have used has been quantified aggregated studies, while some has been qualitative case studies. We decided that both types of studies are relevant to the thesis and useful to us, since qualitative conclusions can be drawn also from quantitative studies. Making this decision we further increased the volume of suitable material and opened up our minds to a possible final result other than a quantifiable risk pattern. We open minded entered a work process where the end result was of a more implicit nature.

3.4 Material collection

We have, as mentioned earlier, used various databases with scientific articles in our material collection process. Primarily we have used three different databases with partially overlapping content, namely Google Scholar, Science Direct and Business Source Premier. Our initial searches were limited to only non-financial risks in mergers and acquisitions, but as mentioned before the research on this is very limited. Only some of the different aspects we are interested in were covered; topics such as HR and technology were well covered, while for example market and quality aspects were completely left out. We realized that we needed to broaden our search to find sufficient data.

During the collection of material it became obvious that the relationship between the acquiring and acquired company are relevant when estimating risks involved in any M&A activity. We therefore realized we had three different approaches when collecting material:

1. To only consider target company specific risk and completely neglect the relation to the acquirer (e.g. environmental, legal, quality, organizational and product type risks)
2. To consider the reasons behind the M&A (capture technology, market channels, IP etc)
3. To consider the relationship between the two companies (geographical, cultural, technological, product portfolio etc)

Since we in our case are working on a general level, without a specific case, we do not know any specific details about neither the acquirer nor the acquired and we are not dealing with a specific company but a category of companies. Hence, approach two and three above are not possible. Therefore we decided to take the first approach and identify risk in independent companies, companies that necessarily had not been involved in a recent merger or acquisition. We decided that the material only need to concern the target company and can hence be based on any company in the ICT-industry. This was a vital material inclusion decision which gave us access to far more material.

Another inclusion decision was made when we decided to treat risk the same way as lack of success factors. We decided to look at risk as the opposite of chance, two concepts that move in opposite direction from the same point, one in "positive" and one in "negative" direction. By doing this we were able to use literature about failure, industry crises, critical and hazardous

factors but also literature about success factors and winning strategies when mapping our risk. This decision widened the variation of possible keywords, and we decided that we finally had enough available material for our study.

In our selection process of articles we have used a number of principles. Firstly, to assure that the article is of adequate scientific quality, we have only included articles that has been peer-reviewed and approved for publishing in scientific journals. When reading the articles we have used our own judgment to assess the relevance of the material. We have also looked at the citing function in the electronic databases, where the number of citations made on the article is calculated. A high number would typically indicate that the article is accepted and used as reference in many other researchers' work. Obviously, there is of course a risk that the article has been cited as an example of bad or divergent research, but we consider this a minor risk. Some consideration has also been taken to in which journal an article has been published, and we have preferred work from well-reputed journals. Most of the articles that were used in the material collection are very recent and have been published within the last decade. This make our findings in the report "state of the art", something that is important when studying such a fast changing subject as the ICT industry.

Since our subject is of a very wide nature we have been forced to use a framework in our material collection process. We decided to use Bearing Consulting's risk categories, presented in section 2.5, to structure our work and to help the reader understand the presentation of material in the material chapter. The material collection was conducted during four weeks and is to be seen as the core of this report. Our analysis and our conclusions are based on this material and we believe that the material is comprehensive and relevant. The hardest problem we faced in the collection process was how to determine when we had enough material. We solved this by starting in one risk category, and when the data we found started to correlate we went on to the next risk category. When we had gone through all categories we summarized our findings, shown in figure 3.1 as the arrow back from material summary to material collection, to see where we needed to focus in order to make our material comprehensive. We have also numerous times during our work discussed our material with our tutor at the university and with experienced consultants at Bearing Consulting, which at one point led us to the conclusion that we had good and sufficient material to go on to the next step in the thesis process.

3.5 Analysis methodology

When enough material had been collected it was summarized into one single list. This list can be found in Appendix A and include a column with all risks that could be extracted from the material. The risks were extracted by going carefully through our material and step by step note the risks that are present there. The reader may not fully understand the different risks as they are presented in the appendix, since they for practical purposes had to be described very briefly. The important thing is that the reader understands the connection between the risk list and the material chapter. This list has then been used to connect business characteristics to risk categories, in order to answer our research questions. The procedure will be explained more thoroughly in the analysis chapter.

3.6 Method criticism

Some critique can be directed at our material collection method. Firstly we realize that we during the collection process might have been influenced by the material we found, but a complete objectiveness is never possible. We had limited knowledge about the subject when the work started; something that might mean that single articles subconsciously may have influenced us to a large extent. On the other hand, the fact that there are two of us doing the research would decrease this effect. Also we realize that there is a risk that articles we find refer to other similar articles, and that we end up in a circle of similar articles written within the same discourse excluding contradictory research. Since we have limited our research to fit into Bearing Consulting's risk categories we might also have excluded risks that lay outside the model. The reader must have this in mind when reading this thesis, that our research might have returned other results if it would have been conducted under different circumstances.

On a concluding remark, during our work and the more informed we got about non-financial risk, the more obvious the need for a holistic perspective became. All risks in one way or another seem to relate to other risks, and studying single risks in isolation seems inadequate since risks seem to interact in a complex way. Actions taken to reduce the risk in one part of the business might increase the risk in another part. Risks are never constant but vary over time; mega-trends such as the growing awareness of the global climate crisis might influence company risk in very unpredictable ways. This insight further assured us that we need to look at the subject from a broad perspective, using various sources from various research discourses. We did not only wish to look at the risks from an economic perspective, but also from for example an environmental and political perspective that in the short perspective did not have any direct economic results for the individual business. The authors behind such articles are likely to have a different perspective on things, and by triangulating sources by authors with different backgrounds we hope that we can give a wider perspective than the current most influential financial paradigm gives.

Chapter 4

Material

This chapter contains a summary of the reports we have read and various risks are described and placed under the risk categories that we borrow from Bearing Consulting's risk analysis model. Some risks are hard to categorize since they might fit under multiple labels. All categorization is made subjectively by the authors. Some larger categories have subheadings to simplify for the reader.

4.1 Market risks

The collected material concerning market risks are divided into subsections dealing with strategies, globalization, research and development, network of actors and market characteristics.

4.1.1 Strategies

When assessing general market risks for the ICT industry we find that risks vary with the age of the firm. Our findings suggest that, for service companies within the ICT industry, the strategies of highest relevance are those that aim at the companies' early post-entry stages in their development. The strategies at this development stage should provide means for widening the companies' product portfolios and increase the level of product versioning in order for the companies to be able to stay competitive and to stay in business [32, 70]. The importance of above strategies in software companies' early development stages are verified by Lee and Lee[55], who also add that there is an increased risk of company failure if the early strategies concentrate on low price which demands high volumes, or if the strategy is unclear, e.g. a mixture between different strategies. The case is similar for manufacturing ICT companies according to Kazanjian[48] who points out the importance of strategic positioning on the market in a company's early development phase while the strategy should be oriented towards sales and marketing as companies grow. In later stages of company growth, the strategy for staying competitive and enabling further progress is once again to be focused on market positioning[48] but also on the possibility to obtain external support[55]. The need for external support or co-operation is explained by Lee and Lee[55] to be that large companies are significantly more affected by market influences.

4.1.2 Globalization

Esteve-Perez et al.[29] studied data from 2028 manufacturing firms with the purpose to determine the factors of firm survival. Their study provides evidence that firms that actively advertise themselves on the open market and manufacture firm-specific products together with necessary research and development (R&D) are more likely to become successful. The study also shows that companies that are internationally oriented with a large proportion of export sales are more likely to survive than domestically oriented companies. This is assumed to be the reason why international markets are more competitive and companies that can manage high levels of competitiveness also are more likely to survive. Gabrielsson and Gabrielsson [70] take the discussion about the importance of international market interaction a few steps further. They conclude their study about market strategies in the ICT sector by stating that ICT companies, independent of business goals, need to globalize or they will be outrivaled by international competitors. The reason comes from the industry's changing macro environment, global customer base and general industry globalization but also from the fact that for ICT companies to be able to develop and increase the companies' efficiencies, globalization is considered to be a necessity[90]. However, globalization strategies for business activities do not come in standardized packages, thus the managerial issues to solve are many and complex[70]. The result from the risk management involved when companies are forced to globalize is therefore to the largest extent shaped by the managers' ability and approach towards dealing with risks. Being able to evaluate what business activities and what marketing strategy to bring to the global market and what business activities to shut down is by Gabrielsson and Gabrielsson[70] the most difficult problem to solve when establishing a global go-to-market strategy for ICT companies.

4.1.3 Research and development

Except the necessity for companies in the ICT industry to go global, there are also necessities of ambitious and continuous R&D work and investments for staying competitive in the highly technological and always shifting business environment[6]. By not doing so ICT companies are risking their product portfolio to become outdated. Aoun et al.[6]therefore express the need for investment as the only way for companies in the ICT industry to survive. Another market risk factor for companies in the ICT industry is the rapidly changing and evolving market; companies need to be able to adapt quickly. According to Aoun et al.[6] the service sector within the ICT industry requires the most intensive investments but also the shortest adaptation times. The investment behavior of the manufacturing sector of the ICT industry is also much higher than the manufacturing sector of other industries.

4.1.4 Network of actors

The way in which ICT companies usually are organized together with their need of continuous investments result in several market risks for potential investors. The network dependencies of ICT companies (dependencies on other market actors) put companies at a risk of failure since network effects demand several actors' involvement[43]. A concern about network dependencies are highlighted by Cleff et al.[15] who in a report from the Center for European Economic Research reveal that about 15% of companies in the ICT industry are concerned about major companies'

abuse of market power. The abuse of market power would negatively affect the competition and could therefore constrain the important technological development. Schoder[82] further discusses the combinational risk of the ICT market in terms of network dependencies and R&D investments and states that risks consist of the insecurity of forecasting whether R&D investments will be profitable or not in markets with strong dependencies. As a consequence of this, Schoder[82] suggests that ICT companies should finance their necessary R&D development with equity funds before debt. Hyytinen and Pajarinen[43] state in terms of investment financing that equity-dependent ICT companies' investments are less efficient than those financed by debt, while they at the same time agree with Schoder[82] that equity must be considered the most appropriate form of financing.

4.1.5 Market characteristics

Other market risks concerning some of the branches in the ICT industry are the high fixed costs and the relatively low variable costs. This is for example the case for electronic circuit board manufacturers. Development of these products are costly but the production, transportation and after market costs are relatively low[86]. The risks occur when these high fixed investments are put in an investment dependent environment which can make the continuous fixed costs unbearable for the company[43]. However, risks from continuous research, innovation and development do not only come from uncertainties to cover costs. An ever-changing market puts companies at risk of not having access to accurate information about market trends, market development or competition relationships[15]. For the same reason information about new technologies or best practice methods can be difficult to obtain. Risks from an ever-changing market also affect the customers' tolerance and at the same time make the company dependent on the customers' and media's acceptance of the new product features[15]. The uncertainty of customer loyalty, tolerance and acceptance makes the product demand difficult to estimate. About 15% of the companies in the ICT industry explicitly state that it is the uncertainty in customers' demand that is constraining further innovation research [15].

4.2 Operational risks

The gathered material concerning operational risks are summarized in the parts of prerequisites for operational success, network of actors, funding and size of operating company.

4.2.1 Prerequisites for operational success

Mendelson[62] has assessed a number of prerequisites that need to be addressed in order for a company's operations to be managed successfully. These prerequisites are considered to be most important in firm growth and stability phases[48]. Since company operations in the ICT industry are heavily dependent on human capital[48] inter-organizational knowledge sharing and transparency are important factors. Other factors that need to be addressed are the importance of knowing what to do with the shared information, implementing methods to assess and process information and decide on how decision structures should function in order to speed up the response time of decision making. Risk occurs when these prerequisites are not met which could

result in ambiguous decision making, lowered efficiency[21] and reduced competitiveness[72]. The positive contributions to the company's success if these prerequisites are fulfilled, or vice versa if not fulfilled, have a greater impact on companies in industries characterized by fast evolving, dynamic environments, such as the ICT industry[62].

4.2.2 Network of actors

The market risks caused by dependencies on other actors primarily concern companies' inability to individually influence the demand of the product[43]. For example is the growth of a PC software developer dependent on increased sales of PC's and a semi-conductor producer is dependent on that semi-conductors are being used in the production of new electronic products. Concerning operational risks, companies organized in networks are found to run a lower risk of operational failure since the network presence reduces the vulnerability to external threats[65]. A major reason for this is the networks ability to gain, share and combine both physical and organizational resources among the network actors[91, 89, 42, 45].

Companies in the ICT industry to a large extent use external contractors, outsourcing, to perform different parts of the company's operations. Outsourcing, especially to eastern Asia, is so common that 99.5% of the manufactured ICT products in China is financed with foreign capital[58]. Outsourcing of a company's operations as a business strategy holds numerous risks for the outsourcing company. Commonly stated risks are losing necessary competence[57], problems with evaluating contract manufacturers (CM's) and product qualities, problems with reversing outsourcing decisions, cost uncertainties, risk of losing intellectual property (IP) and increased dependency on foreign suppliers[8].

4.2.3 Funding

ICT companies rely more on equity than on debt to finance the companies' operations[40, 5]. Due to the high level of uncertainty of R&D success, debt is explained to be a too expensive way of financing R&D activities[5] or that it might not even be feasible to obtain[43]. High levels of debt might indicate substantial interest costs in a R&D intense environment which could drain a company's internal funds[5]. R&D uncertainties increase the cost of external funds since the choice of equity by companies to finance their operations puts the company at risk since equity is partially gathered from external sources, such as Venture Capitalists (VC). Dependency of external financial sources exposes companies to risks caused by macroeconomic changes that could lead to variations in present VC's willingness to invest further, the availability of other equity offerings might be limited[43]. Sohaimi[84] encounters additional risk for ICT companies by having VCs as the common form of external funding. According to Sohaimi the lack of VC's knowledge in the invested company's core competence is the most likely area of conflict that affects the company's operational performance. Aoun and Hwang[6] agree with Sohaimi[84] that not having enough knowledge about the invested company's core competence constitutes increased risks with investments in the ICT industry.

4.2.4 Size of operating company

For the individual company, the size of the company itself can have an impact on the possibility of survival. Dhawan[24] found that the risk of failure for small firms is higher than that of large firms. Dhawan also found that the profitability was higher in small firms than in large firms, supporting the common trade-off statement between risk and profit. The reason behind these findings is that small firms to a higher degree need to adopt more aggressive strategies, making them more productive than their larger competitors but also more exposed to risks. Aoun and Hwang[6] state that large firms have a considerable advantage towards smaller firms since their investments are less time-dependent. Large firms can to a higher extent wait until more profitable options are available. Small firms therefore need to be more accurate in each investment decision since they are more exposed to external threats. In a study conducted by Psillaki et al.[75] they conclude that there is no significance between firm size and the risk of firm failure, but in this case firm size was based on the company's sales and not on staff size. Also Aoun and Hwang[6] state that small companies are able to compete against larger companies because of their quick responsiveness to the evolving market, characteristics that are less common in larger companies.

4.3 Technology risks

The collected material concerning technology risks are divided into the subcategories R&D and innovation, knowledge tied to individuals and funding.

4.3.1 R&D and innovation

The ICT is a very technology intensive sector and many products are a direct result from various research projects, both conducted at businesses and universities around the world. In many countries, among them Sweden and Finland as well as the European Union as a whole, the ICT industry constitute the largest amount of business research and development[33]. Research show that ICT companies in all growth stages with intensive R&D work and differentiated technology strategies perform better and have a reduced risk of business failure. The same correlation is established from technological cooperation where companies that cooperate with outside institutes also run a lower risk of business failure[55, 29]. What on the contrary increases the risk of failure is if companies have few legal patent rights or if the top management crew is recruited from other companies and hence are not familiar with the company's technological core competence. To reduce the level of risk, technological management competence should therefore be recruited internally.

Esteve-Perez and Manez-Castillejo[29] state that in the highly innovative environment of high-technology industries, the key to survival is to take the lead in the innovative process. Mendelson[62] however found no statistical evidence that higher R&D intensity would generate a better business result. Mendelson based his study on the statistical relationship between R&D expenses and business result. The result reflected on the investing business is unknown and therefore are the uncertainties of getting a return on the investment from R&D activity very high [33].

4.3.2 Knowledge tied to individuals

Research and development is to a large extent dependent on the knowledge of specific individuals. Aoun and Hwang[6] talk about high adjustment costs when describing the R&D characteristics of the ICT industry. High adjustment costs means that highly educated work forces are expensive and the costs due to hiring and rehiring this type of work force are very high. The high costs come from high salaries and that even highly educated experts need long and expensive on-site training and firm-specific knowledge in order to contribute to the R&D. A company's knowledge base is formed by individuals' knowledge and is lost if those individuals leave the company. Even worse is that firm-specific individual knowledge easily can end up at competitors when individuals are fired. Those factors contribute to the risk involved in R&D and affect the companies possibility to acquire external funding for technical development.

4.3.3 Funding

Not having enough funding for development is a critical factor for ICT-companies. In a study conducted by the Centre for European Economic Research it is stated that about 24% of the companies in the ICT-industry have difficulties with their innovation because of insufficient funds[15]. The result of insufficient funds is often delays in product introduction or that companies stop working with the costly but crucial continuous technological development. Therefore is cost and lack of financing the most common barriers from conducting research and development, as perceived by ICT companies[15]. When starting a research initiative it is most often impossible to tell if or when the initiative will be profitable. Because of that, many smaller companies, that might have trouble funding the research they need, may not be willing to take the risk involved in innovation projects[15]. On the other hand, Aoun et al.[6] conclude that larger companies might be hindered in their innovation process due to the inertia that comes with increased organizational size.

4.4 Total Quality Management

The collected material concerning total quality management are divided into the subsections product quality and business quality.

4.4.1 Product quality

There are several risks associated with inferior product quality for a company. Except the obvious risk of losing market shares due to products not fulfilling the customer demands there are specific risks depending on the nature of individual companies.

It is common today that companies outsource their software production both domestically and globally with a booming software market in low-wage countries such as India and Russia as a result[52]. The quality risks that rise with this development are many. Unexpected work related to testing and correcting software deficits that do not meet the quality specifications, or worse, do not fulfill the required quality due to lack of quality specifications, may delay whole projects and bring large costs[47]. Also, end products with quality problems may lead to legal claims from

the customers due to the harm that software errors inflict on an organization[37]. Similar risks arise in hardware producing companies. Contract manufacturers (CMs) take larger and larger responsibility in the hardware development process, including production, design, research and development, from the original equipment manufacturers (OEMs)[7]. Because of this, quality issues that are important to the end customer may not be forwarded to the developer so that the developer can do the needed changes. Also incentives that can be used to increase quality may be missing in the contract between the CM and OEM. Why would a CM work hard to increase quality on the products they make if they are not rewarded for that work? Kaya and Özer[47] identifies two factors that increase risk in the outsourcing relationship: "First, the CM and the OEM may not be able to contract on quality; second, the OEM may not know the cost of quality to the CM".

4.4.2 Business quality

The mindset towards and level of internal business quality depend on various factors. Research by Mann and Kehoe[59] concludes that larger companies generally put more effort into quality work; less than 15% of companies with fewer than 300 employees have an active total quality management program, to be compared with over 30% of companies with more than 300 employees. They also determine the most important factor behind increased quality to be the mindset and attitude towards quality from the board, trade union, employees and middle management.

In their studies on the relationship between product quality and business performance, Kroll et al.[53] see several positive outcomes from increased quality. Companies with high quality products may reduce their variance in returns, making them less vulnerable to both macroeconomic forces, such as business cycles and firm and industry specific factors, that only hit certain industries but not the whole economy. Better quality result in a larger market share and reduced direct costs leaving low quality companies struggling.

4.5 IT, Security and Support Systems

A large risk for technology companies is the theft of intellectual property. The success of an ICT company often depend on their level of innovation and technology, hence the importance to safeguard it's intellectual property from outside actors[43]. This is also an issue when considering business partners or possible companies to merge with; the risk of intellectual property theft in for example China may cause companies to avoid investment[60]. This is of specific interest in the ICT-industry since the products most often are easy to imitate and reproduce[43]. The risk concerning knowledge sharing and intellectual property with contract manufacturers affects both the contracted and the contracting part. Contract manufacturers usually cooperate with several competing clients, creating a risk that firm-specific information can end up in the wrong hands. Risks with knowledge sharing of intellectual property also creates a risk that the contracted manufacturer will ignore rules and regulations and instead adopt the knowledge for competing on the market with its own products[7]. Risks also occur for the contracted that accidentally can leak information about its processes through the close cooperation and therefore make itself useless to the client since the client now have the proper information for developing in-house instead[87]. The risk of intellectual property theft with contracted manufacturers in for example China hinders

the development of the production sites since clients are not willing to share new high-technology production solutions with actors in areas where intellectual property regulations are weak[58].

4.6 Human Resources

If the intention behind the M&A is to capture firm specific technology, which is very common in the ICT industry, the risks in HR increases. A change of business culture in the target firm may cause key personnel to leave the company and in the worst case join competitors. Firm integration is a key element in all M&A activity and especially when the personnel is the main driver[12]. The importance of human capital in the ICT industry in order to keep specific knowledge within the firm is further emphasized by Kazanjian[48].

4.6.1 Top management

Extensive research has been made on the impact from composition and size of the top management team on business performance. Hambrick and D’Avenis[36] studied the importance of a stable top management team by looking at large bankruptcies and concluded that there is a negative spiral between top management deterioration and business deficiencies. Other studies have shown that businesses with larger top management teams perform better over time. In young ventures, studies show a positive relationship between a lower average age of the top management team and business success. Younger executives on the other hand tend to take higher risks than older executives[66]. In a study by Lee and Lee[55] the most important risk factor in the management structure of failed newly started technology-based ventures is the education level of the entrepreneur, where lower education level more often lead to business failure.

4.6.2 Business culture

Several articles mention the business culture compatibility between companies to be an important factor in a merger or acquisition. O’Reilly[67] acknowledges business culture to spring from the motivation of people and the tendency to work for a common goal. Miller[64] mentions estimations that mismanagement of cultural issues contribute to 85% of the failed mergers through cooperation issues between companies. Schein[81] agree on this in his book and describes how the present global business landscape with mergers and acquisitions make it vital for companies to be able to work across cultural borders. He describes business culture as something that does not only exist within individual employees but come into life when people are put together in a social context. When people are put together in a new group they together form a culture based on the members’ personalities and backgrounds and Schein describe this as an ”interplay of culture creation, reenactment, and reinforcement [that] creates an interdependency between culture and leadership”[81]. In order to create an efficient organization after a merger or acquisition it is important that leaders understand the local culture and manage to align subcultures toward a common objective.

4.7 Environmental risks

Several reports have highlighted the alarming conditions in the Asian waste electrical and electronic equipment (WEEE or e-waste) recycling[58, 76, 88]. Rich industrialized countries that produce the largest amount of WEEE export the waste to less developed countries in Africa and Asia[76]. The electronic waste levels are rapidly increasing; in 2004, by estimation, about 100 million PCs became waste[88]. Also the production of ICT equipment is a severe burden to the environment. In their report on energy and material use in the production process of microchips, Williams et al. (2002) conclude that the semiconductors make for a disproportional amount of resource use compared to the economical value they create. This high amount of consumed energy, water and material contributes to the pollution of land and water through its waste, as well as emissions of green house gases such as carbon dioxide.

Pucket and Smith[76] describe the rich western countries' e-waste strategy, exporting the waste to less developed countries, as a "convenient escape valve" and about "exporting the [waste] crisis to developing countries of Asia", all to be "a dirty little secret of the high-tech revolution". The e-waste contain valuable material such as gold (about 4 g in a regular PC) that can be recovered for profit, especially in countries with low wages[39]. This makes the current e-waste situation lucrative for companies in such countries, doing large damage to both the workers and the surrounding environment.

To fight this development, the European Union is implementing a concept called extended producer responsibility (EPR). This make the producer of each product responsible for dealing with waste issues both upstream in the supply chain, in the production process and after the product hit the market[22]. The purpose of this is to create incentives for the producers to create more environmentally sustainable products in order to reduce costs when their life ends[80]. If this issue is not considered at the design phase of the products, there is an obvious risk that unforeseen costs regarding the recycling occur.

4.8 Code of conduct

Most code of conduct issues in the ICT industry regard conditions at outsourced services mainly in Asia. In the ICT hardware sector, the original equipment manufacturers (OEMs) to a large extent outsource the actual production to contract manufacturers (CMs) that employ far more people than the OEMs[83]. Outsourcing reduces the OEMs' control of their production activities and may also reduce the responsibility taken. Numerous reports describe problems at factories in the ICT hardware field ranging from worker's health, excessive work hours and wages lower than minimum allowed[58, 83]. In addition to these work oriented misconducts there are also frequent report about workers refused the right to form unions, and there are also reports of dismissal of employee spokespeople[14, 58].

Not much research has been made on the level of corruption in companies within the ICT industry. Transparency International[44] report that corruption levels within the software and services sector is the lowest among all sectors, but the semiconductor and technical hardware and equipment production sectors show higher corruption levels.

The above misconducts risk both loss of good will and law suits.

4.9 Political risks

There are several institutions providing international political risk ratings for individual countries that is used both when conducting due diligence and to base research on. One such service commonly used by researchers is the International Country Risk Guide by the PRS group. The political risk rating is made subjectively by using available material to answer questions about factors influencing political risk such as government stability, socioeconomic conditions, internal and external conflicts, religious and ethnic tensions and corruption[34]. Several studies has been made on the stock price reaction and the stock return in connection with foreign direct investments (FDI) and cross-border mergers and acquisitions. Those studies show that political risk significantly affect both the stock price and returns[49, 25]. Diamonte et al.[25] also show that political risk plays a more significant role on returns when investing in emerging than in developed markets. The difference, according to them, is as much as 11 percent difference in return per quarter in favor to investments made in low risk emerging markets than in high risk emerging markets, and 2.5 percent different in mature markets. A particular factor that increases the risk in FDI and M&A is the level of corruption since it produces bottlenecks, heightens uncertainty and raises costs. Corruption may also disturb the market mechanism by prohibiting market entry[35]. The corruption risk increases when the difference in country corruption level of the acquirer and the acquired increases; the two parties simply do not know how to deal with each other[35].

There is also an inverse relation in political risk where the acquirer or investor contributes to increase the political risk by making an investment. According to the UN, mining and smuggling of coltan ore, from which the important electronic equipment metal tantalum is extracted, helped finance the civil war in the Democratic Republic of Congo. In 2001 the electronics industry was accused of indirectly financing these activities and thereby indirectly contributing to the war[58].

The material in this chapter describes the risks that are the most observed in the scientific research about the subject. All material has been reviewed and the individual risks that are mentioned in the text have been identified and collected into a list, presented in Appendix A. It is on this list of risks that the following analysis is based.

Chapter 5

Analysis

In this chapter we analyze the collected material and answer the research questions. To simplify for the reader we have chosen to go through the analysis process step by step so that it hopefully will be clear what decisions we have done and what findings we have made. In the first section we will start with answering research question one by identifying the business characteristics that lie behind or cause the different risks that we have extracted from the material. The second step is to categorize the risks into the categories that Bearing Consulting use in their risk model. With this done, we have created a risk pattern that shows what business characteristics that cause what kinds of risks, and from that we can decide what we believe are the most important sources of risk.

5.1 Answering research question 1: Identifying the business characteristics that cause the identified risks

In order to make an analysis possible we had to condense our collected material into something more manageable. From the material based on 54 scientific articles we have therefore extracted 61 specific and relevant risks. Those risks have been collected into a list, which can be seen in the middle column of appendix A.

The goal of this first step in the analysis is to find out what business characteristics that make these risks arise. We want to find out what parts of a business, what business characteristics, that make companies vulnerable. To do this we study the risk list in appendix A as well as the articles that the risks are originally presented in and identify what the authors mean cause the risks. For example, some articles study how risks arise as a company grows. Risks from such research have been assigned the business characteristic business phase, meaning that the main thing that make this risk arise is the phase of growth that a company is in. Other such characteristics can for example be the geographic location or if the company produce physical products or not. All 61 risks are analyzed in this way, and the business characteristics we find linked to the risks are also presented in appendix A, in the left column. Sometimes the decisions are not easy; we have to make some generalizations not to make too many different business characteristics. We base this categorization on the material instead of making own subjective decisions, which we believe result in a better analysis that is more accurate with regard to the original research.

All 61 risks are tied to one or several business characteristics. A risk can for example be a

cause of not only one business characteristics but a combination of two or more. Throughout the categorization process we have to balance between functionality and comprehensibility: a too detailed categorization would create too many business characteristics to make any analysis meaningful, while at the same time too few characteristics would take the edge off the analysis and make it too general. For example we have one characteristic called *Market strategy* that contain both product portfolio and sales and marketing strategy, since we believe those characteristics in this context are similar enough to be regarded as one.

When this first step of the analysis is done we see distinct patterns of what business characteristics that cause risk. After discussions we have defined ten different characteristics that are relevant to the proceedings of the analysis work. Those are: firm size, business phase, governance, market strategy, funding, innovation process, network dependencies, outsourcing, product properties, market strategy and geographical location. Each one of them are described in more detail below.

5.1.1 Firm size

Firm size is simply the size of the business. Businesses of different sizes are exposed to different kinds of risk. This can for example be differences in profitability, decision making time and processes and the availability of capital.

5.1.2 Business phase

All companies go through different growth phases in their life. Starting as a new venture and eventually growing into a well established mature company. Risks can be associated to the phase of which a company is in, for example initial uncertainties of the market acceptance of the product that a company offer or insufficient support during the establishing phase.

5.1.3 Governance

Governance is a popular term that is frequently used in today's management literature. In our case we define this as a company's top management's ability to steer the company through monitoring and control of its own and its partner's interests. This can be seen as how well the top management understands the surrounding and what expectations there are on the company, both from the market and its different stakeholders. The business characteristic that we call governance includes the top management's market awareness and ability to make change as well as how the top management enable knowledge sharing within the organization.

5.1.4 Market strategy

Under this label we have put all risks that deal with how a company plans on acting on the market. This could for example include how a company positions itself on the market or how well its products fit with what the market wants. The difference between market strategy and governance is that governance describes how to act when in a certain position, while market strategy deal with planning and strategy.

5.1.5 Funding

Under this label we put all issues regarding how a company acquire the capital it needs to be successful. Funds can come from different sources such as venture capitalists or banks, and depending on what kind of funding a company use different risks arise.

5.1.6 Innovation process

Innovation process is a term that we use to describe the activities included in the research and development activities. The technical and innovation level of the ICT-industry make this business characteristic interesting, and risks arise from the never ending need to update the product portfolios. The result of an expensive innovation process can never be known beforehand and the market may react in different ways to the outcome.

5.1.7 Network dependencies

The complex nature of the ICT-industry creates a situation where corporate risks are not only caused by the company itself, but arise from its surroundings. There is an eco-system of actors that companies in the industry have to interact with, actors such as suppliers, wholesalers and manufacturers throughout their entire value chains. Risks arise when companies become dependent on other actors; they are no longer able to independently deliver their products to their customers. If the cooperation with those actors for some reason would not work anymore, the company would not be able to continue its activities. But risks may also arise from actors outside a company's value chain. For example, a single company in the ICT-industry can seldom control the demand of its product itself but are dependent on how well other products sell. This is extra common in the ICT-industry where each product often is only one small part of a technical system.

5.1.8 Outsourcing

This business characteristic is linked to risks that arise due to a company's decision to let an outside actor carry out certain business activities. Those actors can be based in the same or in a foreign country. It is common in the ICT industry that companies outsource their production to low-cost countries such as China and other Asian countries.

5.1.9 Product properties

Different risks arise depending on what kind of product a company produces. During the analysis process we can see distinct differences between companies making goods and services. Risks that arise depending on if companies make physical or non-physical products are tied to this business characteristic.

5.1.10 Geographical location

Risk levels depend on in which country or between which countries a deal is made. Typical risks tied to this category are political, such as the stability of the surrounding, and code of conduct

issues regarding corruption.

The business characteristics that we have described above are the answer to our research question one and will be used in the remainder of the analysis chapter.

5.2 Answering research question 2: Identify the most important sources of business risk and map a risk pattern

Now when we know what business characteristics that are the most important factors to corporate risks we want to go on with investigating if there is a pattern between them and if some of the characteristics can be considered more interesting than others.

5.2.1 Categorizing the risks

To start with we want to categorize the 61 risks in appendix A based on what kinds of risk they cause. To do this we have once again used the categories in Bearing Consulting's risk assessment model from section 2.5. All risks have been analyzed one by one and placed into the most suitable category. Some risks span over more than one suitable category and have hence been placed in several categories. As an example of this, the risk of losing intellectual property has been judged to be both a technical and an operational risk. The categorization of risks can be seen in the right column of appendix A.

When all risks have been categorized it becomes obvious that a large part of the risks we have identified fall under the categories market, operations and technology. This can be interpreted in different ways. Since we have based our work on existing research material the case may simply be that those areas may more often be the focus of research, hence there is more material to be found about those three categories. The popularity of some areas might depend on more academic prestige or research trends. There is a chance that we unconsciously focused on those areas during our material collection, and that we happened to find more material regarding them. But the most likely explanation why we found so many risks connected to the market, operations and technology categories are that those are central to businesses, that they in turn might contain risks connected to various categories. For example, quality and security risks can quite suitable be categorized as technology and operation risks, respectively. The categorization of risks is sometimes hard, where does the border go between environment, political and code of conduct risks? Should inadequate working environment be treated as a code of conduct or environmental risk? Or maybe even a HR risk?

Our result may be seen as a way to legitimate Bearing Consulting's model, since all risk categories in the model have been found in the collected data. Earlier research has already shown this and the model is already, with slight modifications, business praxis.

5.2.2 Connecting the business characteristics with the risk categories

So, up to this point in the analysis chapter we have first identified ten *business characteristics* that cause risks. Then, we have placed all risks into the *risk categories*. Now, we will connect the business characteristics with the risk categories. If you for a last time look at appendix A, what

we want to do in this step is to connect the business characteristics in the left column, through the risks in the middle column, to the risk categories in the right column. This is done graphically at first, by putting the business characteristics on the left side and the risk categories on the right side, and then draw a line for each risk that connect them. For example, a risk belonging to the market risk category might be caused by a company's size. Then a line is drawn from the business characteristic *Firm size* to the risk category *Market risks*. The pattern that arise when connecting business characteristics to the risk categories are shown in figure 5.1 below. The thicker the lines are, the more risks there are between a business characteristic and a risk category.

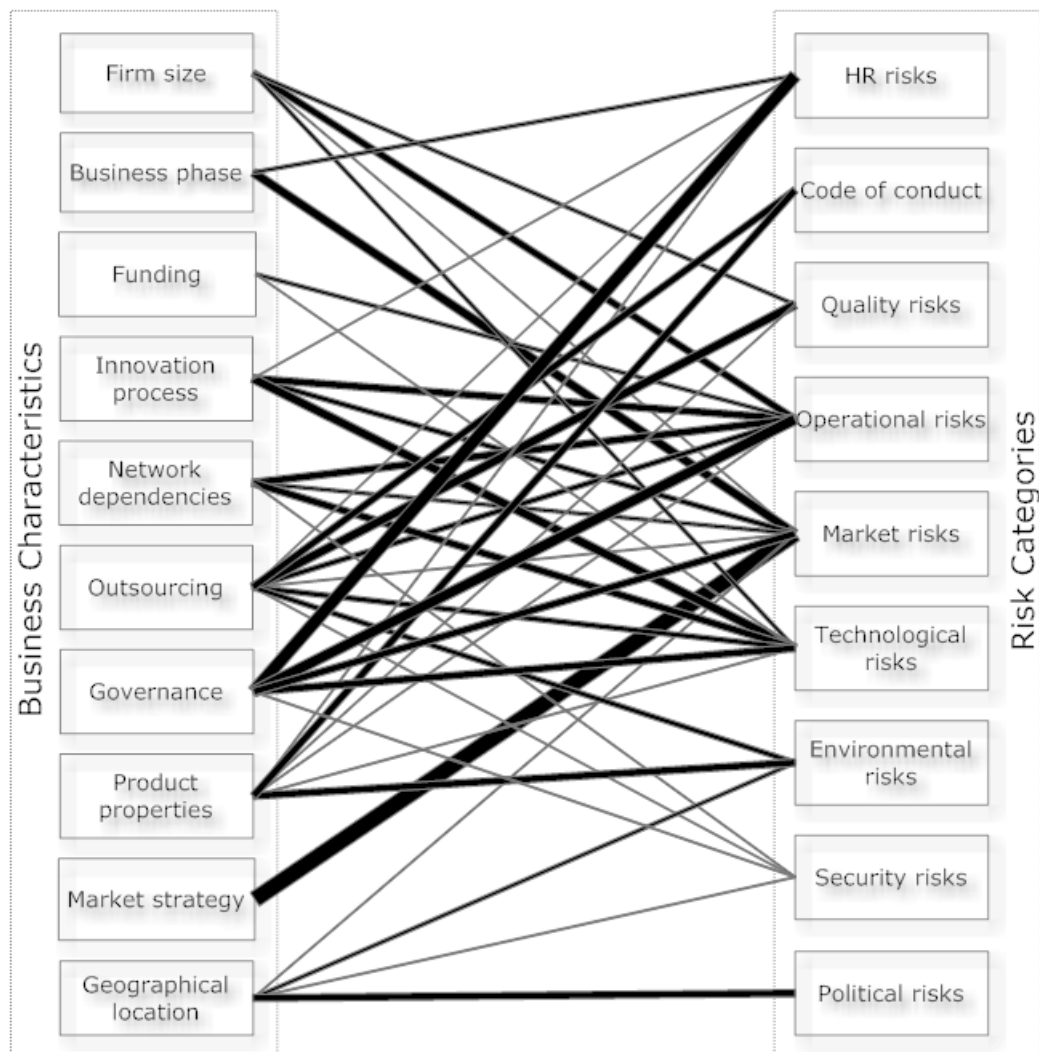


Figure 5.1: Risk pattern for the ICT-industry. The figure is deducted from appendix A. The boxes to the left represent the left column in appendix A containing the business characteristics. The boxes to the right represent the right column in appendix A containing the risk categories. The lines in between represent the risks that link the business characteristics to the risk categories.

Our primary finding from figure 5.1 is that it shows which business characteristics that influences the most risk categories. This can be seen by studying the spread and width of lines going out from the business characteristics' boxes. What we find here is that some business characteristics connect lines (risks) with almost all risk categories. This finding make us believe that those business characteristics are central and the more important sources of business risk, unlike some other characteristics that do not seem to be of the same importance.

5.2.3 Selection of the most important business characteristics

If we focus on the left boxes in figure 5.1, we will see that some business characteristics seem to cause both a large number of risks and that they are widely spread (they are linked to several boxes to the right). We propose that an important source of risk can *not* only be identified based upon the number of risks it causes, since we do not know the effect and probability of occurrence for each risk. Hypothetically one single risk caused by one business characteristic may constitute a bigger threat than the total threat from several other risks. We have already discussed the fact that quantification of risks is impossible in this case, but what we can see is how spread the risks are throughout an organization. Or in other words: what business characteristics that are connected to several risk categories.

To easier illustrate this, we put the business characteristics and risk categories in a matrix, as shown in table 5.2 below.

RISK DISTRIBUTION	Market	Operations	Technology	Quality	Security	HR	Environment	Code of conduct	Political	
Market strategy	9	0	0	0	0	0	0	0	0	9
Business phase	5	0	0	0	0	2	0	0	0	7
Governance	4	6	4	0	1	7	0	0	0	22
Innovation process	3	3	6	0	0	1	0	0	0	13
Network dependencies	2	4	4	0	1	0	0	0	0	11
Funding	0	2	1	0	0	0	0	0	0	3
Outsourcing	1	3	3	5	1	1	3	4	0	21
Firm size	1	4	2	1	0	0	0	0	0	8
Product properties	0	1	0	1	0	1	4	4	0	11
Geographic location	1	0	0	0	1	0	2	0	4	8
	26	23	20	7	4	12	9	8	4	

Figure 5.2: Table with risk spread over the risk categories

The numbers in the cells in table 5.2 represent the number of risks connected from the business characteristics (in the column to the left) to the risk categories (in the top row). The cells are color coded from green (no risks) to red (large number of risks) to give a better picture of the spread. We see for example that the largest number of risks in a single cell is in the market strategy and market risk interception (top left cell with nine risks). But based on our earlier arguments, this does not make market strategy an important business characteristic, since there is no spread to the other risk categories. We see that other business characteristics, such as outsourcing, have a wider spread among several risk categories. The rightmost column in table 5.2 summarizes each row, showing the number of combined risks that every business characteristic cause. We denote this combined risks since this sum is larger than the number of risks caused by the business characteristics. For example, we see that network dependencies cause only six risks in appendix

A, while it causes eleven combined risks. This happens because one risk might be put in *several* risk categories (more than one category in the right column in appendix A), making the combined risk count larger for one single risk.

So why do we talk about this difference between combined risk and number of risks you may wonder? Well, in figure 5.3 below we have plotted the combined risk sum with the sum of risks caused by each business characteristic.

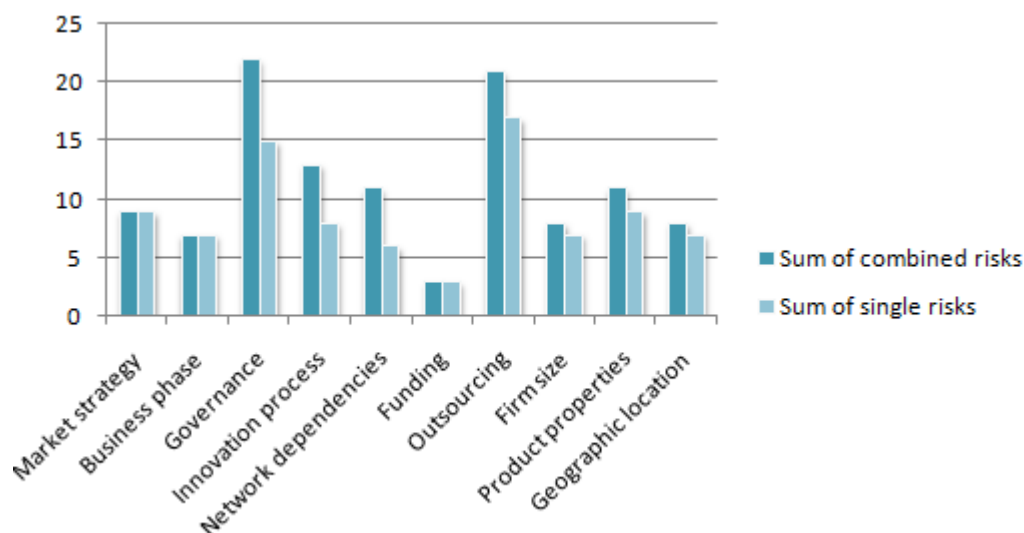


Figure 5.3: Illustration showing the risk spread of each business characteristic

Figure 5.3 show the number of risks that a business characteristic cause (light bars) and the number of combined risks (dark bars). The different heights of the two bars indicates the spread of risks between the different risk categories. This difference between the two bars is presented in figure 5.4 below, to further illustrate this effect.

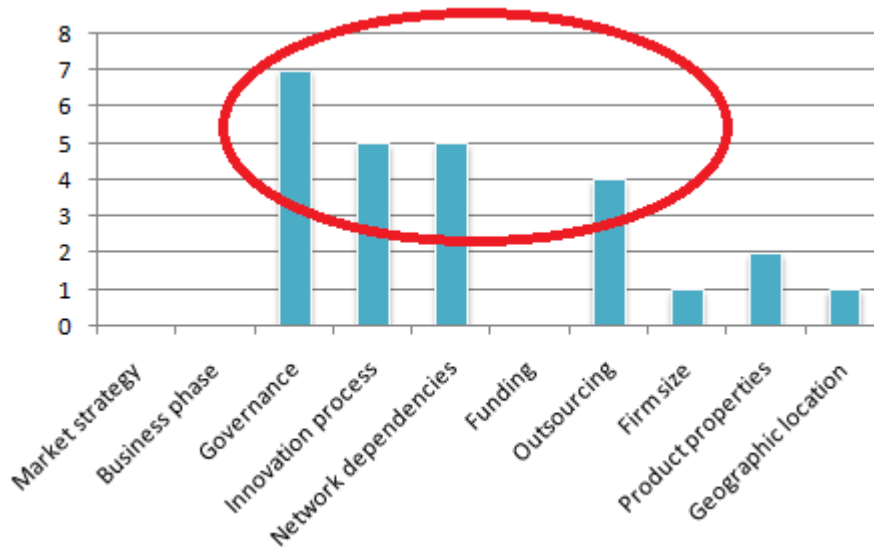


Figure 5.4: Extraction of the risk spread of each business characteristic from figure 5.3

Taking the spread shown in table 5.2 and the height of the bars in figure 5.4 into account, we conclude that the most important business characteristics that cause risk for companies in the ICT industry are *governance*, *innovation process*, *network dependencies* and *outsourcing*.

To further explain those four business characteristics we have made four short cases that hopefully will make the reader fully understand what typical risks they may create.

MINI-CASE: GOVERNANCE

Governance is all about companies' ability to "breathe and feel" the changes of the market. The AOL Time Warner merger is a famous case that clearly illustrates that not being aware of changing market conditions can have a critical outcome.

In the year 2000 the American Internet service and media company AOL merged with the entertainment and media conglomerate Time Warner in the history's most valuable merger, US\$183 billion[31]. The deal was cleared by the Federal Trade Commission in 2001. Around year 2000-2001 it was quite a ride in Internet industries and the actors involved were in for a thrill. In 2002, a year after the merger was finalized AOL's profit started to decrease. At the same time Internet companies' market valuations were questioned and specifically the value of AOL Time Warner. By the end of 2002 the value of the company had dropped dramatically and AOL Time Warner reported the largest loss of an individual company in history, US\$99 billion one year after the merger was finalized[2].

MINI-CASE: OUTSOURCING

A typical fear with outsourcing to CMs is the loss of control and competence and the empowerment of the CM to evolve into a market share stealing competitor. This is something that General Electric learned first hand.

In the 1980's there were four major producers of micro-wave ovens on the global home appliance market, Japanese Matsushita, Sanyo and Sharp and American GE. GE experienced a market share drop in relation to their competitor since the Japanese producers were able hold a significant lower retail prize for their micro-wave ovens. GE took a bold decision at the time and closed down their factory in Maryland, USA, and instead outsourced the production of their ovens to a small unknown Korean producer. The contracted Korean producer had almost no available technology, no prior knowledge in the field, no modern production facilities and no established distribution channels. The Korean producer initially got the necessary knowledge from visiting GE engineers and the production was eventually successful. GE could now be a contestant of the price-pressing contest once again. However, the Japanese competitors were markets leaders with huge production possibilities which eventually resulted in GE's capitulation from the market. The small unknown Korean producer however, now had enough technical skill and facilities to start producing ovens under their own brand, and so they did. A few years later the little unknown producer, today named Samsung, was the world's largest producer of micro-wave ovens [27] that competes with GE in many different markets.

MINI-CASE: INNOVATION PROCESS

In the innovation demanding environment that characterizes the ICT industry it is of highest importance to continue investing in innovations in order to survive. Innovations can be generated from within the own organization or be acquired from other companies. For the investment to be financially successfull it is in both cases important to evaluatate what the customer benefit and consequently the customer demand is.

Ebay may have over-estimated the customer benefits when trying to innovate the e-commerce industry in 2005. Ebay acquired the Internet-based telephone company Skype for a dazzling US \$2,6 billion in an attempt to provide VOIP services for e-commerce customers. What happend was that the customer benefits that were realized from the innovation were not of interest for Ebay's customers, e-mail worked just fine. Ebay eventually admitted that the prize tag of the innovation attempt was too high, but that didn't reflect the stock prize much since most stock analysist already knew that. This costly attempt to innovate their business has been referred to as one of the worst deals in the history of the PC industry. In 2009 sources said that Ebay is trying to find a buyer for Skype[17, 4, 11].

MINI-CASE: NETWORK DEPENDENCIES

When investing in companies in the ICT industry one should be well aware of that the targeted company's faith is in the hands of other actors. ICT companies are strongly dependent on other actors in their own value chain but also on other value chains, hence neither their demand nor supply of products can be fully controlled by themselves.

The faith of the Swedish software developer UIQ was in 2009 decided by the three major mobile phone producers Nokia, Motorola and Sony Ericsson. Sony Ericsson and Motorola each owned a 50 percent share of UIQ while Nokia was excluded from the value chain of UIQ's products. Sony Ericsson and Motorola had an interest in UIQ since they used UIQ's developed platform (based on Symbian OS) in their mobile phones. The actors' behavior that followed had severe consequences for UIQ. Nokia bought all shares in Symbian and turned the operating system into a free open-source software for anyone to use. The purpose was to neutralize symbian based platforms as a competitor and to gain functions that could be added to their own platform (the S60). Motorola didn't follow through on its commitments to use UIQ's platform in models to come and Sony Ericsson shifted to use Windows Mobile. After the desertion, UIQ's CEO said "we got into a position where we have no customers, no product to sell, and therefore no income either" and "there are no opportunities to create a new line of business in the current financial climate". After decisions made and actions taken from actors both in the same value chain and in other value chains, UIQ filed for bankruptcy and about 200 employees had to go job searching [68, 73, 10].

If we extract all other business characteristics from figure 5.1 than the ones identified as the most important, we end up with figure 5.5. When we study the spread of those risks we see that those four business characteristics in combination together influence all risk categories but one. This is political risk, which in figure 5.1 is only connected to a company's geographical location.



Figure 5.5: Risk pattern for the ICT-industry with the four most important business characteristics

The four business characteristics that we have identified as the most important are in many ways central to companies in the ICT industry. Companies need to keep a high innovation level or order to compete on the technical and ever changing market. A single company rarely makes a complete product or solution which creates an unavoidable dependence between actors in the ICT industry, making network dependencies an important business characteristic. Also outsourcing is a central term in the ICT industry where producers of both goods and services outsource different parts of their organization to other actors. It is also of course of great importance that companies know what is happening in this global and complex marketplace and that they are able to react to changes, constituting the base of governance which therefore also is an important business characteristic.

Innovation process, network dependencies, outsourcing and governance, in our opinion and with support from our material, make for the business characteristics that should be extra carefully

examined during the due diligence process in connection to an investment or M&A activity.

5.3 Similarities between the identified business characteristics

After identifying the four most important business characteristics, the next step in the analysis process is to see if they have anything in common that can explain why they are special. It is obvious that all four concern things that a company cannot, or only to some extent, control. Both before and during an innovation process the outcome is very hard to judge and control. Adding the fact that innovation work is very expensive but yet vital to a company's survival in the technology dependent ICT industry, make the uncertainties in the innovation process even more crucial. We also believe that the same things apply to network dependencies. Knowing how a complex market will develop, how consumers will react and how other, not necessarily rational, actors will behave creates uncontrollable network dependencies. The step is not long to the outsourcing processes, also meaning that you put control of your business in the hands of other actors that you do not have full control of. Governance is also tightly connected to the same phenomenon, since it deals with understanding and controlling the company's surrounding environment.

But what really connect those four properties are that they all have arisen from the globalization of the economy. The ICT industry has both driven and been driven by the globalization trend. The informations- and communications technology itself, together with safe and cheap transportation of goods, has made it possible for companies to spread out around the world to build new markets and production sites: the technological and political stability has created the base for a global outsourcing economy. The world has become smaller in a sense, and more actors fight for the same space. A complex market that involve huge networks of actors, all with internal relationships, has grown up and today no company in the ICT industry is an island by itself. Looking at our four main business characteristics this is strikingly clear, they are all related to this phenomenon. The risks in the innovation process that we have mentioned stem from a global complex market where cooperation and technological partnerships and acquisitions are necessities if a company intends to survive. Outsourcing has become more common due to globalization when activities more easily can be transferred to other actors, both nationally and internationally. It has created the possibility to reduce costs by outsourcing the production of goods and services to low wage countries, something that is very common in the ICT industry. The network dependencies are also a result from globalization since companies has become more tangled up with each other resulting in that they can not independently control for example the demand of their products, the supply of necessary material or the access to market channels. Governance is the companies' ability to understand what is going on around it, an ability that is of course more important the more a company depend on outside partners. A few decades back, all important operations remained inside the same company and even within the same building, making governance an easy task. Today when operations are spread out globally, just knowing what is going on with the most vital parts of the company takes a lot of effort and skill.

This finding, that the globalization of the ICT industry is the driver behind many risks, is interesting since it is a recent development. A vast majority of the material that was used in this thesis is from the last decade and has hence been influenced by the globalization process,

that is fairly young. Classic risk assessment literature mostly deal with internal risks, risks that has arisen within the company. Such risks do of course still exist and must be considered, but what this thesis show is that focus must be put also on external factors and risks that arise in the relationship with other actors. Risk assessment must, due to the globalization process, evolve and to a larger extent look at factors outside the company. We believe this is a new orientation and that *the last decades' global development also need to be reflected in the risk assessment work.*

Our findings are presented in figure 5.6 below, where typical questions for each business characteristic are asked.

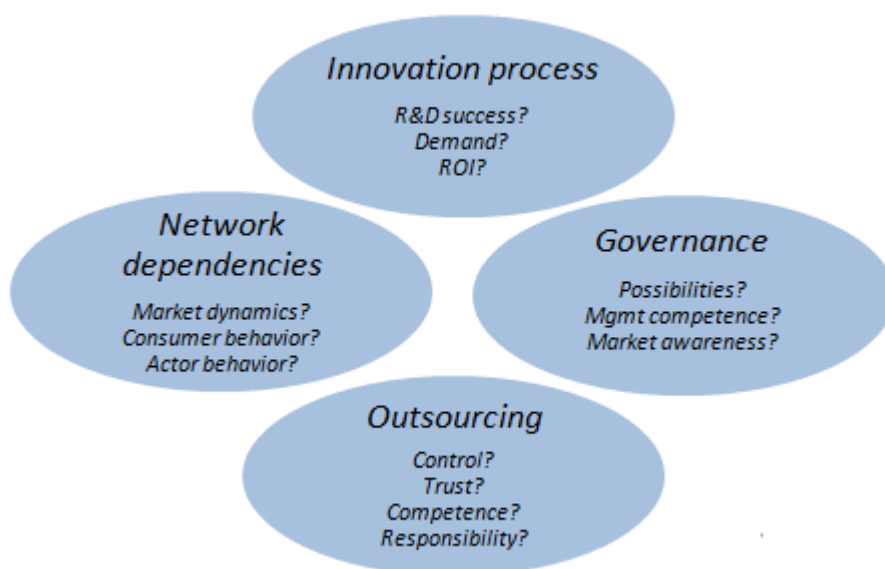


Figure 5.6: Illustration of the most important business characteristics

5.4 Are these results specific to the ICT-industry?

When putting together the collected material some market properties appear to be extra important to the ICT-industry. Those all regard the fact that the industry the last decades have been characterized by a strong growth, that the marketplace is extremely dynamic, global and that different actors in the industry have strong connections to each other. Other characteristics of the industry are the uncertain and global customer demand. The ICT industry is considered to be the most dynamic and globally dispersed sector in the world economy[3], maybe because it has driven the development itself with its information- and communication products. The ICT industry is the forerunner in the global economy, but many other sectors follow its lead. This is why we believe that our findings in this thesis, that the most important business characteristics stem from the globalization process, will be applicable on other industries as well as soon as they reach the same global status as the ICT industry has.

If the same research methodology that we have used in this thesis would have been applied to another industry today, it is very possible that the result would have been different. Other

business characteristics would most likely have been more important in influencing the risk level of such companies, making up another kind of risk pattern. But if the same industry became more globally dispersed and was reviewed again in the future, maybe the results will be similar to the ones in this study.

5.5 About our working procedure

In the methodology chapter we discussed the problems with quantifying non-financial risks to a comparable unit. This belief has been confirmed in several articles we have stumbled upon, as well as in contact with professors from different universities. We discussed the possibility of translating risks into monetary terms, but this is not possible in our case since we do not deal with a specific case, but with a general industry, where certain parameters such as company size is impossible to define. The specific interaction between acquired and acquirer might be of great importance, something that cannot be studied on a general level. For example can risks that are critical to one company be harmless to another. This problem with latent risks that are brought to light in M&A activities are exemplified by the case of ABB acquiring Combustable Engineering presented in the introduction chapter. The latent risks of Combustable Engineering became critical to ABB as soon as the acquisition was signed.

When ranking risks to each other were not possible we had no choice other than treating them all the same. But this approach is also troublesome, since it is sometimes hard to define what can be seen as one risk or two risks. Different articles have different level of details, where one might discuss the general market risk while another in great detail describe how different market strategies influence different kinds of market risks. In addition, an unbalanced material collection process could highly influence the number of different risks found, so treating them all the same would still not give material reliable enough to draw any conclusions.

This is why we decided, as shown earlier in this analysis chapter, to look at the spread of risks. The risks identified from the material should be regarded as a sample of risks, well representing the different kinds of risks in the ICT industry. From this sample conclusions about different business characteristics are drawn, conclusion that with high probability would have been the same even if the risk sample would have been different.

During our work we have on several occasions discussed other possible categorization methods of risks. The most interesting one has been the distinction between internal and external risks. It seems like there are some risks that are both caused by and hit a single company in isolation, risks that that company has to deal with alone. Then there are external risks, risks caused by factors lying completely outside the company, factors such as political regulations or a behavioral change of market leading actors. Such distinction between internal and external risks would have been very helpful in the due diligence process, since it would show what risks the company should deal with and correct itself. Unfortunately, our experiences from the work with this thesis have shown that such distinctions are hard to make. The risks are connected in a complex manner which figure 5.1 clearly shows. Internal and external factors interact and cause risks that are in the borderland between them, hence it is very hard to separate internal from external risks for companies in the ICT-industry. This lay well in line with our findings, that the most important business characteristics causing risk do so because of the dependence between different actors.

Chapter 6

Discussion

In this chapter we will deal with some interesting questions that we stumbled upon during our work. We will take one step back to discuss issues that are not directly tied to the research questions but still must be dealt with to put the thesis and its findings in a relevant context. Our hope is that the discussion further increases the readers understanding of the due diligence process in investment and M&A activity.

6.1 Risk versus uncertainty and the quantification problem

In section 2.1 we discuss the difference between risk and uncertainty. We say that risks can be used in mathematical calculations, both as probability of occurrence and as impact effect. Uncertainties, on the other hand, can only be identified but not assigned a numerical value. The due diligence process started as a purely financial risk assessment and has since been extended to also include non-financial aspects. In the financial due diligence process risks are calculated with quantified input parameters, such as key numbers and industry historic figures or other data. Calculations result in probability and effect of risks, which are then used when making for example investment decisions. But lately it has also become obvious that non-financial factors play a big role and that they to a great extent affect the risk propensity of a company. With this insight, it is of course attractive to transfer the due diligence process also to such aspects, but this is not easily done. Non-financial risks are in their nature very hard to quantify, and hence we claim that non-financial due diligence do not really deal with risks, but with uncertainties. The due diligence vocabulary stem from the financial world, but when shifting field and moving more into the field of organizational analysis, the expression risk is no longer really accurate.

Our findings, presented in the analysis, deal with uncertainties and not risk. Hence there is no meaning in trying to quantify them. The material we have used is mostly built on interview based aggregated research. Researchers have with their theories and hypotheses formulated questions mostly to people in central positions in different companies. Those people has then subjectively interpreted the researchers' formulations and given answers to them based on their own analyses of the situation. These analyses are of course colored by the respondent and its relation and insight to its organization. The answers have then subjectively been interpreted by researchers, once again with their theoretical background and frame of reference and have then, in some cases,

been quantified so that statistical calculations can be made. We accept the relevance of such research and agree that they might give a good picture of the reality. But that we, based on this material with its many sources of uncertainty and error, would build a quantifiable model concerning the uncertainties of a whole industry would not be believable. We cannot decide what are the single most important risks since they are dependent on a specific context and do not deal with the industry as a whole.

When subjective risk assessments are made an interesting and well-documented effect often occurs. This effect make risks with low probability of occurrence but with big result if they occur often overrated. Oppositely, common risks with a small outcome are often underrated. A common example of this phenomenon is people being afraid of plane crashes or nuclear power plant accidents, events that are very unlikely to occur but with catastrophic results. Few people are afraid of driving their car or riding their bike, but those activities bring far higher risks. This phenomenon within the field of risk perception has been studied by Lichtenstein et al.[56] and we believe that this same phenomenon also may occur in the due diligence work where it might be easy to see the large but less likely risks and neglect the smaller but more frequent risks. The whole subjective risk assessment methodology put the classic risk mathematics out of play and instead we are dependent on arbitrarily evaluating uncertainties of different kinds.

6.2 Business culture as a residual

Many reports that we have read name business culture as the most important factor behind failing mergers and acquisitions. This is often formulated in vague terms with no reference to reliable research. It is of course possible that the business culture is such an important aspect as those authors claim, but we have so far not seen a definition of what such cultural aspects would include and we believe that the culture concept often is used as a grouping of non-identified problems that arise. Business culture becomes a residual that is convenient to use to describe the uncertainties that cannot be placed in another suitable category. The fact that culture is treated as such an important factor might say more about the understanding of the M&A process than about real cultural problems. Starting a M&A process with the belief that 85% of failed mergers would be due to cultural differences, as some researchers say[64], questions the relevance of doing a due diligence at all. If you consequently blame the failure of mergers and acquisitions on incompatible cultures, then you also discard the purpose of the due diligence since the meaning is to find the real sources of failure.

6.3 Possible reasons behind mergers and acquisitions

It is known that approximately half of all mergers fail. Despite this the number of M&A attempts increase every year. In the introduction chapter we present some common reasons behind mergers, but we believe that the mainstream M&A literature might miss some aspects. Individuals might see mergers as a way to gain legitimacy and respect as a step in accelerating its own career. The ability to conduct a successful merger or acquisition is a highly coveted ability.

Another possible reason behind M&A activity could be to hide inconvenient problems or to show that something is being done. If there are no other ideas, a company can always do a merger

to show that some action is taken, just like downsizing or reorganization can be used. A merger or acquisition could be a possible solution instead of dealing with the real problems within the organization. And if the merger then fails, you can always blame business culture. Doing this the top management can avoid being blamed for both bad results and a failed merger.

As a part in the M&A activity an outside actor is often contacted to evaluate the conditions and uncertainties (the due diligence process). This actor has of course a limited time to gain knowledge and insight about all different parameters in the process and its findings can in no way cover all possible scenarios. But this report, made by experts, contributes in another important way: it provides a proof that the merger or acquisition is possible. It gives the M&A legitimacy. The report might only confirm the acquiring company's gut feeling, but when it is printed on paper it is real. This corresponds well to Meyer and Rowans'[63] theory about a company's facade as separated from its core. In the business climate it is important with a facade to show competitors, customers and stakeholders that you are a modern and progressing company. Such actions might in many cases just be a show or display more than something that in a real way affect the daily work. The importance of this shiny facade might consciously or subconsciously be used by the top management to motivate their actions.

With this said we do not in any way imply that mergers and acquisitions are meaningless, but it is important to have in mind that the internal reasons behind the actions do not always have to be the same as the ones that are presented to the outside.

6.4 Collision between academy and practice

During our work we have run into several obvious and interesting collisions between the academic research and the practical due diligence field work. Those two different parts do often look at the same issues from different perspectives. Bearing Consulting, for example, chose to quantify all risks into bars in different heights in their risk assessment process (see figure 2.1) based on personal experience and not on actual qualitative findings. We understand the pedagogical purpose of this quantification and that it is a powerful tool to show the customer differences in risk between different risk categories. It can also be seen as a way to win legitimacy, where bars that symbolize risk are convincing and easy to accept as opposed to a written report, like the one you are reading right now. The quantification is an excellent practical marketing and presentation tool that works well on the field, but a scientist would most likely be more questioning to this approach since the bars really does not mean anything else than "take an extra look into this".

This phenomenon points out the obvious perspective difference between academy and practice that we have had to face during our work. Nothing says that the academic view is more correct, it is just simply two different standpoints to look at the same thing from. We do not intend to go deeply into some kind of discourse discussion since that would be outside the framework of this report, but we still want to share our view on the obvious and necessary differences between the practical field workers and the academic researchers. With an academic analytic view the field work would be extremely limited, time consuming, hindering and more or less impossible. The subject is too complex for pure scientific methodology to be effective; *the work will to some extent have to be based on personal experience and well-grounded subjective decisions*. We have found this collision between perspectives very interesting and it is obvious that the two sides have a lot

to learn from each other. The people working on the field could pay some more attention to the academic critically analyzing work procedure in order to legitimate its work and to discover other rewarding activities than M&A. Decisions are seldom based on purely rational grounds but are instead influenced by the social environment and the explicit and implicit industry wide trends that shape the business landscape. Today's truth in business is that mergers and acquisitions create successful organizations, even though research show that more than half of them fail. If the people on the field would blindly listen to the researchers there would hence be no more mergers or acquisitions. Although M&A activities have a high failure rate it can still be considered to be necessary for a business ongoing success. We conducted a summary over companies within the ICT-industry on the Global Fortune 500 list[16]. Out of 60 reviewed companies we have found evidence that 59 companies sometime during their history have made a merger, an acquisition or both. This proves that even if mergers and acquisitions are uncertain to succeed, they are still necessary for companies to become large and successful enough to be listed on the Global Fortune 500 list. Even if M&As are haunted by high failure rates, there are many such actions made and we have shown that many of the most successful companies in the world have been involved in M&A activity. There are also writers who question the correctness with the high failure rate of M&A activity. Epstein[28] says that "commonly used narrow interpretations of merger success (such as 50% or 70% fail rate) undervalue the contributions of mergers, and that a more comprehensive evaluation often leads to very different conclusions." Either way, the conflict between academy and practice is interesting and it illustrates the large gap between the parties.

Since the academy use a proof-based methodology, meaning that it should be possible to prove all opinions and hypothesis, the situation gets extremely complex when moving into non-financial sources of business risk. This complexity has been mentioned in several reports and is pointed out as one reason why not so much research has been made on the non-financial or soft factors in mergers and acquisitions. This further increase what we earlier discussed, that people working in the field of risk assessment often have to base their work on subjective quantifications, since this is the only known way of approaching the subject.

We have carried out the work with this thesis in close cooperation with both academy and practice. When all academic material had been collected and discussed with Bearing Consulting we found some differences in view between the two parties.

For example, Bearing Consulting expressed their belief that business risks in the ICT industry vary depending on if the company's actions are geared toward other businesses or to end consumers, so called business-to-business (B2B) and business-to-consumer (B2C). Neither during the material collection nor during the material condensation there has been any indication that the risk levels would be different depending on what types of customers a company has. The research seems to completely neglect this perspective. Possible reasons to this could be that there has been no research in this field, that there are no differences in risk between the two types of customers or that this kind of differentiation is included in what is labeled value chains, ecosystems or actor networks. If more attention had been put on those different customer types in the research, maybe our result would have looked different. Perhaps customer type should have been one of our important business characteristics, but since we found no material regarding this we cannot include it in this thesis. It would have been interesting, as a next step, to study other industries than the ICT industry to see if there are any interesting similarities or differences and if for example customer type would have been paid more attention to in those industries.

Another difference between the academy and practice that we found regards the different incentive programs that companies use and what happen to them when a company is acquired or merged. It is for example impossible to keep an incentive program that gives the key personnel the option to buy stock in the company, since an acquired company's stock might be taken over completely by the acquirer. If the incentive system has big differences regarding options and bonuses compared to the acquiring company, a change is unavoidable. Bearing Consulting in their daily practice see this as a big and common problem, when key personnel chose to leave an acquired company due to incentive disagreements. This issue has not been dealt with in any article we have come across, once again showing that there need to be communication between the academy and practice so that research can be directed at the most interesting and important spots.

6.5 Research alignment

One thing that hit us at the end of our material collection is that we found no conflicting studies whatsoever. This is very surprising since there are so many sources of error when studying non-financial risk, that some studies simply must have come to different conclusions. But this never happened, and we have some theories that might explain this. One is that there simply is such a limited amount of research material and that there are no conflicting conclusions simply because there is not so much research that could collide. Another theory regard how material is presented in search engines, such as article databases. We do not know how search engines are designed, but we see an obvious risk that the results showing up first are the most popular and most referenced to. This could be good, since the best articles are made available. But there is a risk that research becomes aligned and that only the opinions and conclusions that agree with each other and the perceived mainstream truth gets publicity. Any deviating research might be punished so that it does not reach us.

6.6 Risks today and tomorrow

All our results that we have shown in the previous chapter are based on how the ICT industry looks today, since all material that we have used is based on research on existing companies. It means that the risk pattern that we have discovered will probably change when the conditions and environment that companies act in change. If we are to look into the future there are some indications on what might happen and what changes to business risk this might bring. The ongoing globalization process could hopefully create a more positive situation in poor countries, where a local wealth might be built on more work and better salaries when outsourcing of production from the richer countries continues. This will hopefully lead to better conditions, which in turn will bring well-grounded demands for better working conditions and environmental concern. To meet those demands, the producers will need to take more responsibility about their products, make them environmentally sustainable and take a more active part in the recycling process. Producing companies, and in the end the consumer, might at last have to take responsibility and fully pay for the harm that the luxury consumption of some technology inflicts. Tougher demands will have to be put also on the ICT industry regarding sustainability and fair trade.

Better insight into the problems throughout the whole value chain might force retailers of the end product to control that no ethical violations has been made upstream in the value adding process, for example in the Asian production facilities. The same demands that have been put on for example the clothing industry will have to be put also on the ICT industry, to make sure that there is complete transparency into the production processes and that working environmental laws and human rights are met. The global environmental focus may make consumers no longer accept products that do serious harm to the environment. Outsourced production processes will eventually have to modernize to meet higher environmental demands, something that with time could lead to increased production costs.

The supply of natural resources needed to produce material for technology products are limited, and can only be found in certain places of the world. The ICT industry has already been blamed for indirectly financing the civil war in the Democratic Republic of Congo. When production and consumption of such resources increase the need to further exploit some parts of the world will rise further. How long will consumers in the rich world accept that the material used to build their new technical and unnecessary toy has literally taken people's lives in the poor world?

Historically we have seen similar developments in other industries, where for example the popularity of the Fair Trade mark in the food industry is used to separate products that have been produced in ethically acceptable and environmentally sustainable ways. Why can there not be a Fair Trade mark for technology products that in so many ways violate the same things as the food industry does? Such demands discussed above might come fast from both politicians and the public and it is therefore vital that companies already today look over their code of conduct issues both at themselves, their suppliers and their suppliers' suppliers. Being a frontrunner in those issues might even be a way of differentiating from other actors, making obvious and sound ethical activity also financially attractive.

There may also be a future change in consumer behavior to a more sustainable position, something that for example has already to some extent happened in the car industry. Huge cars with strong, fuel guzzling engines have lost their prestigious position to smaller, fuel efficient substitutes. This consumer move went against what a large part of the car industry was working for, and showed that consumers can in a real way influence also the production focus of large companies. A similar trend can be expected in the ICT industry when consumers no longer accept waiting for the large companies to make the ethically right decisions.

Chapter 7

Conclusions

It is now time to look back on our research questions and see if we have been able to answer the questions that we asked ourselves in the beginning of our work, and what other conclusions we have drawn during the process of writing this thesis.

1. What general *business characteristics* are the sources of risks that arise in mergers and acquisition activities in the information and communication technology industry?

The mapping of risks has convinced us that there are ten business characteristics that to a large extent influence the risk propensity of a company. Those are described more thoroughly in the analysis section and are presented in short in figure 7.1 below.

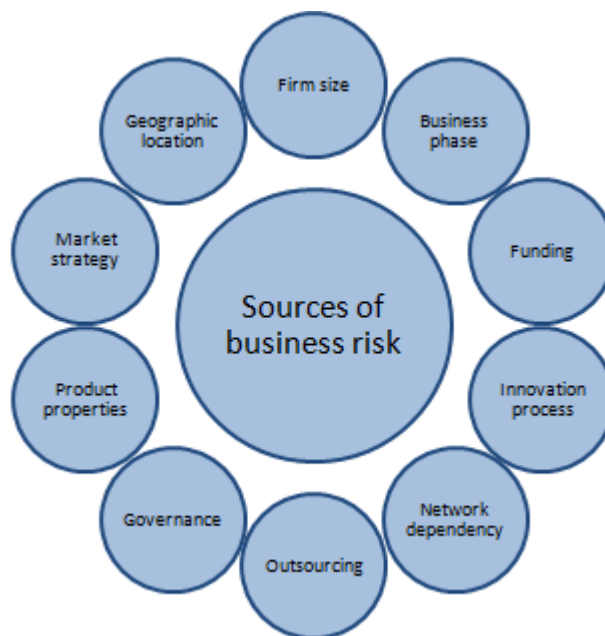


Figure 7.1: Business characteristics that are the most important sources of risk for ICT companies.

2. Based on the answers from the first question, is it possible to create a *risk pattern* that identify the *most important sources* of business risk in mergers and acquisition activities, and how would such a pattern look like?

We have used our material to create a risk pattern for the ICT industry (see figure 5.1 in the analysis chapter). From this pattern we have elevated four business characteristics that we believe have a particularly importance for the upcome of risk. Those four are the innovation process, outsourcing, governance and network dependencies. They all give rise to a large amount of risks spread widely throughout the entire company. Why these four shoot out as important factors in the due diligence is because they create uncertainties that a single company cannot completely control itself, but stem from its interaction with other actors. We have come to the conclusion that they all stem from the globalization process where the ICT industry is one of the forerunners. More global operations put new demands on the assessment of risks and the last decades' development has lead to a situation where more effort need to be made on factors in a company's external eco-system. We believe that more industries will globalize and follow the ICT industry's lead, which with time will make the same approach we have proposed also interesting in other industries.

Figure 7.2 below shows the four most important business characteristics and typical questions that may have to answered in the assessment process of these.

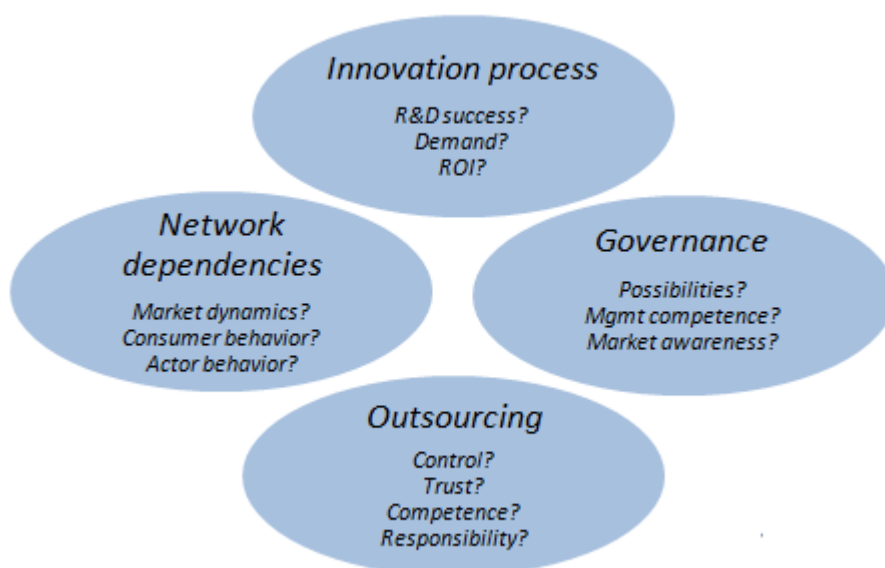


Figure 7.2: The four most important business characteristics to investigate during risk assessment in the due diligence process for ICT companies.

During the intensive months under which the thesis was written a complex world of risk assessment has appeared. Above all it has become obvious that quantification of non-financial risk is extremely difficult, something that many articles, researchers and professionals agree with.

Therefore we have concluded that the risk assessment part of the due diligence process has never treated risk, but *uncertainties* that by nature and definition are not possible to mathematically calculate.

7.1 How can the results of this report be used?

The main conclusion that we make after indentifying our four main risk-causing business characteristics is that there are no shortcuts to a good due diligence. The four characteristics all deal with the interaction between companies in a global setting and all risks can hence only be identified after a thorough assessment. It is not sufficient to only look at the single company in isolation; also the interactions with other surrounding actors must be included. The due diligence process must follow the global development and be widened to include larger analyses of the surroundings where also external parameters should be regarded. Internal and external factors interact, which makes both of them vital and rule out the option of neglecting any of them. Also the same approach can be used in other industries that has reached the same global status as the ICT industry.

Appendix A

Table with risks

This table is the basis for our analysis and consists of three columns. The center column contains a summary of all risks that we have identified from the collected material. In the left column are the business characteristics that influence the upcome of those risks, based on the material as well. The right column contains a subjective categorization of risks into the risk categories used by Bearing Consulting, as explained in section 2.5.

Business characteristics	Risks	Risk categories
Market strategy, Business phase	Focus on low price demanding high volumes	Market
Market strategy, Business phase	Too small customer segment	Market
Market strategy, Business phase	Mixture between different strategies	Market
Market strategy, Business phase	No strategic position on market	Market
Market strategy, Business phase	Insufficient external support	Market
Market strategy	Inability to build brand	Market
Market strategy	Too general product portfolio	Market
Market strategy	Limited to only domestic market	Market
Governance, Market strategy	Difficulties to enter global market	Market
Innovation process	Outdated product portfolio	Market
Governance	Inability to quickly adapt to a changing market	Market
Network dependencies	Dependency on other actors on the market	Market, Operational
Network dependencies, Innovation process	Large actors constrain technical development	Technology
Governance, Network dependencies, Innovation process	Insecurities in forecasting R&D success	Technology, Operational, Market
Funding	Insufficient equity availability	Operational
Innovation process	High fixed development costs	Technology
Governance	Limited information about the market development	Market

Governance	Limited information about the latest technology	Technology, Operational
Innovation process	Customer acceptance of new products	Market, Operational
Governance	Slow decision making	Operational
Governance	Incorrect decision making	Operational
Network dependencies	Insufficient network structure increase negative networking effects	Operational
Funding	VCs lack of knowledge about target firm core competencies	Operational
Outsourcing	Losing necessary competence	Operational, Technology
Outsourcing	Problems with evaluating CM quality	Quality
Outsourcing	Reduced control of product quality	Quality
Outsourcing	Dependency on external partners, reduced agility	Operational
Outsourcing	Cost uncertainties	Market
Outsourcing, Network dependencies, Governance	Losing intellectual property	Technology, Security
Firm size	Small firms more profitable	Operational
Firm size	Small firms more time-dependent on investments	Operational
Firm size	Small firms adapt high risk strategies	Operational
Firm size	Small firms have quicker responsiveness to market changes	Market, Operational
Network dependencies	Low R&D cooperation with outside institutes increase failure risk	Operational, Technology
Governance, Innovation process	Competence is dependent on specific individuals	Technology, Operational, HR
Firm size, Funding, Innovation process	Unavailable funds for R&D in smaller firms	Technology
Firm size, Innovation process	Innovation process hindered due to organizational inertia	Technology
Outsourcing, Product properties	Unexpected extra work to correct bad software	Operational
Outsourcing, Product properties	Legal claims due to poor software quality	Quality
Outsourcing	Problems with constructing legal contracts with respect to quality	Quality
Outsourcing	Decreased insight in the development process	Technology
Outsourcing	Cost control and incentives might miss when outsourcing	Quality
Firm size	Small firms to a smaller extent have a quality program	Quality
Governance	Mismanagement of cultural issues	Operational, HR
Governance	Top mgmt deterioration increase firm failure	HR
Governance	Small top mgmt teams increase failure risk	HR

Governance, Business phase	Younger top mgmt teams tend to be more successful	HR
Governance, Business phase	Younger top mgmt teams tend to take higher risks	HR
Governance	Lower education level increase risk	HR
Product properties	Responsibility of recycling of own products	Environmental
Outsourcing, Product properties, Geographical location	Contributing to severe pollution in poor countries	Environmental
Outsourcing, Product properties, Geographical location	Risk of law suits due to pollution	Environmental
Outsourcing, Product properties	Worker damage leading to law suits	Environmental, HR, Code of conduct
Geographic location	Fraud	Security
Geographic location	Governmental instability	Political
Geographic location	Internal and external conflicts	Political
Geographic location	Religious and ethnic tensions	Political
Geographic location	Market corruption	Market, Political
Outsourcing, Product properties	Excessive work hours for personnel	Code of conduct
Outsourcing, Product properties	Wages lower than minimum allowed	Code of conduct
Outsourcing, Product properties	Refusal of workers right to form unions	Code of conduct

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