The value of a business continuity management plan from a shareholders perspective

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Preface

This thesis, written during the spring 2007, is the last part in my Master of Science in Mechanical Engineering at Lund Institute of Technology. The thesis has been conducted at Marsh Risk Consulting, Rotterdam, in cooperation with the Division of Engineering Logistics at Lund University.

It has been 20 fascinating weeks, where I have been able to deepen my knowledge in Supply Chain Management, Risk handling and Business Continuity Management. These weeks has convinced me that this is the area I want to continue working in, the next coming years.

Helping me with the chance to broaden my knowledge, in this area, is Marsh. The cooperation between Marsh Sweden and Marsh Netherlands has given me the opportunity to write my thesis abroad. During these 20 weeks I got the chance to experience another business culture and meet new friends.

Starting new in a new country, new environment and with a, to me, new subject was both exciting and scary in the beginning. What has made the process easy and fun is the colleagues in Rotterdam, they have helped me and made every day a joy. They have accepted me as a college and member of the team and offering help whenever I needed, without asking. A special thanks to my mentor in Rotterdam, Onno Cleeren, for always being there and helping me with both complicated and easy questions, always giving me the encouragement and right criticism to stretch my abilities and accomplishments, further.

Also thanks to Everth Larsson for taking time to review my material at sometime spontaneous and irregular times. Everth has helped me getting my thesis up to the standards according to the University’s but also helping with me with the administrative work around the process.

I have also given the chance to visit companies and see the practical side of the subject studied. The interviewees have been very helpful in taking time to show me their businesses. Helping me with introducing me to these companies is Per Axel Nilsson, who also has been inspiring me from the beginning to continue my research in this area.

None of this would have been possible without the support and help of my parents. They have always been supportive of my different adventures throughout the years, giving me the courage to always try new things, resulting in me growing as a person.

Writing a thesis on your own is challenging, but with the help of all the people around me, this half year has been exciting, fun and learning. I hope you will enjoy the thesis as much as I have.

Best Regards

Rotterdam,
2007-06-08
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Abstract

Faster…better…cheaper. This has long been a mantra for most companies, and is often the way profits are made and competitive advantage is gained. But events like terrorism, natural hazards and Internet crime have recently brought new risks to the companies and the supply chain. The more efficient and global your company is in reducing costs and, the more at risk you are. Numerous management teams are not aware of the different risks, lurking around the corner. Even with the risks threatening the company and drivers that can result in a disruption, companies are hesitant in spending money on safety measures such as safety stock and extra suppliers.

Supply Chain Management (SCM) is today a fairly common subject in companies and involves coordinating and integrating material, information and financial flows both within and among companies. It is said that the ultimate goal of any effective SCM system is to reduce inventory, but in case of an interruption still be able to get a hold of the required input actors.

The increasing amount of risks affecting Sweden and the rest of the world in form of natural hazards, strikes and terrorist attacks has opened a discussion on how to protect your company from a disruption. The cases studied in this thesis have been affected by risks that can be divided into natural hazards, social risks, legal risks and terrorism.

To reduce the likelihood of a disruption occurring and the impact after the event; a business continuity management (BCM) plan can be implemented in a company. The BCM plan is the plan to ensure ability of an organisation to provide service and support for its customers and to maintain its capability before, during, and after a disruption. BCM is the ongoing management of the business continuity plan. To insure that it is always up to date and available.

During a disruption, the drop in shareholder value was between 60 and 5 percent in the different cases, but the average drop was 20 percent. What affects the outcome of the share values is how the management reacts and how to handle the media. Another factor is the importance of the product, if it is the main product of the company the share value is hit harder.

Even though there are clear connections between the disruptions and the drop of shareholder value, companies lack recovery and contingency plans. Many of the cases show that the companies had to make up plans during the event and this resulted in higher costs due to alternative routes or costly supplier. There is a growing trend, which is still very uncommon, that a company has an implemented and trained BCM plan, especially in Sweden. Companies, studied in the thesis, have started implementing recovery plans or crisis plans but to get the company back to where they were, a contingency plan, is not common.

My assessment is that the existence of a BCM plan in these situations would have prevented extra costs and drop in share value. The companies would have had a strict plan to follow, areas of responsibilities would have been mapped out and action would have been taken earlier. By having a BCM plan implemented in the company the likelihood of a disruption occurring can be lowered as the impact after a disruption, is mitigated. Consequently; loss of shareholder value can be prevented…
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1 Introduction

This chapter sets an outline for this study. It gives the reader a description of the background, the areas of enquiry, purpose of the thesis, definitions, the focus and delimitations that are set, the target group and also the disposition.

1.1 Background

In today’s fast paced business environment there is not much tolerance for downtime or disruptions. Companies strive to get the most efficient supply chain with the methods like Just in Time, Built to order, Lean production etc. The purpose is often to reduce costs, but still be able to satisfy the end customer. Concerns that the companies face are pressure on margins, an increasingly competitive and complex marketplace, difficulty in managing a large vendor base, shrinking product life cycles, and customers demanding better availability and choice. This often results in unstable Supply Chains that is not ready for a disruption.

Not so long ago risk management was considered a niche speciality and not a priority for the everyday company. 9/11, Katrina hurricane, bird flu and events like these have made companies more aware of crises that might strike. But events does not have to be of this size to have severe consequences, by hitting the right nerve in the organisation, a small incident can but the company at risk. They have also seen the consequences of not being prepared for disruptions in the Supply Chain. While competition has become fiercer over the last year’s contribution margins have been under pressure. This effect combined with an evermore critical and demanding client has created an uncertain demand. Survival of a company thus comes down to dealing with disruption and uncertainty in a responsive way.

What is also noticed is that the disruptions in the Supply Chain are getting more common and also more severe. The smallest disruption in one end of the chain can trigger a large crisis in the company due to increased dependability.

This thesis contributes by giving a more clear connection between Supply Chain Management and Business Continuity Management. By locating the space between the Business Continuity Management and the Supply Chain management and then bridge this. This might result in a clear picture what effect the implementation of a Business Continuity plan would have in a Supply Chain disruption. My aim is to look at the effects on stakeholders. With examples from different cases and situations managers from other companies could use the result of generalisable conclusions and recommendations on why and how to integrate the Business Continuity Management in their own Supply Chain.

1.2 Areas of enquiry

The market is getting more demanding and the companies need to work harder to keep a competitive advantage. Products are in many ways getting more complex with plural parts that result in more processes for assembling. To be able to cut down costs companies are outsourcing a lot of the processes, not just to the country next door but around the world. This results in more complex Supply Chains and therefore a larger exposure to risks of disruptions since a Supply Chain is only as strong as its weakest link. As companies often work toward “Leaning down” they consequently lose their flexibility to stand up for any disruptions in the Supply Chain. These results in the need to integrate a Business Continuity plan in the Supply Chain, hence some questions that this thesis tries to answer.
What are a Supply Chain and Supply Chain Management?
- What kinds of techniques are used today when it comes to Supply Chain Management and what are the trends?
- Some drivers in the Supply Chain can result in disruptions or affect the consequences of disruptions. What are these drivers and how are the companies coping with them?

What is Business Continuity Management?
- How do companies use Business Continuity Management?
- What are the trends in Business Continuity Management?
- What is the connection between Supply Chain Management and Business Continuity Management?

What kinds of risks are companies facing nowadays?
- If they are aware of the risks, what do they do to prepare themselves?

Looking at different kinds of cases where a crisis has occurred in a company, what is the outcome of this event?
- How did the stakeholders react to this event?
- How did the company handle the crisis?
- If a Business Continuity Plan existed, how did this help the company?
- Would there be a different outcome if a BCM plan had been implemented in the company?

What does a company gain from having a Business Continuity Plan in place?
- Which effects might having a Business Continuity Plan in case of a disruption have on stakeholders?

1.3 Purpose of the thesis

The purpose of the thesis is to explore the relation between Supply Chain Management and Business Continuity Management. Identifying the possible positive or negative impacts directed on the company following a crisis, as a result of a disruption in the Supply Chain, by looking at different cases and include investigations made on the reaction from the shareholders.

1.4 Objective

The objective of this thesis is to clarify the (inter)relationships amongst the concepts Supply Chain management, Business Continuity Management, Risk and Shareholders. By finding the relationships between these concepts companies could get a better understanding of the risk exposure in their supply chain and thus gain insight in the effects a supply chain disruption could have on shareholder value. The assertion made in this thesis is that the effect of a supply chain disruption on shareholder value is mediated by the implementation of a Business Continuity Plan.

1.5 Focus and demarcations

In this thesis the focused is on the upstream and downstream Supply Chain Management, dealing with the key suppliers of the company. Downstream Supply Chain Management is mentioned but not as much, since I believe it is harder to control this seen from a logistic
view. Downstream activities handle more marketing and other ways to gain customers and this is something that will not be brought up in this thesis. The supply chain will be looked at from an out zoomed perspective, the interrelationships between the companies, and not magnifying the production lines within the main company.

The aim is to focus on the shareholders in this thesis, to see the effects on these after a Supply Chain disruption. Shareholders are all the entities that have an interest in the company.

1.6 **Target group**
The target group is Marsh clients mainly on management level who I want to provide with background information on the effects of implementing BCM into their own organisation. Also the thesis is targeted towards graduates studying logistics, risk management or subjects related to those areas. The thesis assumes that the reader has taken basic courses concerning this subject.

1.7 **Disposition**
To classify the different stages in the thesis and the chapters belonging, an illustration of the content is being presented below.

![Illustration of the content of the thesis](Figure 1)

**Introduction**
This chapter presents the background and the analysis of the problem. It also defines the purpose of the thesis and states the target groups, focus, and demarcations.

**Method**
A presentation of the scientific positioning and approach used during the different parts of the thesis is described in this chapter. The chapter also explains how the data collection was performed as well as tackles issues like a reliability, validity and triangulation discussion.
Supply Chain Management
In this part of the thesis the definitions of Supply Chain and Supply Chain Management is brought up. The different techniques that are connected to the Supply Chain are explained and also the trends that occur today. The different types of disruptions and the drivers for these are also presented in chapter 3.

Business Continuity Management
Different definitions are described that are related to business continuity, business continuity management and business continuity planning. Secondly the framework of BCM is being described.

Risks
Different risks can be divided into different classifications. There are different ways manage risks which is also presented in this chapter. Finally in the chapter, disruption likelihood and impact is being studied.

Shareholder value
Share holder value is being defined and connected with the outcome of a disruption. The outcome of a disruption discussing recovery and non recovery is being presented and also what can be done to prevent negative outcome in the share value as a result of a disruption.

The collection of data
In this empirical chapter the procedure while collecting data is presented. The amount of cases, the sampling and how the interviews were conducted are presented. Last in this chapter the collection of shareholder value is being presented.

Cases
Different cases are being presented in this chapter. The cases are divided into different groups dependent on what kind of disruption hit the company.

Analysis
A discussion based on the theoretical and empirical data is being conducted in this chapter. The Chapter is divided into supply chain management, business continuity management and risks. In the end a connection between the concepts is being presented.

Conclusions and recommendations
The questions set out to be answered in this thesis are being presented again and answered with the data and analysis conducted earlier on. Further more, recommendations and further researched is being presented.
2 Method

This chapter describes how the research was performed and how it actually turned out. The chapter goes through the different scientific norms and then how they were used in the thesis. Areas discussed are research philosophy, research approaches, research strategies, time horizons and finally how the data was collected.

2.1 Method awareness and reflection

People interpret texts and information differently. Different approaches result in different interpretations of the same text. Methodology is an important part of a scientific report, and it also influences the researcher’s approach. Thus, I find it significant to emphasize important methodology areas, as well as describing my approach and working model.

Before starting to think about the research, what kind of form you should use, questionnaires, interviews etc., it is of importance to consider different kind of approaches. This thesis is using the “Onion ring”\(^1\) to illustrate the different kind of layers that need to be peeled of before getting to the research methods in the core of the onion. I have chosen this illustration for the reason that I believe it gives a good overview of the methodical approaches and strategies.

![Figure 2: The research process "onion"\(^2\)](image)

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\(^2\) Ibid.
2.2 Research Philosophy

When it comes to our conception, perception and valuation of reality there is two possible main approaches to choose from. These two particular scientific approaches are positivistic or interpretivism and a description will be given as follows\(^3\).

2.2.1 Positivism, Interpretivism and Realism

There is a significant difference between those who want to explain and those who want to understand\(^4\). The positivism was founded by a French sociologist called Comte\(^5\). Positivism is known by an objective perception and the principles were designed and used mainly in the field of nature science\(^6\). The assumption is that the researcher is independent of and neither affects nor is affected by the subject of the research\(^7\).

According to the positivists, people only have two sources of assured knowledge, which is what we can observe with our senses and what we, with our common sense, reason to conclusion. They mean that one should critically perceive all statements and observations and only be sure when there are facts that one can guarantee without any question of a doubt\(^8\). This means that everything that has to do with feelings, values, religion or political views is not considered science\(^9\). Moreover, as much as it is possible, the positivists strive to quantify their facts.

The meaning of hermeneutic is the “knowledge of interpreting”. It is about attaining a conclusion from the observations that have been done.

The hermeneutic approach differentiates from the positivistic approach by a subjective understanding and is mainly rooted in social science. Reality is said to be a result of the human mind\(^10\).

The supporters of the hermeneutics approach uphold that it is often wrong or even impossible to look for knowledge through research or statistical investigation. It is instead thought as important to observe people’s individual circumstances and perceptions of reality in order to try to interpret and create an answer to the investigated question\(^11\).

Positivism stands for quantitative statistical data for analysis, scientific models for explanation and a role for the researcher as being very objective and almost invisible. Hermeneutics stands for qualitative understanding and interpretation of systems and for the role of the researcher as being open subjective and involved.

Realism, than could be said to be a mixture of positivism and interpretivism, is based on the belief that a reality exists that is independent of human thoughts and beliefs. Seeing as realism

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\(^3\) Thurén, T. (1996)
\(^4\) Arbnor, I., Bjerke, B. (1994)
\(^6\) Backman, J. (1998)
\(^7\) Remenyi, D., Williams, B., Money, A., Swartz, E. (1998)
\(^8\) Thurén, T. (1996)
shares some aspects with positivism it does distinguish that people themselves are not objects to be studied in the style of natural science.\textsuperscript{12}

The philosophy of the thesis will be a mixture of the positivism and the interpretivism, hence the realism. The reason for this is that positivism refers to that the reality can be explained and analyzed by empirical methods which are not applicable on the case studies. Solely taking a positivist approach while conducting case study research would probable lead to a rather narrow perspective. Integrating interpretive approach in the case study allows for a more subjective perspective, thereby reflecting the various views from all stakeholders better.

2.3 Research approaches

The extent on which the researcher is aware of the theory at the beginning of the research raises the question on the design of the research project. Should the research contain an inductive or deductive approach? The other question is if the research is considered to be Qualitative or Quantitative. This could be considered to be the next peel of the Onion ring.

2.3.1 Induction, deduction

Throughout the theoretical and empirical part of the project there are two different approaches that could be used; induction and deduction. The researcher can decide to use one or a mixture of the approaches, depending on what is most appropriate\textsuperscript{13}

Inductive approach is when you collect data and develop theory as a result of your data analysis. The researcher identifies patterns and/or formulates a theory or general conclusions using observations of the reality and the collected data. There is a certain connection between the inductive approach and hermeneutic. To use an inductive approach successfully might involve a long-lasting period of time and prove to be resource demanding. In general, the use of induction is most common within areas where no relevant or only a limited amount of theory exists. For example finding new biological species, where no information exists before the discovery.\textsuperscript{14,15}

The second approach, deduction, means that a hypothesis is developed from existing theory within the subject. Conclusions are drawn on single occurrences, derived from existing theory and general principles. This is often more connected to the positivism.\textsuperscript{16} The procedure of this approach is first assuming a hypothesis, expressing the hypothesis in operational terms, testing this operational hypothesis, examine the specific outcome and if necessary modifying the theory.\textsuperscript{17}

To have a pure deductive approach would result in me creating a theory or a hypothesis and then testing it. To have a pure inductive approach, there is a need of having experience of the subject before hand. This is something that I will have first after doing theoretical work. Consequently there is no possibility to use just one approach during this project hence I will use a mixture of the two approaches.

\textsuperscript{12} Saunders M., Thornhill A., Lewis P. (2006)
\textsuperscript{13} Arbnor, I., Bjerke, B. (1994)
\textsuperscript{14} Saunders M., Thornhill A., Lewis P. (2006)
\textsuperscript{15} Ibid.
\textsuperscript{16} Ibid.
\textsuperscript{17} Ibid.
2.3.2 Quantitative and Qualitative methods

Quantitative and qualitative methods are two different techniques to collect, process, and analyze information. There is a distinct connection between the quantitative method and deduction and between qualitative and induction.

Studies conducted on information that can be measured or valued numerically is said to be quantitative methods. The focus is more on numbers and frequencies rather than on meaning and experience. A good example where quantitative studies are used is when processing the data during a statistical research.

Qualitative methods are ways of collecting data which are associated with describing meaning, rather than with illustrating statistical conclusions. This could be in the form of case studies and interviews. They provide a more in depth and rich description. When collecting data in a qualitative way the most profitable way is to use case studies or perform interviews and allow more room for interpretation and open questions than generally is the case in quantitative studies.

To clarify the difference between quantitative and qualitative methods, the table used by Saunders, Thornhill and Lewis is being shown beneath.

<table>
<thead>
<tr>
<th>Quantitative data</th>
<th>Qualitative data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Based on meaning deduced from numbers</td>
<td>Based on meanings expressed through words</td>
</tr>
<tr>
<td>Collection results in numerical and standardized data</td>
<td>Collections result in non-standardised data requiring classification into categories</td>
</tr>
<tr>
<td>Analysis conducted through the use of diagrams and statistics</td>
<td>Analysis conducted through the use of conceptualisation</td>
</tr>
</tbody>
</table>

Table 1: The difference between quantitative and qualitative data

The method used in this thesis is going to be a mixture of the quantitative approach and the qualitative approach. There will be interviews and case studies that result in a majority of qualitative approach; hence the handling of shareholder value in the case studies is going to be performed in a quantitative way.

2.4 Data collection methods

2.4.1 Primary and secondary data

Data is often divided into two groups, primary and secondary data. The word primary data relates to that the information collected is coming from the original source without middle hands. This information is considered to be more reliable than the secondary data as they come directly from the source and therefore has not been altered and are hence independent and consequently more credible. The credibility can also be strengthened if two, from each other independent, sources give the same statement.

19 www.wikipedia.com
20 www.holah.karoo.net
22 Arbnor, I., Bjerke, B. (1994)
Collection of primary data can be done in different ways, such as observations, interviews and experiments. The most common collection of primary data is interviews. They can be divided into personal interviews or phone interviews. The big advantages when doing interviews are the possibility to handle unexpected answers and also the ability to construct a follow-up question. The disadvantage of interviews is the timeframe that is needed, hence this is a time-consuming process and it might be hard to analyse.24

Secondary data is the information that already has been filtered by someone else or been processed for another purpose. It is therefore important to be critical to the data that is going to be used. A downside to secondary data is that it could be misleading since the author might have different perceptions and purpose for the data other than the current research. Something that validated the source might be that more than one author is referring to this source. The most common secondary data is often written material such as books, articles and reports.25

Literature is said to be all kinds of written material, for instance books, brochures, articles. So therefore it can be both primary and secondary data. The benefit of this method of data gathering is that a large amount of information can be received with a small degree of resources. The disadvantage is that the data gathered through literature studies is primarily secondary data, based on research with another purpose in mind.26

The use of sources in their shape of books is mainly used when collecting data for the theory chapter. The case studies and different theses are used when collecting data for the empirical chapter. The latter are considered to be secondary data hence the need of criticism toward the source since it might be written for another purpose and with a different paradigm.

In this thesis there will be a use of both primary and secondary data. The study is going to be based on both secondary data such as articles and reports but will be complemented with interviews.

2.4.2 Case studies

A case study is a story about something exceptional, special, or interesting; stories can be about individuals, organisations, processes, programs, neighbourhoods, institutions, or even events.27 The case study method refers to a group of methods with underline qualitative analysis.28 It is defined as an “Empirical inquiry that investigates a contemporary phenomenon within its real-life context” and can be conducted for exploratory, explanatory or descriptive purposes.29 Exploratory purpose is to identify important factors and measures of process modelling success, explanatory purpose is to aid in the design and interpretation of the survey and the descriptive purpose is about portray an accurate profile of persons, events or situations.

25 Arbnor och Bjerke (1994)
28 Gable, G., (1991)
29 Yin, R., K., (1994)
A case study distinguishes itself from other research methods since mostly a relative small number of cases are investigated. The importance is not the quantification of data or using statistical data for measuring effects, but to understand the study itself. In order to assure the quality of the case study design to generalize from the findings, four tests are identified by Yin as being relevant, which are construct validity, internal validity, external validity, and reliability. These different tests are being explained later in this chapter.

The cases can be sorted after different criteria. Either by looking at the cases one by one or sort them into categories. The cases in this study are divided after the kind of disruption that has occurred to the company, this could be for example if there has been a natural hazard or a operational disruption.

In this case there is going to be a larger amount of case studies. To get validity to the thesis triangulation is going to be used. To validate the subject multiple sources is going to be used and also the mixture of written sources and interviews.

The criticism of the case study in this thesis is that it can be difficult to find generalization and you end up with a large amount of different studies. Also the process is time resuming and might not give you the information that suits the purpose. During this process I have read a lot of cases and after looking into them you realise that some are not relevant but then the time is already spent.

2.4.3 Sampling
The case study acquires sampling strategies can be divided into two groups; Random Probability Sampling and Purposeful Sampling. The first strategy is more of a quantitative strategy and when it comes to a large number of cases. Purposeful Sampling has, like the name says, a purpose. This is for more qualitative studies. When it comes to this strategy there is a specific criterion to the sampling and a certain amount of cases.

The strategy used in this study is going to be the Purposeful Sampling. The two subcategories that are going to be used are Criterion Sampling and Theory-based Sampling. At first specific criteria are set for sampling, in this case for example Supply Chain disruption and the second strategy the theory of Supply Chain Management and Business Continuity Management are going to be used during the Sampling. During the sampling I have used material not older than 1995. When looking at results older than this, the data is often out of date or hard to find; this especially when it comes to finding Share value graphs. When using search engines the key words includes for example combinations of disruption, share value, production, shortage, crisis and other relevant phrases. Also the event needs to be publicly announced. This way of method is used by Hendricks and Singhal in their researches.

2.4.4 Observations
Observation is another way of collecting data and this by making a visit on the unit that is of interest for the study, an opportunity to directly observe interesting behaviours, activities and processes is given. Observations also makes it possible for the researcher to get direct input.
that has not been "filtered" by anyone else that could be the case in for example interviews. It is hence a primary data that the researcher receives from this method. As this is a good method to gain primary data, this method will not be used in this thesis. The reason for this is the impossibility to observe a crisis in the company, the time frame is to short for this.

2.4.5 Questionnaires

To use questionnaires is a method to gain primary data from few to many sources. The use of questionnaires are being sent out and a large amount of quantitative data is collected. This is not a method that is going to be used in this thesis as the studies are more qualitative and the use of interviews is going too be used.

2.4.6 Interviews

This method provides information with direct significance concerning the purpose of the research35. Throughout the interviews the researcher gets access to primary data from the original source36.

There are different ways of constructing an interview and there are different kinds of structural forms:37

Open
In an open interview the informer can broadly develop his opinions regarding an overall topic giving a general understanding.

Directed open
During this structure the researcher focuses on specific areas and thereby controlling the information gathered. This prevents the informer to slip away from the subject.

Semi-Structured
During a Semi-Structured interview the subject of interest is defined in beforehand and the questions are formulated as they surface during the interview.

Structured
This interview approach is stricter hence all the questions are constructed in advance and are posed in a precise order. This leaves the informer with only one specific way to respond.

To get high reliability it is of importance to inform the interviewed person of the purpose of the question. Also it is of importance to arrive at the interview well prepared, well-read and with a goal. The disadvantage with interviews is that they are very time consuming and could also imply high costs due to travelling

During the interviews concerning this thesis the use of a mixture of semi-structured and structured form is going to be used. While using beforehand written questions to have a path while interviewing there will also be an opportunity for discussions so the ideas and thoughts of the informer really surfaces.

35 Arbnor, I., Bjerke, B. (1994)
37 Lantz, A., (1993)
2.5 Reliability, Validity and Triangulation

A source ought to be evaluated with reference to how useful the source is considering the purpose of the research. During the collection of data, there is always a certain extent of uncertainty. Hence, when conducting an academic study, there are two aspects that need to be considered; reliability and validity. These two can be seen as a measure of credibility. To be sure to get reliability and validity the researcher can use triangulation.

Reliability is about measuring correctly, how well it endures unexpected variations of any kind. It deals with how something is measured. Also to what extent you get the same values when repeating the measures.38

To make sure that high reliability is achieved following questions can be asked39:

1. Will the measures result in the same values when repeated?
2. Will similar observations be achieved by other observers?
3. Is there transparency in how sense was made from the raw data? Is there a risk of observer error?

It is common to think of a dart board when talking about reliability. If the results of the measurement cluster around each other, then it can be said that the evaluations are reliable, even if the cluster is off centre of the target as showed in the picture below (see picture 3).40

![Figure 3: Reliability](image-url)

In order to improve the reliability, the thesis will be as precise as possible throughout the whole process. To achieve reliability the interviews are going to be well prepared with before hand written questions and be well educated about the subject. It is of importance to make the researcher’s intention clear to the interviewed person, this by describing who he or she is and what the purpose is with the interview. The answers to the questions are also going to be sent back to the interviewed so there is a certainty that the answers are understood and correct written. A goal is also to spread the sources in the company so different groups are being interviewed. This might be difficult with a tight timetable. By finding different sources to the cases improves the reliability. The use of triangulation, as mentioned below, improves the reliability.

Validity concerns what is measured and if you measure what you have set out to from the start42. Are the findings really what they appear to be about? Do the findings make sense?

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38 Arbnor, I., Bjerke, B. (1994)
40 www.ifmsa.org
41 Ibid.
42 Ibid.
If using the example with the dartboard again the sign of good validity is when hitting the board in the middle (See figure 4). By using different methods in investigating the same problem the validity in the research is strengthened. To increase the validity the use of different perspective can be used.

There are three types of validity; Construct validity, External validity, and Internal validity. Construct validity is establishing the correct operational measures for the concepts being studied or in other words the degree to which a study investigates what it set out to investigate. Internal validity is the degree of confidence that the results gathered within the case are true. Does the A lead to B. External validity is the degree of confidence that the results can be generalized. In other words, can the result be used in other situations? If I find patterns here, then yes, it is applicable.

By using different data sources, different evaluators and different theories, the reliability of the research is increased since different perspectives are achieved through different sources.

![Figure 4: Validity](image)

To increase Validity and Reliability the use of Triangulation is recommended. Triangulation is the combination of at least two or more theoretical perspectives, methodological approaches, data sources, investigators, or data analysis methods. The use of triangulation is used to improve both reliability and validity.

There are four types of triangulation:  
**Data triangulation**, which involves gathering data through several sampling strategies, so that the gathering of data is on different times and social situations, as well as on a variety of people.  
**Investigator triangulation**, which refers to using more than one researcher when gathering and analysing data.  
**Theoretical triangulation**, which refers to the use of more than one theoretical position in understanding data.  
**Methodological triangulation**, which refers to the use of more than one method for collecting data.  

As mentioned above the use of triangulation gets a higher reliability and validity. During the collecting of data the use of data triangulation is going to be used, this by using different sources.

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43 [www.ifmsa.org](http://www.ifmsa.org)  
44 Denzin, N. K. (1970)
sources on the same subject. When using Investigator triangulation there is a use of more than one investigator, this will not be done in this thesis hence I am the only one who is going to perform the research. Theoretical triangulation implies that different angles when looking at the problem are being used. I can not say that this is applicable to this thesis since I will only look at Business Continuity for a Supply Chain perspective. The use of methodical triangulation has been discussed earlier in this chapter when stating that more than one approach is going to be used throughout the thesis for example, the use of financial data and interviews.
2.6 Analysis method

This chapter will outline the specific analytical procedures that are mainly applicable for qualitative studies. The strategies can be divided into deductive and inductive.

Deductively based analytical strategies contain Pattern matching and Explanation building. When it comes to inductively based analytical strategies there are Data display and analysis Analytic induction, Grounded theory, Narrative analysis, and Template analysis. The one of these methods that is going to be used in this thesis is the Data display. Data display and analysis is a method when the reduced or selected data is being organised and assembled into diagrams or visual displays. This could be matrices or networks.\(^45\)

Why I use to use this method is because this would give me a good overview of the case studies and result I have come up with. This will be done by collecting the information in a matrix table and kept as an overview in the appendix. Normally the use of data display is when the case studies are of a great number but I do believe this method will be of value to this thesis.

The interviews are going to be recorded to give the ability to listen to the answers more than once. This results in reducing the chance of misunderstanding or writing down false information. By listening to the interviews again in a different order prevents the chance of the interview taken at first is given more attention then the last.

Except from the Data display the analysis and the method that is going to be used mainly is logical reasoning. The reason for this is the qualitative data and the amount of case studies and interviews.

2.7 Conceptual Framework

During the research in this thesis the theory of Hendricks and Singhal is going to be used as a conceptual framework. The theory is used as starting point for further research made in the following chapters.

Singhal and Hendricks use different studies to define the connection between Supply Chain and Share holder values. The result of these studies, they present in a picture shown below (Figure 5).

The framework first links the supply chain strategies, which could be; design of the supply chain network, integration theories, supplier strategies, and sourcing strategies to key operational metrics. The choice of these strategies affects the operational metrics, which in return could be areas such as forecasting, supplier performance, lead time, inventory, capacity, and quality. These areas consequently affect the efficiency, reliability and, the responsiveness in the supply chain.\(^46\)

As shown in the framework, efficiency, reliability and, the responsiveness in return influence the cash flow, earnings, but also the intangible assets such as credibility and reputation. The tangible and intangible costs in return affect the shareholder value.

\(^{45}\) Miles, M.B., Huberman, A.M., (1994)
On the tangible side, revenue, disruptions can lead to loss in sales and market share, lower sales price because of markdowns of excess inventories, and can prevent the firm from capitalizing on strong market demand due to unavailability of products. Cost could be as a result of the disruptions increasing the costs associated with expediting, premium freight, obsolete inventory, additional transactions, overtime, storage and moving, selling, and penalties paid to customer. Disruptions can also negatively impact the productivity and utilization of assets. For example, the firm may end up with excess inventory for some products and experience stock outs and backorders for others.48

When looking at the intangible costs, disruptions can negatively influence customer service if customers are unable to get the products they want at the time they asked for it. Inefficient customer service leads to higher customer dissatisfaction and lower devotion and comfort levels among customers, and poor word-of-mouth publicity.

When using the framework presented by Hendricks and Singhal it is easy to argue that if there where to be a disruption in the supply chain this would in the end affect the shareholder value.

Disruptions in the supply chain affect a company’s short- and long-term profitability, which in turn affects the shareholders value. The basis is that if supply chains were more reliable and responsive there would be decreased likelihood of a disruption and due to better response; less impact. This would consequently lead to smaller drop in share value.49

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48 Ibid.
49 Ibid.
3 Supply Chain Management

In this chapter the adequate theories connected with the Supply Chain Management will be described. The theory will then be used as support in the analytical data and in the end for the analysis.

3.1 Introduction

Focus on the performance of supply chains and how it is managed has increased considerably in recent years. Supply chains are getting more complex due to changes in the environment, product design and the customer demand among other things. Manufacturers (having adopted lean principles and JIT thinking within their organisations) are turning their attention to the wider demand and supply networks to make further performance improvements.50

Increasing global competition, removal of trade barriers and increased accessibility to global customer via the internet has resulted in a growing interest in Supply Chain Management (SCM).51 With increasing accessibility to global markets, many companies are expanding beyond the boundaries of their own country. Not only are they expanding through the sales of products to other countries, they also are locating their production facilities in other countries or in order to focus on their core activities.52

Since the mid 1980s, companies have devised many cooperative schemes to improve supply chain coordination. This includes different kind of lean production methods and JIT strategies. The trend is still strong in the slimming of processes to lower costs in the supply chain associated with ware housing and un-wanted extra costs.54

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50 www.scottish-enterprise.com
51 Li, D., O.Brien, C., (1999)
52 Fleidner, G., Vokurka, R. J., (1997)
53 www.ballsolutions.com
54 Sheffi, Y., (2001)
3.2 Supply Chain

The definition for Supply Chain is wide and not easy to narrow down to one perfect description. The main reason is that every company and person has its own definition of the subject. A quite wide definition found is

*The supply chain is all that happens to a product from dirt to dust*\(^{55}\).

Cooper and Ellram tried to narrow it down a bit and defined the Supply Chain as follows:

*An integrative approach to manage the total flow of a distribution channel from the supplier to the ultimate user*\(^{56}\).

A distribution channel consists of suppliers, manufacturers, distributors and customers, connected by a common process. It also involves supporting links in transport, communication and other facilities\(^ {57}\). The supply chain is typically comprised of multiple companies who are increasingly coordinating activities via an information system.

Another definition is given by the internet site Investorwords.com:

*The network of retailers, distributors, transporters, storage facilities and suppliers that participate in the sale, delivery and production of a particular product*\(^ {58}\).

According to Mentzer *a supply chain is three or more entities directly linked by one or more of the upstream and downstream flows of products, services, finances, and information from a source to a customer*\(^ {59}\).

*A supply chain, logistics network, or supply network is a coordinated system of organisations, people, activities, information and resources involved in moving a product or service in physical or virtual manner from supplier to customer. Supply chain activities transform raw materials and components into a finished product that is delivered to the end customer*\(^ {60}\).

There is not a precise definition for the term Supply Chain but as shown in the definitions above they all refer to the different processes in a chain that together result in the product being produced and delivered to the end consumer. The supply chain is made up by a number of processes. This could be for example sourcing, manufacturing, transporting and selling physical products. Often the definitions focus on the physical flow, but it is of importance to mention the flow of information, finance and knowledge too.

The definition of the Supply Chain which is going to be used in this study is: *Supply Chain is three or more units linked together by the upstream and downstream flows of products, services, finances, and information from a source to a final customer.*

\(^{55}\) Ayers, J.B. (2000)
\(^{56}\) Cooper, M., Ellram, L. (1993)
\(^{58}\) www.investorwords.com
\(^{59}\) Mentzer, J. T. (2001)
\(^{60}\) www.wikipedia.org
The term Chain is still being used even though supply chain is not a linear chain but more of a complex system of networks. Often forgotten is that the supply chain has not only one direction of the flow. There is a “reverse flow” also which could be in form of product returns or payment.  

A supply chain is not just a simple line of processes linked together. Each link in the chain must design its own logistics process to function. This results in that there are supply chains within each supply chain and the outcome is a unique assembly for each company.

The range of the supply chain includes procurement, production, distribution, and demand management. Together the activities, the organisations and the processes present a static view of the supply chain at a certain moment but the supply chain also has to be dynamic to cope with rapid changes. Below the five operations are described that together create the Supply chain but far from many situations have exactly this composition.

**Product:** The design of the product decides the process of production. It also determines the logistics requirement as inventory, transport and time for delivery.

**Production:** Production and similar processes add value to the product flow. The method of the production also influences the way of inventory, transport and time for delivery.

**Procurement:** Procurement is the acquisition of goods or services at the best possible total cost of ownership, in the right quantity and quality, at the right time, in the right place for the direct benefit or use of the governments, corporations, or individuals generally via, a contract.

**Distribution:** This is the link between the production and the market hence the customer. It influences logistics through market demands and service- and efficiency requirements.

**Demand management:** This includes a number of activities that are related to the market such as; forecasting, processing the customer order, market coordination and sales support activities.

Supply Chains create value by being reliable and responsive in matching demand and supply. Reliability is delivering the right product in the right quantity at the right time to the right place at the lowest price. Responsiveness is the ability to respond quickly to changing market conditions.

**3.3 Supply Chain Management**

Supply Chain Management (SCM) is a major issue in many industries as firms realise the importance of creating an integrated relationship with their suppliers and customers. Managing the Supply Chain has become a way of improving competitiveness by reducing uncertainties and enhancing customer service. The role of planning and coordination in complex integrated systems and information technology to synchronize the Supply Chain is described in a framework that creates the appropriate structure and installs proper controls in the enterprise and other components in the chain.

about.com
Also the definition Supply Chain Management (SCM) varies. Different companies but also managers from a single company have different viewpoints, or paradigms. One viewpoint and way of SCM might not work for another company.

The term SCM is said to have been established by the consultant Keith Oliver, of strategy consulting firm Booz Allen Hamilton in 1982. His definition of the term SCM is

“The process of planning, implementing, and controlling the operations of the supply chain with the purpose to satisfy customer requirements as efficiently as possible. Supply chain management spans all movement and storage of raw materials, work-in-process inventory, and finished goods from point-of-origin to point-of-consumption”.

Supply Chain management is about buying the right thing and shorten the delivery cycles.

Mentzer defines SCM as, “the systemic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular company and across businesses within the supply chain, for the purposes of improving the long-term performance of the individual companies and the supply chain as a whole”.

SCM is the ability to integrate each step in the supply chain into one large system. There are theories of how to go about this the best way but this varies from company to company. Basically it is the way your company improves the process of finding the raw material components it needs to make a product or service and deliver it to the final customer.

SCM is the control of the supply chain as a process from the supplier to manufacturer to wholesaler to retailer and finally to the consumer. SCM does not involve only the movement of a physical product through the chain but also any data that goes along with the product and the actual entities that handle the product from step to step of the supply chain. Reduce inventory, increase the speed of transactions with real-time data exchange and to increase revenue by satisfying customer demands more efficiently are three main goals of the SCM.

The definition of SCM that is going to be used in this study is: the coordination of materials, information, and finances as they move in a process from supplier through manufacturer, wholesaler and retailer to the final consumer. SCM involves coordinating and integrating these flows both within and among companies. It is said that the ultimate goal of any effective SCM system is to reduce inventory, but in case of an interruption still be able to get a hold of spare parts.

As mentioned above the SCM consists of three flows trough the Supply Chain; the product flow includes the movement of goods from a supplier to a customer, as well as any customer returns or service needs. The information flow involves transmitting orders and updating the status of delivery. The financial flow consists of credit terms, payment schedules, and consignment and title ownership arrangements.
By sharing this data "upstream" (with a company's suppliers) and "downstream" (with a company's clients), SCM applications have the potential to improve the time-to-market of products, reduce costs, and allow all parties in the supply chain to better manage current resources and plan for future needs.\(^70\)

Increasing numbers of companies are turning to Web sites and Web-based applications as part of the SCM solution. A number of major Web sites offer e-procurement marketplaces where manufacturers can trade and even make auction bids with suppliers.\(^71\)

The following are five basic components of SCM.\(^72\)

**Plan** – This is the strategic part of SCM. There is a need of a strategy for managing all the resources that is needed for meeting the customers’ demand for the products or services. A large part of the planning is finding a way to monitor the supply chain so that it is efficient, delivers high quality, costs less, and brings value to the customer.

**Source** – Decide the suppliers that will deliver the goods and services you need to produce your product. Set prices, organize delivery and payment processes with the suppliers and create a common system to monitor and improve the relationship. Also developing processes for handling inventory of goods from the supplier with all the processes related like for example receiving shipments and transferring them to your manufacturing facilities.

**Make** – This is the manufacturing step. Schedule the activities necessary for production, testing, packaging and preparation for delivery. As the most metric-intensive portion of the supply chain, measure quality levels, production output and worker productivity.

**Deliver** – Often this part is referred to as logistics. Coordinate the receipt of orders from customers, build up a network of warehouses, transfer the products to customers and set up an debiting system to receive payments from the customers.

**Return** – The problem part of the supply chain. A network for receiving defective and excess products back from customers and also support for customers who have problems with delivered products.\(^73\)

Management extend over organisational boundaries. Therefore a common information system available to all members makes coordination easier between organisations.\(^74\)

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\(^{70}\) searchcio.com

\(^{71}\) Ibid.

\(^{72}\) www.cio.com

\(^{73}\) Ibid.

During the past years the, Supply Chain excellence, optimisation, and integration have become the focus and goal of many organisations worldwide. Strengthening the SCM is perceived by many firms as the way to enhance customer satisfaction and enabling profitable growth.75

3.4 Techniques used in Supply Chain Management

There are different techniques that are used in the supply chain and the ability to use these techniques to gain competitive advantage is the difficulty of SCM. There are many different techniques used in the companies today but the most spoken of or used in this study are presented in this section.

3.4.1 Outsourcing or Offshoring

Often the terms outsourcing and offshoring are often mixed together and the difference between the two definitions might not be clear to the reader. Simpson defines the two definitions in two short sentences the differences:76

**Offshoring**: to set up an entire facet of a business operation overseas.
**Outsourcing**: to hire someone outside of the company to perform work for the company

Outsourcing is when one company hires another to complete a task or a process that the first company does not want to complete within its walls. The reason why the company would want to outsource is for example cost savings, higher productivity or enhancing expertise.

Offshoring is simply outsourcing outside of the country.77. Offshoring describes the relocation of business processes from one country to another. This includes any business process such as production, manufacturing, or services78.

Removing geographical boundaries has enabled greater efficiency and created opportunities fraught with unknown risks and new business paradigm79. A paradigm is on that serves as a pattern or model, it could also be a set of assumptions, concepts, values, and practices that creates a way of viewing reality for the people or organisation that shares them. For example Easy Jet in their paradigm to try to fly people in the most cost saving way or Toyota who has the whole organisation focusing on the JIT-thinking.

75 Advance Manufacturing Research, (1995)
77 www.ecediinc.com
78 www.wikipedia.com
3.4.2 Just in Time
Just in Time has gotten to be a familiar concept. The original idea was to bring material and components to the specific point and time when they would be used. This would lead to the reduction of inventory costs and provide more space in the factory. Hence the loads are smaller so the handling and quality control might be easier. The procedure is that a new batch is ordered when stock reaches the re-order level. However, one drawback of the JIT system is that the re-order level might be determined by historical demand that might not be applicable to the demand a present time. The demand might grow and the slimming of the inventory results in smaller buffers for unforeseen events.\(^80\)

3.4.3 Lean production
Lean production focuses on systematic lowering the waste of resources in the production and focus on customer orientation. Lean production can be described in five principles:\(^81\)

1. Precisely specify value by specific product.
2. Identify value stream for each product.
3. Make value flow without interruptions.
4. Let the customer pull value from the producer.
5. Pursue perfection.

By looking at the five principles it is clear that the optimization of the flow, of value towards the customer, is the guiding principle.

3.4.4 Built to order
Building systems to order means that there is no finished product inventory in the channel to manage. The Built To Order system relies strongly on the tight integration of the upstream supplier of parts, the midstream manufacturer and assembler of components, and the downstream distributor of finished goods in the supply chain. An example of a company using this method is Dell who puts together the product after the order has been placed by the customer.\(^82\)

3.4.5 Redundancy
To create redundancy in the supply chain the company could hold extra inventory, maintain low capacity utilisation, and have extra suppliers. Although redundancy can help the company during a disruption it is an expensive measure and often just temporary. The company need to pay for the extra capacity and extra workers. Many say that a measure like this leads to sloppy operations and reduced quality. This measure might help during a disruption but does not follow the lean thinking that is often strived for in the companies.\(^83\)

3.4.6 Volatility
Volatility refers to the spread of all likely outcomes of an uncertain variable. Typically, in financial markets, we are often concerned with the spread of asset returns.\(^84\) In SCM it is often about demand, how this fluctuates.

\(^{83}\) Sheffi, Y., (2005)
\(^{84}\) www.investorwords.com
3.4.7 Agility
Supply chain agility can be defined as the ability to respond quickly to changes in demand or supply. Many companies are at risk seeing as their response time to changes in demand or disruptions is too long. Two main parts in agility are visibility and velocity. Visibility, in short, is the ability to see from one end of the supply chain to the other, which mean a clear view upstream and downstream inventory, demand and supply, supply conditions, and production as a few examples. Visibility also includes the information flow in the supply chain, to have a clear view of the line of communication as one example.

The second part of supply chain agility is velocity. Velocity is defined as distance over time. Hence to increase velocity, time must be reduced. Here we are referring to "end-to-end" pipeline time that is the total time it takes to move products and materials from one end of the supply chain to the other. It is not just velocity that matters in the creation of agile supply chains, it is acceleration. In other words how rapidly can the supply chain react to changes in demand, upwards or downwards?

3.4.8 Flexibility
Flexibility can be defined as the ability to respond to changes in the environment. In the case of a manufacturer, flexibility is the capability to change the output in response to changes in the demand. In a supply chain the flexibility of one entity is highly dependent on the flexibility of upstream entities. The overall flexibility of a supply chain will therefore depend on the flexibility of all the entities in a supply chain, and their interrelations.

3.5 Supply Chain disruptions
As long as there have been Supply Chains, there have been disruptions, and no Supply Chain is immune to them. The focus on Supply Chain disruptions has only recently grown and the reason for this is the 9/11, Hurricane Katrina and events similar to this. Another reason is the companies striving towards lean Supply Chains, which results in the slimming with little room for redundancy and slack. A third reason is globalisation of companies. The supply chains are stretched over borders which could result in more fragile Supply Chains. Other drivers to disruptions in the supply chain are being presented in the next section. The disruption of material or information flow in the supply chain is often unpredictable and rare but often quite damaging. The chances of experiencing a disruption in the supply chain are higher now, and in the future, than in the past. This because the supply chains are getting more complex but also the trends to slim the supply chain leaves no room for errors. Evidence indicates that ignoring the possibility of supply chain disruptions can be devastating for a company.

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86 Ibid.
88 Lynn, B. C., (2006)
89 Chopra, S., Sodhi, M.S., (2004)
90 Hendricks, K., Singhal, V.R., (2005)
3.6 Drivers of supply chain disruption

There are trends and measures taken today that drives supply chain disruptions. Many of them may not solely be responsible but they increase the likelihood and possibly the impact of a disruption. Some drivers are being brought up in this study.

3.6.1 Competitive environment:

The industry is facing a more competitive environment today than a decade ago. The market is characterized by extreme competition, volatile demand, increased demands from customers, increased product variety, and short product life cycle. These trends are expected to increase in the future. As a result of these conditions it is hard to match demand with supply. Companies are having a harder time forecasting demand and adapting to unexpected changes in product life cycles and changing customer preference.\(^9^1\)

3.6.2 Increased complexity in Supply Chains:

Due to global sourcing, managing a large number of supply chain partners, the need to coordinate across many tiers of supply chains, and dealing with long lead-times the complexity of the supply chain has increased. As a result of this it is harder for companies to match demand with supply and this increases the risk of disruption.\(^9^2\)

3.6.3 Increased Technology:

A company can provide a company with a competitive advantage if having the latest developments. The more complex technology in the company both in the machinery and in the products can lead to enhanced risk of disruptions hence there are more parts that can break and cause a disruption in the production.\(^9^3\)

3.6.4 Globalisation, Outsourcing and partnerships:

Globalisation is about removing geographical boundaries to enable greater efficiencies and created opportunities fraught with unknown risks and new business paradigms. Many, if not all, companies are affected by the globalisation, even if the company itself has decided to stay local the supplier might have chosen to go global to access larger markets or efficiency.\(^9^4\)

In the global business environment that we have today many businesses turn to outsourcing, joint ventures or supply relationships, this to cut costs and optimise efficiencies.\(^9^5\) Some issues that occur when outsourcing is the more complex supply chains over boarders, different time zones and different cultures. To make the outsourcing successful there is a need for partners in the supply chain to collaborate, share information and plans and have a visibility in each others operations.\(^9^6\)

\(^9^1\) Hendricks, K., Singhal, V.R., (2005)
\(^9^2\) Ibid.
\(^9^3\) Ibid.
\(^9^5\) Marsh (2006)
\(^9^6\) Hendricks, K., Singhal, V.R., (2005)
Offshore supplier might be less expensive but the lead time is longer with might be vulnerable to disruption in the Supply Chain. A local supplier might be more expensive but in case of an interruption in the Supply Chain the local supplier will get the parts delivered faster. 97

3.6.5 Higher and more specific customer demand:
In the new economy, markets and customers are changing rapidly, primarily to do with a wider selection of products and services, shorter product life cycles and faster, more efficient ways of delivering them. The risk is that the customers needs or wants changes without the companies noticing this. 98

3.6.6 Single Sourcing:
Single sourcing means that the buyer is supplied by only one supplier at the time. 99 Often does these good or services link directly to the core competencies of the buying company. People who argue for single sourcing mean that it reduces the administrative work, the transportation costs can be lowered, and the relationship between the buyer and the supplier is closer. 100

3.6.7 Limited buffers:
Reducing inventory and excess capacity and squeezing slack in supply chains has more tightly coupled the various links leaving little span for errors. The goal many companies have is Just in Time delivery and zero inventories to lower the cost of inventory. This as a result tends to result in a brittle Supply Chain. 101

3.6.8 Focus on efficiency:
A lot of companies focus on efficiency in the Supply Chain (lower the cost) but forget the flexibility. The need for reducing cost in Supply Chain result in a higher risk of disruption. 102

3.6.9 Over-concentration of operations:
Firms have over concentrated their operations as a result of economies of scale, lower transaction costs, and volume discount. As a result there is a cluster of operations at a certain location, which makes the Supply Chain fragile if the environment changes. 103

3.6.10 Poor planning and execution:
Poor planning and execution result in mismatch between the demands and deliveries. Often there is a lack of information when it comes to inventory or estimated demand. There is in many occasions a lack of future metrics to anticipate the coming problems and the ability to deal with these. 104

97 Sheffi, Y., (2001)
98 Ibid.
100 Ibid.
102 Ibid.
103 Ibid.
104 Ibid.
4 Business Continuity Management

In this chapter Business Continuity and Business Continuity Management is being defined and the different steps to bring a Business Continuity Plan into the company are being studied.

4.1 Introduction

Business continuity planning and disaster recovery planning are fundamental to the well being of an organisation. They are intended to ensure continuity in the face of unforeseen or difficult circumstances.\(^{105}\)

Business continuity management (BCM) is a tool that can be implemented to provide greater confidence that the outputs of processes and services can be delivered in case of a disruption. It is concerned with identifying and managing the risks which threaten to disrupt essential processes and related services, mitigating the effects of these risks, and ensuring that recovery of a process or service is attainable without significant disruption to the company.\(^{106}\)

The scare relating to the Y2K bug, resulted in many companies performed a close review of their business involving contingency plans in the event of downtime or disaster. Another influencing factor was the 9/11 attack that resulted in businesses sharpening their risk assessments to prepare for unforeseen events. Business continuity is meant to cover the whole business, not just the web-site or key applications as it was when it was started in the IT sector.\(^{107}\) BCM provides capability to adequately react to both operational disruptions while protecting welfare and safety.\(^{108}\)

Business continuity accomplishes various things for organisations, with the degree of success in each area dependent on the amount of effort, skill, resource and commitment provided by the organisation for the BCM. There will be different outcomes in every business which are specific to the organisation in question.\(^{109}\)

According to a study made by Chartered management Institute;\(^{110}\)

- 73 percent of managers report that BCM is important in their organisation, and 94 percent of those who had invoked their plans agreed that they had reduced disruptions.
- Around one in three organisations reported experiencing disruptions due to loss of IT (39 per cent) and loss of people (32 per cent) over the past year; and those affected by extreme weather conditions had risen over the past year from 9 to 28 per cent.
- Only half of organisations with plan in place carry out regular and thorough rehearsals, despite strong evidence that rehearsals are vital to ensure the effectiveness of planning. 80 per cent of those who had rehearsed their plans reported shortcomings that needed to be addressed.
- Corporate governance is identified as a key driver by 80 per cent of managers working in listed companies. There is also evidence that planning is been driven through the

\(^{105}\) Devargas, M., (1999)
\(^{106}\) Gibb, F. Buchanan, S., (2006)
\(^{107}\) www.sybase.com
\(^{108}\) BS 25999-1:2006
\(^{109}\) www.continuitycentral.com
\(^{110}\) Chartered Management Institute (CMI), (2007)
The value of a business continuity management plan from a shareholders perspective

supply chain, through the requirements of public sector procurement contracts and by customers demanding evidence of BCPs from their business-critical suppliers.

The reluctance to introduce adequate measures is understandable. Business continuity is not a tangible commodity so it can be difficult to understand its benefits, until you consider the consequences of inadequate contingency planning. The bombing of World Trade Center 1993, 150 enterprises went out of business out of the 350 enterprises affected. Later on, after 9/11 some enterprises for example, Morgan Stanley, Cantor Fitzgerald and American Express, were able to resume business within several days while other companies suffered severely, many going out of business. In some cases, there were no backup communication systems and a number of companies didn’t even have an accurate count of employees. Some more alarming statistics are that 80 percent of businesses suffering a major disaster go out of business in three years, while 40 percent of businesses that suffer a critical IT failure go out of business within one year. In the case of suffering a fire, 44 percent of enterprises fail to reopen and 33 percent of these failed to survive beyond 3 years (the primary reason being loss of vital records).111

Smaller companies tend more to rely on having a variety of suppliers; larger ones tend more to require that their suppliers have BCM plans of their own. Overall, though, nearly a quarter have no plan to cope with disruption to their supply chain or outsourcing suppliers.

Where organisations insist on the supplier having a BCM plan;112

- 18 percent are happy to rely on no more than a statement from the supplier.
- 27 percent ask only to read the supplier’s Business Continuity plans and a
- 27 percent don’t know how the supplier’s plans are verified.
- Only 27 percent actually involve themselves in helping the supplier to develop a BCM plan and get involved in rehearsals of the plan.

This is an alarming gap in the continuity planning of many businesses. A chain is only as strong as its weakest link, and as outsourcing reaches wider and deeper, it is becoming more and more crucial to integrate continuity planning throughout the supply chain.

Many companies focus on outsourcing to Asia, the ability to use the low-costs and available workforce. Also with Asia accounting for a third of the EU:s total import many companies have serious dependency on their Asian supply chains. But researches show that less than half of the Asian suppliers questioned had Continuity plans that could protect them in a infrastructure failure and only a fifth had plans in case of a pandemic outburst.113

There is now acceptance of the need for BCM and interest seems to be continually growing. There are different reasons for this; the globalisation and the standardisation of the products are changing. The companies have more spread out and complex supply chains and the products are more complex today due to the increased technology but also, customers want special designed products. The globalisation and outsourcing have highlighted the need for

111 www.usfst.com
112 www.thebci.org
113 Elkington, M., (2006)
greater assurance about the resilience of supplying companies, also when it comes to fewer suppliers the need for a plan has become clearer.114

### 4.2 Definitions

There is still no set standards so terms connected with the BCM are defined differently depending on the source. A number of definitions will be brought up in this chapter and then looking at the similarities and secondly set definitions used in this study.

#### 4.2.1 Business Continuity

The first detention is Business Continuity which is the basic step stone for the rest of the terms. Business continuity is defined according to Business Continuity Institute as:115

“…the process of anticipating incidents which will affect critical functions and activities of the organisation, and ensuring response to any such incident in a planned and rehearsed manner”.

Microsoft defines Business continuity as follows116:

“The ability of an organisation to continue to function even after a disastrous event, accomplished through the deployment of redundant hardware and software, the use of fault tolerant systems, as well as a solid backup and recovery strategy.”

The Disaster Recovery Institute International provides the following definitions117:

“The ability of an organisation to provide service and support for its customers and to maintain its viability before, during, and after a business continuity event. “

Business continuity involves two distinct areas; Business Continuity Planning and Business Continuity Management118. The definition of these two will be explained in the following chapters.

#### 4.2.2 Business Continuity Management

There are many different sources that define Business Continuity Management (BCM) due to the different perspectives on the subject. Three definitions are being presented below.

According to the Business Continuity Institute (BCI), BCM is a:119

“holistic management process that identifies potential impacts that threaten an organisation and provides a framework for building resilience with the capability for an effective response that safeguards the interests of its key stakeholders, reputation, brand and value creating activities”.

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114 www.rmi.ie
115 Chartered management institute (2002)
116 www.microsoft.com
117 www.continuitycentral.com
118 Ibid.
119 Chartered management institute (2002)
Hiles and Barnes define the term as: 120

“Business Continuity Management means ensuring the continuity or uninterrupted provision of operations and services. Business Continuity Management is an on-going process with several different but complementary elements. Planning for business continuity is a comprehensive process that includes disaster recovery, business recovery, business resumption, and contingency planning”.

The draft British Standard for BCM builds on this stating that: 121

“Business continuity management (BCM) is a holistic management process that identifies potential threats to an organisation and the impacts to business operations those threats, if realized, might cause, and which provides a framework for building organisational resilience with the capability for an effective response that safeguards the interests of its key stakeholders, reputation, brand and value-creating activities.”

Looking at the different definitions, BCM is about;

- Identify the possible threats that a company can be exposed to and see what kinds of effects these threats might lead to,
- Insuring the continuity or uninterrupted delivery of products or services,
- Creating a framework that generates resilience to the company,
- Protection of the key stakeholders, reputation and brand, and the value creating activities,
- BCM is a continuous management process, not a single project.

As a conclusion the BCM is the ongoing management of the business continuity plan and insuring that it is always up to date and available plus the ongoing management of operational resilience and process availability within an organisation, with the aim of ensuring that the organisation experiences the minimum possible day-to-day disruption.

4.2.3 Business Continuity Planning

Several managers are now, in order to tackle supply chain risks, implementing an approach for dealing with specific kinds of disruptions. Disruptions that are hard to predict, have a small probability of occurring but that, when they occur, have a direct and significant impact on the capability of the supply chain to meet customers’ demand. This approach is often called Business Continuity Planning (BCP). 122

The Business Continuity Institute defines Business Continuity Planning as: 123

“The advance planning and preparations which are necessary to identify the impact of potential losses; to formulate and implement viable recovery strategies; to develop recovery

120 Hiles, A., Barnes, P., (1999)
121 www.continuitycentral.com
123 www.thebci.org
plan(s) which insure continuity of organisational services in the event of an emergency or disaster; and to administer a comprehensive training, testing and maintenance programme”.

Business continuity planning is developing a plan that, when implemented, will help to prevent operational interruptions, crises and disasters happening and will help the company quickly return to a state of “business as usual”, should any of these events occur. Once it has been designed, the business continuity plan must be tested and exercised to ensure that it will perform as expected. The Business continuity plan needs to be flexible enough to be effective when activated in part or in its entirety, to ensure that disruptions to the business are minimised.124

The Business Continuity Plan is consisting of four elements, already mentioned in earlier chapter; Disaster Recovery, Business Recovery, Business Resumption and Contingency Planning.

<table>
<thead>
<tr>
<th>BCP</th>
<th>Disaster Recovery</th>
<th>Business Recovery</th>
<th>Business Resumption</th>
<th>Contingency Planning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Focus</td>
<td>Data Recovery</td>
<td>Process Recovery</td>
<td>Return to Normal</td>
<td>Make Do</td>
</tr>
<tr>
<td>Example Event</td>
<td>Mainframe or server failure</td>
<td>Laboratory Flood</td>
<td>Building Fire</td>
<td>Loss of Application</td>
</tr>
</tbody>
</table>

Figure 8: Business Continuity plan 125

Disaster Recovery is the first step right after the crisis, followed by the Business recovery. These steps could be compared to emergency response or crisis management. It deals with the first critical hours. Business resumption is the subsequent step that helps the business getting back to normal. Contingency planning is actual overlapping all the previous steps seeing that the planning is needed both before the crisis but also alters during the event.

4.3 Frameworks for Business Continuity Management

Authors have explored the question of what elements make up the formal BCM system. Gilbert and Gips saw a BCM system as consisting of four major elements: risk identification, risk assessment, risk ranking risk and management.126 Similar to this are the four elements mentioned by Chapman, that are: risk identification, risk assessment, supply chain continuity management and coordination and learning from experiences.127

124 www.logicacmg.com
125 www.davislogic.com
Morton presents a more detailed system consisting of nine activities:  

1. provide top management guidelines;
2. identify serious risks;
3. prioritize the operations to be maintained and how to maintain them;
4. assign staff to disaster teams;
5. take a complete inventory;
6. know where to get help;
7. document the plan;
8. review the test plan with key employees and train all employees; and
9. maintain the plan.

Gibbs and Buchanon are also using nine phases:  

1. Program initiation.
2. Project initiation.
3. Risk analysis.
5. Monitoring and control.
6. Implementation.
7. Testing.
8. Education and training.
9. Review.

There are in other words different ways to divide the different steps in the Business Continuity Plan. The Business Continuity Institute and the British Standard have come up with a standardized way for the strategy. That BCM lifecycle is going to be explained in this study as I find it easy to use and often seen in other companies.

The framework is then divided into six sections (see figure 9):

1. BCM programme management,
2. Understanding the organisation,
3. Determining business continuity strategy,
4. Developing and implementing a BCM response,
5. BCM exercising, maintaining and reviewing BCM Arrangements, and
6. Embedding BCM in the organisation’s culture

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4.3.1 BCM programme management\textsuperscript{131}

Programme management is at the centre of the Business Continuity process. The approach from the organisation to the programme is dependent on the programme management. The participation of management is of importance to insure the implementation of the programme. The involvement of management contains of appointing right persons to be accountable for the BCM policy and one or more persons to implement and maintain.

To implement the programme in the company the organisation should communicate the programme to its stakeholders, arrange proper training for the staff, and exercise the business continuity capability.

Ongoing management activities should ensure that the programme is rooted within the organisation. Each component should be regularly reviewed, exercised and updated. The Business Continuity Plan should be reviewed every time there is a change in the organisation’s supply chain both within the company’s wall and containing the supplier, distributors or there is a signs of insufficiency.

4.3.2 Understanding the organisation\textsuperscript{132}

The aim of this part of the life cycle is to help understanding the organisation through the identification of the company’s key products and services and the critical activities and resources that support them. This element ensures that the BCM programme is aligned to the organisation’s objectives, obligations and legislative duties.

\textsuperscript{130} BS 2599:1-2006
\textsuperscript{131} Ibid.
\textsuperscript{132} Ibid.
Understanding the organisation comes from identifying the organisation’s objectives, stakeholder obligations, legal duties and the environment in which the organisation operates and also identifying the activities, assets and resources, including those outside the organisation, that support the delivery of these products and services.

To assess the impact and consequences over time of the failure of these activities, assets and resources is often called a Business Impact Analysis is made. The procedure for this is;

- Assessing the impact that would occur if the activity, supporting the delivery of the key product or services, was disrupted.

- Establish the maximum tolerable period of disruption on each of the containing activities. This means finding the maximum time period for when the process need to be up and running again, the minimum level on which the process can perform and the length of time within which normal level of operation need to be resumed.

- Finding the interdependent activities, assets, supporting infrastructure or resources that also need to be maintained.

- Next step in understanding the business is identification of the critical activities. The critical activities are those which loss would have the greatest impact in the shortest amount of time and which need to be recovered most rapidly. Each critical activity supports one or more key products or services. It is important not to forget the other activities even though there are not critical they need to be handled within their maximum tolerable period. The company then calculates how much resources are needed on each activity.

In a BCM framework, the level of risk should be understood specifically in respect to the organisation’s critical activities and the risk of a disruption to these. Critical activities are strengthened by resources such as people, premises, technology, information, supplies and stakeholders. The organisation should understand the threats to these resources, the vulnerabilities of each resource, and the impact that would occur if a threat became an incident and caused a disruption in the supply chain.

As a result of the Business Interruption Analysis the company should identify measures, known as loss mitigation and risk treatment, which reduce the likelihood of interruption, shorten the period of disruption and limit the impact of a disruption on the company’s key products and services.

It is important that the organisation understands the interdependencies of its activities, any reliance it has on external organisations, and any reliance placed upon it by others.

**4.3.3 Determining business continuity strategy**

This sector is about implementing appropriate measures to reduce the likelihood of events occurring and/or decrease the potential impact of those incidents. It is also about providing continuity to the critical activities during and following an incident but also take into account of those activities that have not been identified as critical. The most appropriate strategy or

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133 BS 2599:1-2006
strategies will depend on maximum tolerable period of disruption of a critical activity, the cost of implementing the strategy or strategies and finally the consequences of the inaction.

The strategies might be required on different areas such as people, premises, technology, information, supplies and stakeholders. The right strategies need to be found to maintain the core competence and skills in the company. These strategies might include documentations of the handling of the critical activities, training the personnel in multiple skills, use third parties, succession planning, and knowledge preservation and management.

To protect the premises and reducing the impact of the availability of the company’s area the following measures can be taken: alternative premises within the organisation, provided by other organisations or by third parties, the ability to work from home or at remote place, or use an alternative workforce in an established site. The premises need to be close enough for the personnel to be willing to travel the distance.

The technology strategies will depend on the nature of the technology used in the company and how they are linked to the critical activities. The strategies used when it comes to technology might be; geographical spread of the technology, holding older equipment at alternative sites for emergency use and third, additional risk mitigation for key machines or long lead time equipment.

Information strategies should be used to make sure that the critical information is protected and recoverable. Important factors in the information used for the critical activities are confidentiality, integrity, availability and currency. The information should be stored both in physical and virtual copies.

The company should identify and maintain a list of all the core suppliers in the organisation that support the critical activities. The strategies when it comes to the suppliers should contain; storage of additional suppliers, arrangement with third parties for delivery on short notice, holding of materials at warehouses or shipping sites and finding alternative or substitute suppliers. Also what might be needed is the increase of suppliers on the critical activities, encourage or demand that the supplier has a working Business Continuity Plan, make sure that there are contractual and/or service agreement.

The stakeholders are an important part of choosing the BCM strategies. The organisation needs to consider and protect its key stakeholder. Appropriate strategies need to be developed to manage relationships with the key stakeholders, business or service partners and contractors.

Determining business continuity strategy allows a range of strategies to be evaluated. This enables an appropriate response to be chosen for each product or service, such that the organisation can continue to deliver those products and services at an accepted level of operations and within the time limit. The choice made will take account of the resilience and countermeasure options already present within the organisation.
4.3.4 Developing and implementing a BCM response

This part of the BCM lifecycle ensures that a company’s arrangements are validated by exercise and review and that they are kept up-to-date.

Developing and implementing a BCM response results in creating of a management framework and a structure of incident management, business continuity and business recovery plans that detail the steps to be taken during and after an incident, to maintain or restore operations.

The company should define an incident response structure that will enable an effective response and recovery from disruptions. In any incident situation there should be a simple and quickly put together structure that will allow the company to confirm the nature and extent of the incident, take control of the situation, contain the incident, and communicate with stakeholders.

The same structure should trigger the next step; appropriate business continuity response. This structure may be referred to as crisis management team. The team should have plans for the activation, operation, coordination and communication of the incident response. Figure 10 illustrates the three main phases over time of an incident, and the relationship between incident management and business continuity according to British standards.

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134 BS 2599:1-2006
135 Ibid.
Another way of looking at the recovery period is presented in the figure below. In this picture the y axis is presented with the amount of activity that is connected to the different stages.

![Diagram showing recovery overview according to Marsh](image)

Figure 11: Recovery overview according to Marsh

When looking at the British Standard (figure 10) and the Marsh diagram (Figure 11) the connection between them are:

<table>
<thead>
<tr>
<th>British Standard</th>
<th>Marsh diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incident report</td>
<td>Emergency response plan</td>
</tr>
<tr>
<td></td>
<td>Crisis Management &amp; Crisis Communication plan</td>
</tr>
<tr>
<td>Business Continuity</td>
<td>Crisis Management &amp; Crisis Communication plan</td>
</tr>
<tr>
<td>Recovery/ Resumption</td>
<td>Business recovery plan</td>
</tr>
</tbody>
</table>

Table 2: Comparison between British overview and Marsh overview

In the continued explanation of the Business Continuity Plan the British standards is going to be used. This is not what I would call a standard in the means of ISO, but more like guidelines that the companies can use.

Strive of the companies are often to get back to “normal” and therefore creating plans for this (recovery plans). However, in some of the situations it is not possible to know exactly what “normal” is yet, so the implementation of recovery plans might not be possible until later on. This results in that the business continuity plans need to be able to stretch until the recovery plan is developed (see figure 11).

All plans, whether incident management plans, business continuity plans or business recovery plans, should be concise and accessible to those with responsibilities defined in the plans. Plans should contain Purpose and scope, Roles and responsibilities, Plan invocation, Document owner and maintainer, and Contact details.

The purpose and scope of each specific plan should be defined, agreed on by top management, and understood by those who will put the plan into place. Every incident
management, business continuity and business recovery plan should set out prioritized objectives in terms of:

- the critical activities to be recovered;
- the timescales in which they are to be recovered;
- the recovery levels needed for each critical activity; and
- the situation in which each plan can be utilized.

The **roles and responsibility** of the people and teams in charge during and following an incident needs to be clearly documented. There is no time for arguments occurring during the crisis.

**Plan invocation**, the method by which an incident management, business continuity or business recovery plan is brought into play should be clearly documented. This process should allow for the relevant plans or parts thereof to be invoked in the shortest possible time following the occurrence of a business disruption. Also there should be a clear guideline for standing down after the incident, returning to business as usual.

The organisation should nominate the primary **owner of the plan**, and identify and document who is responsible for reviewing, amending and updating the plan at regular intervals. The updating is of importance since the plan also should provide a reference to the essential **contact details** for all key stakeholders.

Following, the different part of the recovery plan is being described. As mentioned before there is a difference between the British standards overview and Marsh’s. In this study the British standards division are being describe below, the parts might be named differently but the procedures are in the end similar.

**The incident management plan**

The purpose of an Incident Management Plan is to allow the organisation to manage the initial (emergency or crisis) phase of an incident. This plan should be flexible, up to date, easy to use, and provide the basis for managing all possible issues, including the shareholder and external issues, facing the organisation during an incident.

The incident management plan should also include a task and action list. This is a task lists and action checklists to manage the immediate consequences of a business disruption. These tasks should, among other things, ensure that safety of individuals is addressed first, be based upon the results of the organisation’s Business Impact Analysis, and help prevent the further loss or unavailability of critical activities, and supporting resources.

The plan should include emergency contacts. There should be a description of how, and under what circumstances, the organisation will communicate with staff and their relatives. It is important that this information is updated regularly or when new personal is hired.

The plan should satisfy the interests of those whose welfare might be put at risk as a result of an incident, taking into account relevant social and cultural considerations. This could for example be counselling for the staff after an incident.
The organisation’s media response should be documented in the plan, including:

- the incident communications strategy;
- the organisation’s preferred boundary with the media;
- a guideline for the drafting of a statement to be provided to the media at the earliest possible opportunity following the incident;
- appropriate numbers of trained, competent spokespeople nominated and authorized to release information to the media;
- a location where it is practicable to have meetings or conferences with the media, or other stakeholder groups.

A process for identifying and prioritising communications with other key stakeholders should be included. It may be necessary to develop a separate stakeholder management plan to provide criteria for setting priorities and allocating a person to each stakeholder or group of stakeholders.

An alternative location should be established from where the incident will be managed. In this location there should be appropriate sources by which the incident team may initiate effective incident management activities without delay. From here, it should be means of communication and accessing and sharing data.

**Contents of the BCP**

In addition to the items already recommended in the beginning of this chapter a Business Continuity Plan should contain an action plan/ task list with the checklist

1. how the BCP is invoked;
2. the person(s) responsible for invoking the business continuity plan;
3. the procedure that person should adopt in taking that decision;
4. the person(s) who should be consulted before such a decision is taken;
5. the person(s) who should be informed once a decision has been taken;
6. who goes where, and when;
7. what services are available where, and when; including how the organisation mobilizes external and third-party resources;
8. how and when this information is communicated; and
9. if relevant, detailed procedures for manual workarounds, system recovery, etc.

### 4.3.5 BCM exercising, maintaining and reviewing BCM arrangements

This element of the BCM lifecycle ensures that an organisation’s BCM arrangements are validated by exercise and review and that they are kept up-to-date. A BCM plan is not a one time deal, but need to regularly be updated and rehearsed.

An exercise programme should be worked out so that, over a period of time, it leads to the guarantee that the plan will work as anticipated when required. The programme should:

- exercise the technical, logistical, administrative, procedural and other operational systems of the BCP,
- exercise the BCM arrangements and infrastructure, and

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137 BS 2599:1-2006
• validate the technology and telecommunications recovery, including the availability and relocation of staff.

The exercising of the plan might result in improved ability to recover after an incident, raising awareness of the BCM in the organisation and get a more effective and time saving process of restoring the critical activities, among other things.

In reviewing the plan it is important to that it follows any changes in applicable laws, standards, strategies, frameworks and good practice guidelines. The frequency and timing of reviews can be influenced by laws and regulations, depending on the size, nature and legal status of the organisation. They might also be influenced by the requirements of stakeholders.

4.3.6 Embedding BCM in the organisation’s culture\textsuperscript{138}

To be successful, business continuity has to become part of the company, regardless of size or sector. There might otherwise be a risk of the plan just existing in theory in the bookshelf, but not actually in the organisation.

Embedding BCM in the company’s culture enables BCM to become part of its core values and infuse confidence in all stakeholders in the ability of the organisation to cope with disruptions.

To get the plan implemented in the company there is a need of getting awareness among the staff. Also the awareness can be extended to the company’s suppliers and stakeholders. The other thing to make the BCM embedded in the company is training of the staff. The company should have a process for delivering the training throughout the company.

Finally, Business Continuity Plans need to be clear, concise and tailored to the needs of the business; therefore there is not a standardized or one-size-fit-all solution\textsuperscript{139}.

\textsuperscript{138} BS 2599:1-2006
\textsuperscript{139} www.surreycc.gov.uk
5 Risks

This chapter look at different risks that a company can be exposed to. The risks are many and in this study the most common risks are divided into five groups. Also mentioned are the different methods to handle the risks and the attitudes towards the risks.

There are different ways to categorise risks into groups. In this chapter two different categorisations are going to be presented, and then one of the theories selected for the case studies that follows in later chapters.

5.1 Categorisation one\textsuperscript{140}

Deleris, Erhun, and Paté-Cornell are using five groups to categorize the risks into; Operational/ Technological, Social, Natural/ Hazard, Economy/ Competition, Legal/ Political.

5.1.1 Operational/ Technological

Companies need to match demand from the customer to supply. This would be an easy task if the demand would be static. That is not the situation today. The demand from the customers varies quickly and this could lead to forecast errors. Capacity constraints are another risk that can affect the company; this could be for example machinery capacity or the lack of storage area. Another risk that the company stands before is losing cargo. Cargo is being shipped over long distances and without tracking devises there is a chance of loss. There are also the risks of industrial accidents, budget overruns, with as well contract terms, the storage risks, virus attacks on the computer systems and loss of a supplier.

5.1.2 Social

Every company is driven by people, people that run the company and people that work for the company. To this come social risks that can take place in the company. Example of this could be loss of key personal. This person might possess knowledge that is not available anywhere else in the company. There is always a possibility to train new personnel but this takes time.

Image is important to the company hence this can affect the customers and therefore the demand. The image might be damaged by negative media coverage. Other examples of risks that might affect the company are union and labour relations, perceived quality, and coincidence of problems with holiday, third party strikes, fraud, and malfeasance.

5.1.3 Natural/ Hazard

Natural catastrophes are all over the world in different shapes. They can be devastating in large scales and ruin houses and take lives. They can also be small but hit an important nerve in the company and therefore result in big consequences to the company. Example of natural disasters or hazards could be storm, flood, hail, monsoon, tornado, hurricane, earthquake, epidemic or pandemics.

5.1.4 Economy/ Competition

The competition is getting tougher at the moment. New competitors are founded every day and the customers demand is getting harder to satisfy. This results in that the economic and the competition are big parts of the success and future of a company; hence there are a lot of

\begin{footnotesize}
\end{footnotesize}
risks connected with this. Risks of this kind could be interest rate fluctuation, exchange rate fluctuation, commodity price fluctuation, price and incentive wars, and bankruptcy of partners, stock market collapse, and global economic recession.

5.1.5 Legal/ Political

Companies are nowadays outsourcing a lot of their processes. As a result of this there are a lot of risks attached such as; liabilities, laws suits, governmental incentives/ restrictions, and political upheaval.

The counterfeiting is growing every year. The seizure of 103 million dollar counterfeit and pirated goods in 2004 represent an increase of more than 12 percent compared to 2003 and almost 1000 percent compared to 1998.

5.2 Categorisation two

Teresa Wu, Jennifer Blackhurst, Vellayappan Chidambaram divide the risks after the ability, and from where the risks are controlled. They divide the risks in six categories shown below.

5.2.1 Internal Controllable

This group refers to the internal risk factors that originate from sources that are most likely controllable by the company. Examples are the quality and cost of the product.

5.2.2 Internal Partially Controllable

Internal Partially Controllable refers to the internal risk factors that originate from sources that are partially controllable by the company. For example, fire accident in the company.

5.2.3 Internal Uncontrollable

The third internal group refers to the internal risk factors that originate from sources that are uncontrollable by the company.

5.2.4 External Controllable

The first external part, External controllable, refers to the external risk factors that originate from sources that are most likely controllable by the supplier company, for example, selection of the next tier suppliers.

5.2.5 External Partially Controllable

The second external part refers to the external risk factors that originate from sources that are partially controllable by the supplier company. For example, customer demand can be partially impacted by a company’s promotion plan.

5.2.6 External Uncontrollable

External uncontrollable refers to the external risk factors that originate from sources that are uncontrollable by the supplier company. Examples are nature disasters such as earthquake, tsunami

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5.3 **Classification used in this thesis**

The purpose of the study is to find the link between supply chain disruptions, BCM, and shareholder values. I will be using the classification from Deleiris, Erhun, and Paté-Cornell since the cases will look into cases such as Operational/Technological, Natural/Hazard and Legal/Political. Social, Economy/Competition will not be looked at as much as it is hard to find a case with Supply Chain disruption based on these risks. The cases that are used in this study are based on mostly secondary data and therefore limited in amount. In the study also cases with disruptions due to terrorism will be used since cases such as this are increasing in modern days.

5.4 **Taxonomy of managing risks**

There are different ways of handling risks, depending on the attitude towards the subject in the company.

Once risks have been identified and assessed, all techniques to manage the risk fall into one or more of these four major categories:  

- **Tolerate** (aka retention)  
- **Treat** (aka mitigation)  
- **Terminate** (aka elimination)  
- **Transfer** (aka buying insurance)

Ideal use of these strategies may not be possible. Some of them may involve trade-offs that are not acceptable to the organisation or person making the risk management decisions.

5.5 **Disruption Likelihood and Impact**

The different risks that can effect a company can be divided into likelihood (probability) and impact (consequences). Sheffi gives an example on different disruptions or crisis that can hit a company and the chance of these occurring together with the impact they would have. As can be seen in the picture, the chance of loss of key supplier is rare but the impact of the event would be severe. (see picture 12)

![Figure 12: Likelihood/Impact of a disruption](image)

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142 Lane, B., Dorfman, D (1997)  
143 Sheffi, Y., (2001)
A chance of a company been effected by a computer virus is considered low and (most of the times) the impact is low.

When it comes to natural disasters like earthquakes, tornados, floods or lightning there are often statistical models that can be used, since the natural disasters often are frequent. Insurance companies often have well developed models over the likelihood of a natural disaster occurring.¹⁴⁴

Often companies are concerned with the prevention of accidents but what needs to be done first is actually find to the likelihood of an accident occurring. Based on 1.7 million accidents reported by 297 cooperate organisation, another study suggested that for every 600 accidents with no damage or injury there are likely to be 30 property damage accidents, 10 accidents with minor injuries, and on serious or disabling injury. Companies can get to the larger accident by scaling the small mishaps. By reducing the common smaller accident the larger ones are less likely to occur¹⁴⁵.

When it comes to intentional disruptions the likelihood follows a different logic. The perpetrators’ goal is to insure the success of the attack and also to get maximum amount of damage; if the company protects itself in one area the likelihood of the perpetrator attacking in another increases which result in the type of attack altering. As a result there is a big chance that the attack will occur in the worst time and in the worst place when the company is not prepared¹⁴⁶.

In this case we do not talk of just terrorist attacks, which are the ultimate form of intentional disruption, but also for example, a strike. The strike is often the most profitable if it hits the company at a weak point and gives maximum effect, for example before Christmas holiday shopping.

¹⁴⁴ Sheffi, Y., (2005)
¹⁴⁵ Ibid.
¹⁴⁶ Ibid.
6 Shareholder value

The effect that the shareholder value has on the company in a crisis is being researched in this chapter. The connection between a disruption and shareholder value is described and measures that can be taken to prevent decrease.

In chapter one the connections between the supply chain and the shareholder value is explained in the conceptual framework. But what is actually the outcome of a disruption in the supply chain when looking at the shareholder value, and how does the outcome vary?

6.1 Definition of Shareholder value

A shareholder is defined as someone who owns shares of stock in a corporation or mutual fund. For corporations, along with the ownership come a right to declared dividends and the right to vote on certain company matters, including the board of directors.

Shareholder value relies on investors created expectations of future financial performance of the company. These expectations are based on corporate and financial information made available to investors, and will be revised as new information is received. The existing market value of a company, therefore, is dynamic, forward-looking and expectations-based. The difference between shareholder value and share value is the highlighting on future expectations for a company and the price of its shares in the future, as opposed to today.

6.2 Outcome of a disruption

So how does a disruption effect the shareholder value? Studies have been done and some of the results of these are:

- Disruptions increase share price volatility. Share price volatility in the year after the disruption is in average 13.50 percent higher when compared to the volatility in the year before the disruption. Such increases in volatility could weaken investor confidence as well as raise the cost of capital for the firm. It can also make a firm’s shares a less attractive currency for acquisitions as potential targets may be less inclined to do deals that depends on volatile share prices.

- Disruptions have a significant negative effect on profitability. After adjusting for industry and economy effects, the average effect of disruptions in the year leading to the disruption is:
  - 107 percent drop in operating income
  - 114 percent drop in return on sales
  - 93 percent drop in return on assets
  - 7 percent lower sales growth
  - 11 percent growth in cost

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147 Shareholder is also called Stockholder. Share price or value is known as the price of a company’s stock (source: www.investorwords.com)
149 www.wikipedia.com
Disruptions have a devastating affect on performance as firms do not quickly recover from disruptions. Firms continue to operate for at least two years at a lower performance level after experiencing disruptions. Disruptions have a negative effect on stock price, profitability, and share price volatility.

Another fact presented by Gartner Group is that 40 percent of organisations that suffer major disruptions in the supply chain go out of business within two years.\(^{151}\)

### 6.3 The cost of a disruption

In big companies minutes of downtime can cost millions of dollar. Supply Chain disruptions can have significant physical costs, such as damages to the facilities, inventory, electronic network, and infrastructure but also subsequent costs due to downtime. Costs that can not be measured in money are the loss in branding.

The different costs are production loss which is the fixed costs that needs to be paid even if the production is standing still. The Revenue cost is the impact on the cash flow, the sick leave costs is due to employees being sick as a result of the incident and then there is the extra costs due to supply chain interruption. The final loss is branding; this could be loss of intellectual property, liability claims, loss of customer’s loyalty and finally loss of shareholder value.

A study made to estimate the cost of downtime (in terms of revenue) for several on-line companies that cannot function when their computer is down resulted in the following numbers.\(^{152}\)

**Downtime Costs (per Hour):**

- Brokerage operations $6,450,000
- Credit card authorization $2,600,000
- Ebay (1 outage 22 hours) $225,000
- Amazon.com $180,000
- Package shipping services $150,000
- Home shopping channel $113,000
- Catalog sales center $90,000
- Airline reservation center $89,000
- Cellular service activation $41,000
- On-line network fees $25,000
- ATM service fees $14,000

These costs do not include the costs of paying employers who cannot work because of the disruption or the costs of losing the customer’s good will.

\(^{151}\) Horner, K. (2006)

\(^{152}\) Kembel, R., (2000)
6.4 Recovery versus non-recovery

“It’s not the strongest of the species that survive, nor the most intelligent, but those that are the most responsive to change.”

Charles Darwin
1809-1882

A citation that was said over a hundred years ago can still be applicable to supply chains in modern days and to disruptions that can affect companies today. The ability to change and be flexible can prevent a company from going under. According to London Chamber of Commerce and Industry, 90 percent of businesses that lose data from a disaster are forced to shut within two years.\(^{153}\)

Recovery time and grace period are often mentioned after a disruption, where the time to recovery is a function of the company’s resilience, while the grace period is a function of its market position.

Knight and Pretty looked into the share values of a company just after a disruption had occurred and been announced. The result of this is shown in figure 13.

![Figure 13: Market response to a crisis](image)

The x-axis in the graph represents one calendar year following the crises (261 trading days) where the date of each crisis has been aligned on event day 0. The y-axis calibrates a modelled share price reaction where market-wide influences have been stripped out and returns have been risk-adjusted. The graph thereby captures a very clean measurement of share price impact following a sudden and unexpected event.

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\(^{153}\) www.leics.gov.uk

\(^{154}\) Knight, R.F., Pretty, D.J. (1996)
Knight and Pretty found that companies that mishandled crises saw their stock price dropped an average of 10 percent in the first weeks after a crisis, and continue to slowly decrease for a year, ending the year after the crisis an average of 15 percent below their pre-crisis prices (See figure 12). Companies with effective crisis response, on the other hand, saw their stock fall an average (cumulative abnormal returns) of just five percent in the weeks following a crisis, about half the initial decline of companies that mishandled the crisis. More significant, companies with effective crisis response saw their stock price recover quickly, and remain above their pre-crisis price thereafter, closing an average of 7 percent above their pre-crisis price one year after the crisis.  

In other words, the tangible difference between effective and ineffective crisis response was, on average, 22 percent of a company’s market capitalization. Knight and Pretty assess the reasons for this disparity, and conclude that the most significant factors are not the scope of financial damage or reduction in cash flows caused by the crisis. Rather, the most important determinant of a company’s ability to recover and increase its market capitalization after a crisis is the management team’s response.

Knight and Pretty identified four defining characteristics of non recovering companies, compared to the recovering companies:

- The initial loss of over 10 percent of market capitalization in days following the event.
- The magnitude of the estimated financial loss over the first two or three months is significant relative to the size of the company.
- A large number of casualties or fatalities resulted from the event.
- Ineffective management or lapsed safety standards were determined to be at least partially responsible for the event.

The results of these studies highlight the need for today’s management to have a deep understanding of which links in their supply chains are at risk, and exactly what impact a disruption can have on shareholder value.

In a later study by Knight and Pretty, firms with the specialist services from Kenyon International Emergency Services, during a crisis, were outperforming their peers by 40 percent. The enlisting of specialist care enables experts in disaster response and recovery, and humanitarian services to carry out their work efficiently and sensitively. This is consistent with the anecdotal evidence that suggests firms are more likely to experience efficient value recovery if they demonstrate strong leadership, honesty and compassion.

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155 Knight, R.F., Pretty, D.J. (1996)
156 Ibid.
157 Ibid.
158 Knight, R.F., Pretty, D.J. (2005)
The shareholders response can differ depending on what kind of disruption a company is hit by. Knight and Pretty noticed that when the crisis resulted in mass fatalities the stakeholder was more supporting of the company. This can be seen in the graph presented in figure 15.

Another finding in the research was that a company hit by a fire was more likely to get the support from the shareholders than the company hit by a scandal such as fraud.
In a recent study, Hendricks and Singhal use the event study methodology to estimate the economic impact of supply chain disruptions on shareholder wealth. Based on a sample of 519 publicly announced disruptions, they find that after adjusting for normal market movements, shareholders on average lose about 10 percent of their stock value over a two-day period that spans the day of the announcement and the day before the announcement.\textsuperscript{161}

The study found that for companies that announced disruptions:\textsuperscript{162}

- Share price volatility increased an average of 13.5 percent for the 12 months following the announcement, compared to the 12-month period prior to the announcement.
- Shareholder returns were 7.18 percent lower on the day of the announcement, contrasted with comparable portfolio benchmarks.
- Shareholder returns were 10.45 percent lower for the year following the announcement.
- Shareholder returns were 1.77 percent lower for the second year following the announcement.

### 6.5 Mitigating the shareholder drop\textsuperscript{163}

What can be done to prevent the decreasing of share value after a disruption in the supply chain? Some steps can be taken in circumventing the decrease in share value.

#### 6.5.1 Improve the accuracy of demand forecasts:

A main reason for demand supply mismatches is incorrect forecasts. Bringing quantitative rigor to forecasting can improve the accuracy and reliability of forecasts. In developing plans, firms should consider not only the expected forecast but also the forecast error. Firms should also recognize that long-term forecasts are essentially less accurate than short-term forecasts. Forecasts often go bad when firms do not dynamically adjust forecasts, ignore background noise, and fail to consider events outside their own organizations that could have a material effect on forecasts.

#### 6.5.2 Reduce the mean and variance of lead time:

Forecasting inaccuracy and gap between planning and execution can be particularly devastating when lead times are long and highly variable. Reducing the mean and variance of lead time can help reduce the level of uncertainties in the supply chain.

#### 6.5.3 Integrate and synchronize planning and execution:

Although firms have become sophisticated in their planning activities, plans are often shielded from execution reality. By better coordinating and integrating planning and execution many cases of supply demand mismatches can be avoided.

#### 6.5.4 Collaborate and cooperate with supply chain partners:

Collaboration and cooperation among supply chain partners will only happen if there is trust among the various parties, upfront agreement on how to share the benefits, and a willingness to change existing mindsets. Once these elements are in place, supply chain partners can do

\textsuperscript{161} Hendricks, K., Singhal, V.R., (2005)
\textsuperscript{162} Ibid.
\textsuperscript{163} Singhal, V. R., (2006)
joint making decisions and solving problems, as well as sharing information about strategies, plans, and performance with each other.

6.5.5 Invest in Visibility:
To reduce the probability of disruptions, firms must be fully aware of what is happening in their supply chain. This includes internal operations, customers, suppliers, and location of inventory, capacity, and critical assets.
The value of a business continuity management plan from a shareholders perspective
The value of a business continuity management plan from a shareholders perspective

7 The collection of data

This chapter intends to enter deeper in the obtained material and current circumstances of the market. The purpose is to clarify the underlying main driving factors of the problem in the report and to define the prerequisites. This creates a wider base for an accurate analysis.

The data presented in this chapter is collected via books, articles, and internet or via interviews. When collecting data for the different cases presented later in the thesis I have come across some difficulties while researching. The purpose of the thesis is to find the connection between Supply Chain, Business Continuity and Stakeholders. A way to measure the shareholder’s satisfaction is to look at the share value. This has not been easy since the disruptions in many cases might have occurred a few years back hence the share value graph is hard to get a hold of.

The steps taken in the collection of data was first collecting data via the Internet and secondly conducting interviews. The interviews where used merely to confirm the earlier research and the analysis already made.

7.1 Case studies

The purpose of the study is to find the link between supply chain disruptions, BCM, and shareholder value. I will be using the classification from Deleris, Erhun, and Paté-Cornell and the study will look into cases containing risks such as Operational/Technological, Natural/Hazard, Social and Legal/Political. Economy/Competition will not be researched as it is hard to find a case with Supply Chain disruption based on these risks. Also in the case studies disruptions due to terrorism are going to be researched. Terrorism has become a larger issue the last couple of years. Therefore terrorism has been put in a separate section.

12 case studies have been researched and the majority of them are in the industrial sector. Most of the cases are producing companies that have a complex supply chain with many suppliers and distributors. Due to most data is collected via the Internet; the companies mentioned are often of larger size since smaller companies disruptions are less likely to become headlines.

For the ability to compare the disruption in the company to the shareholder value the company needs to be listed. Even so, companies not listed, have been brought up in this study as I believe they add value.
7.2 **Sampling**

When conducting the data collection in the different cases, sampling has been used. The procedure in sampling of data is being presented in the illustration in figure 16.

In the sampling for the data collection for empirical data, Purposeful Sampling has been used. The criterion for the sampling was that there were to be a disruption in the company that was public and that the case was not older than 1995. Words like Supply Chain disruptions, SCM and BCM were used in the search engine. Other key words that were used are Share holder value, decline in share value, delay, production, shortage etc. The search engine that has been used in this study is Google.

The decision tree, shown below, is the procedure used during the sampling. By using these questions the right information was gathered. If the company has a BCM plan might sometimes be a bit unclear hence there is different definition on what a fully implemented BCM plan contains. Even without a defined BCM plan a company can be prepared for a crisis. This is being visualised by the figure 16.

![Decision tree when sampling](image)

**Figure 16: Decision tree when sampling**
7.3 Interviews
In this thesis there is a mix of face to face interviews and interviews made over the phone. The reason for the latter is lack of time and the spread of the companies interviewed.

The companies interviewed face to face were E.ON, Finnveden and Cardo, all located in southern Sweden. Due to the sequence of the data collection, with case studies already been collected via the Internet, the interviews contained more questions about the trends in SCM, BCM and risks then specific cases. This resulted in a feeling on how the Swedish companies face the different strategies.

Important in the study is to obtain trust from the people interviewed; this is achieved by having a straight presentation of me and the purpose of the thesis. The companies will be more open if it is clear that the thesis is done for my exam and not for the company Marsh where I am located at the moment.

To get the most out of the interview, a thorough preparation is made before and questions are written down before the meeting. It is also important to be well informed of the subject, therefore the interviews was scheduled later on in the process.

7.4 Shareholder value
When looking at the change in shareholder value, the share value of the day of the crisis is taken minus the share value some time later divided with the share value of the day.

\[
\text{Change in Share value (\%)} = \frac{\text{Share value of the crisis} - \text{Share value some time later}}{\text{Share value of the crisis}}
\]

The time period that is used in the different cases’ calculations differs depending on the time frame of the disruption. The importance here is to have the same time period in different companies in the same crisis, for example Nokia and Ericsson in the Philips fire. Ideally, to compare the different cases, would be to have the same timeframe, this is not possible in this thesis since the disruptions are of different timelines.

The calculations of the drop caused by the disruption are an approximation from the graph as hard financial data is often not included in graphs older than one year.

It needs to be taken into consideration, that further studies needs to be made to find the exact amount of impact on the share value caused by the disruption and the amount caused due to the situation of the country. The result in share value drop in the graphs in not solely due to the disruption and can therefore be considered contaminated.

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164 See chapter 8.1.1
The value of a business continuity management plan from a shareholders perspective
8 Cases

During this chapter several cases are being studied. The cases chosen for this study are the companies that have had a disruption in the supply chain and from this has a successful or not so successful outcome. Examples of cases being studied are Nokia/Ericsson, Airbus and E.ON.

The study of the financial consequences of some of the cases, where major casualty are involved, may seem morbid. However, catastrophes are phenomena which provide a unique opportunity to evaluate how financial markets respond when major risks become reality.

8.1 Operational/ Technological

Four cases are being presented in this classification of risks, Philips fire, the delay of the Airbus 380, Nike problem with the i2 software and finally the delay of the Play Station 3.

8.1.1 Philips-fire

On Friday night, March 17, 2000, an event occurred that changed the global cellular telecommunication industry radically. A random lightning bolt struck a manufacturing plant (NXP Semiconductors) in Albuquerque, New Mexico, belonging to Philips, sparking a fire that endured for only about ten minutes. This event shifted the balance of power between the two biggest European electronics companies, Ericsson and Nokia. Both Finland-based Nokia and Sweden-based Ericsson, a prime competitor, purchased a critical cellular phone component called radio frequency chips (RFCs) from a Philips Electronics semiconductor plant.

The sprinklers went on as planned and the trained staff easily put the fire out in ten minutes. The fire-fighters arrived at the scene, but all they had to do was verify that the plant was safe. What they did not know was that this was considered to be the cleanest place on earth, a semiconductor fabrication plant for making special chips for cell phones. The fire had damaged two of the four clean rooms.

Philips immediately notified both Ericsson and Nokia, who was the two largest customers, about the incident. The two companies were both about to launch a new generation of cell phones that were dependent of the chips that were made by this plant. Philips estimated, at this time, the delay to be one week. Despite the fire's briefness, the blaze took the New Mexico plant offline for months, and in an instant eliminated a key link in an essential supply chain on which both Nokia and Ericsson had come to depend.

Nokia was not excessively disturbed at the beginning but put the affected chip on a “special watch” that called for daily discussions between Nokia and Philips engineers. What Nokia discovered quite quickly was that the delay would take months and not weeks which would result in the company missing its launch of the new cell phones. Nokia now tried to first get Philips to find alternative supply from its other factories in the world even though this would result in Philips having to outsource some of its own production. Secondly, Nokia looked for other suppliers around the world and paid them extra for setting up and producing the chips.

165 www.businessweek.com
166 Sheffi, Y., (2006)
167 Ibid.
Nokia engineers also quickly re-designed the chips so that the company's other suppliers in Japan and the United States could produce them.\textsuperscript{168}

Ericsson handled the situation differently. They basically ignored the first message from Philips hence they had the stock to cover a week’s delay. By the time Ericsson discovered that the delay would be months, Nokia had already taken the worldwide supply of chips.\textsuperscript{169} Ericsson relied exclusively on the Albuquerque plant for the components, Ericsson found itself with nowhere else to turn for these vital components. At the end of 2000, Ericsson announced a stunning 16.2 billion kronor (€ 1.72 billion)\textsuperscript{170} loss in the company’s mobile phone division. Ericsson retreated from the handset production market\textsuperscript{171}. Thus one of Nokia’s major competitors was eliminated from the marketplace. In April 2001, Ericsson signed a deal with Sony to create a joint venture to design, manufacture, and market handsets. The new company, Sony-Ericsson, would be owned 50–50 by the two companies.

The companies were forced to react to this crisis, and did so in ways that could not have been more contrasting. In analyzing production reports from its facilities throughout Europe, Nokia executives discovered within just three days of the fire--even before Philips officials had notified them of the problems at the Albuquerque plant--that something was amiss in its supply chain. Nokia analysts estimated the potential effects of this supply crisis, and found them to be huge, affecting as many as four million cellular handsets, or the equivalent of 5 percent of the company's revenue.

The winner in this crisis was Nokia, at the time Europe's largest corporation and now the world leader in cellular telephony. The financial consequences of this brief crisis vividly demonstrate the benefits of having modular product designs that enable manufacturers to satisfy demand in unexpected circumstances. Through quick action, Nokia was able to meet its production goals, and even boost its market share from 27 percent to 30 percent--a level more than two times that of its nearest rival\textsuperscript{172}. Ericsson, by contrast, posted a nearly € 1.72 billion loss for the year, and ultimately had to outsource its cellular handset manufacturing business to another firm.

When studying at the different graphs from Ericsson and Nokia you can see that Nokia is working towards the status that they had before the crisis in a quicker paste than Ericsson.

When looking at the graphs of Nokia and Ericsson during the disruption in the Philips plant (figure 17 and figure 18) there is an evident decreasing in the share value in both Ericsson and Nokia’s case. The dip in Ericsson shares is about 41 percent after the fire to the end of 2000. Nokia dropped average 20 percent the remaining of the year. While Nokia managed to get back on its feet, Ericsson kept dropping in share value and market share until it started cooperation with Sony. From that moment onwards Ericsson started to gain value in its shares again.

\begin{itemize}
  \item \textsuperscript{168} www.businessweek.com
  \item \textsuperscript{169} Sheffi, Y., (2006)
  \item \textsuperscript{170} Ibid.
  \item \textsuperscript{171} www.cnn.com
  \item \textsuperscript{172} www.businessweek.com
\end{itemize}
There is a decline in the share price just after the fire, approximately 11 percent, when looking at the Philips graph.
During the interviews, Kenth Björkmarker, Finnveden and Mats Hedberg, Cardo emphasized the companies considered machinery breakdown the most likely internal disruption. This is today the most common disruption in the production companies interviewed.173

8.1.2 Delivery delays from Airbus A380

The Airbus A380 is a double-deck, four-engine airliner manufactured by EADS (Airbus S.A.S.). It is the largest passenger airliner in the world today. Its first flight was on 27 April 2005 from Toulouse, France. Commercial flights are scheduled to begin in late 2007 after lengthy delays.174

Initial production of the A380 was plagued by a series of delays attributed to the 500 km (300 miles) of wiring in each aircraft. Airbus cited as underlying causes the complexity of the cabin wiring, its concurrent design and production, the use of two incompatible versions of the CATIA computer-aided design software, the high degree of customisation for each airline, and failures of configuration management and change control. According to industry analyst Richard Aboulafia, it sounds like weight-reduction design changes are a big part of the delay too. Deliveries would be pushed back by nearly two years.175,176

174 www.wikipedia.com
“However, this is a very long and complex value chain. While everyone on board was on top of their job, the production process... not the airplane... but the production process has one, big flaw – one weak link in the chain: that of the design of the electrical harnesses installation in the forward and aft fuselage.”

Christian Streiff Speech Airbus President and CEO

Airbus announced the first delay in June 2005 and notified airlines that delivery would slip by six months, with Singapore Airlines expecting the first A380 in the last quarter of 2006, Quantas getting its first delivery in April 2007 and Emirates receiving aircraft before 2008. This reduced the number of planned deliveries by the end of 2009 from about 120 to 90–100.

On 13 June 2006 Airbus announced a second delay, with the delivery schedule undergoing an additional shift of six to seven months. The announcement caused a 26 percent drop in the share price (see figure 22) of Airbus's parent, EADS, and led to the departure of EADS CEO Noël Forgeard, Airbus CEO Gustav Humbert, and A380 program manager Charles Champion. In the wake of the new delay, Malaysia Airlines and ILFC were reported to be considering the cancellation of their orders. Launch customers Singapore Airlines, Emirates and Qantas also were reported to be angered by the delays and expecting compensation. However, on 21 July 2006, Singapore Airlines ordered a further 9 A380s and stated that Airbus had "demonstrated to our satisfaction that the engineering design for the A380 is sound [and that] it has performed well in flight and certification tests and the delays in its delivery have been caused more by production, rather than technical, issues."

On 3 October 2006, upon completion of a review of the A380 program, the then CEO of Airbus, Christian Streiff, announced a third delay. The largest delay yet, it pushed the first delivery for Singapore Airlines to October 2007, to be followed by 13 deliveries in 2008, 25 in 2009, and the full production rate of 45 aircraft per year in 2010. The customer with the largest A380 order, Emirates, saw its first delivery pushed back to August 2008 and said as a result that it was considering scaling back its order, potentially in favour of the rival Boeing 747-8. The third delay was followed by the first cancellations to hit the A380 program. In November 2006, FedEx dropped its order for A380F freighters in favour of the Boeing 777

177 www.wikipedia.com
Freighter. In March 2007, the last remaining customer for the A380F (freighter), UPS, announced the cancellation of its order. Airbus suspended work on the freighter version in order to concentrate on delivering the passenger version, but said the freighter remained on offer. As of March 2007, Airbus estimated a 2014 entry into service for the A380F.178

"We cannot wait forever but at this point there is nothing that comes close to the A380 as far as seat capacity", the Emirates airlines stated on the 13th October 2006.179

There will be extra costs for Airbus as they must pay compensation to airlines for late delivery.180

Boeing, which has begun major assembly of the 787, is on schedule to deliver the first one in May 2008 and is working with suppliers on how to build more to meet demand. The Dreamliner is sold out until the "back end" of 2013, program manager Mike Bair said March 19.

Below in figure 21 and 22 the share values of EADS and Boeing is being shown. There is a clear sign of decreasing value when the delays are being announced in the EADS graphs. When looking at the second announcement in 13 of June the decline in share value at EADS is approximately 25 percent. What is interesting to see is at the same time the value of Boeing’s shares is actually increasing with 5 percent. Weather this is a coincident or a result of the downfall of Airbus needs to be investigated more. At the third announcement the EADS share value drops with 13 percent while Boeing increases with 3 percent.

What also needs to be taken under advisement here is that Airbus in not the only product from EADS. If so would have been the case, the drop might have been even larger.

Figure 21: EADS Share value 2006-2007181

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178 www.airbus.com
179 www.usatoday.com
180 www.bbc.com
181 Ibid.
8.1.3 Nike and the i2 software

Nike, Inc., based in Beaverton, Oregon, the world's largest shoe company, announced in February 2001 that it had lost $100 million in sales from the previous quarter because of problems with its new supply-chain software. As a result, Nike's stock dropped 20 percent on the day of the announcement. i2, the vendor who created the supply-chain management software for Nike, saw its stock drop 22 percent the same day.183

Supply and demand issues can be particularly hard for firms like Nike because companies in retail industry need many variations of individual products, colours and sizes are one example.184

Nike worked with several software vendors including Manugistics, SAP and I2 Technologies to run the SCM software. During the 90’s the footwear companies had a rough time but were expected to do well in the year 2001.185 Therefore it came as a shock to the stakeholders in February 2000 that Nike’s earnings would miss the third quarter’s expectations. According to Nike, the software left them with more stock than needed in slower selling shoes and shortages in the more highly demanded models.186 Nike blamed, in some part, the installation of the i2 software produced by i2 Technologies.

It started with a software problem closely tied to a core business process, in this case, factory orders, then the disruption sends a ripple through product delivery that grows into a wave finally hitting the balance sheet. The wave is big enough that the company must reveal the losses at a quarterly conference call with analysts or risk the anger of the stakeholders. And that’s when it hits the pages of The Wall Street Journal, inspiring articles and white papers.187

Unfortunately, Nike didn’t apply patience to the implementation of the first part of its supply chain strategy: i2’s demand and supply planner software applications. Rather than wait to install i2 as part of its other project, Nike decided to install i2 beginning in 1999, while it was still using its legacy systems.188

182 www.bbc.com
183 www.cio.com
185 www.cio.com
186 Bousquin, J., (2001)
187 www.cio.com
188 Ibid.
The i2 software needed to be so heavily customized to operate with Nike’s legacy systems that it took as much as a minute for a single entry to be recorded by the software. And, overwhelmed by the tens of millions of product numbers Nike used, the system frequently crashed. But these problems would have remained only disruptions had they not spilled over into factory orders. The system ignored some orders and duplicated others. The demand planner also deleted ordering data six to eight weeks after it was entered, making it impossible for planners to recall what they had asked each factory to produce. Soon, way too many orders for Air Garnets were going over the wires to Asian factories while calls for Air Jordans were lost or deleted.

The impact on the share value for Nike can be seen in the figure 23 and 24. Nike did not clarify how much the slow-moving economy of US was affecting the share value and how much was due to the implementation of i2. Even so the shareholders of i2 Technologies chose to focus on the supply chain disruption and sold their shares in the software company. This resulted in a drop, for the i2 Technologies, in the stock price, in a single day, from $35.50 to $27.56 in other word a drop of 22 percent.¹⁸⁹ This is shown in figure 25. Nike had a similar drop, which can be seen in the graph below (figure 23); of approximately 28 percent.

The value of a business continuity management plan from a shareholders perspective

Figure 24: Nike (dollar) 190

Figure 25: i2 Technologies, share value 191

190 www.nasdaq.com
191 Ibid.
8.1.4 Waiting for PlayStation 3

The launch window for the PlayStation 3 is of key importance to Sony and industry publishers, since the PlayStation 3 is the inheritor to the industry's best selling console, PlayStation 2 with a commanding 70 percent share of household gaming machines.192

![PlayStation 3](image)

Figure 26: PlayStation 3

The original launch for the console was scheduled in March 2006 but Sony was forced to postpone, because of problems with the Blu-ray disc copy protection technology.194 The problem is with the mass producing of the key component in the Blu-ray disc laser part of the machine.

Sony and Nichia Corp. agreed to cross license blue laser technologies in April 2004. Sony has been readying its production system for blue lasers at its Shiraishi factory. PlayStation 3 is for now the only application requiring large numbers of blue lasers, hence leaving Sony without an alternative supplier.195

The console was released in US and Japan in November but in September the announcement was made that the European launch was postponed until March 2007. Production problems meant that fewer machines than anticipated would be available for the launch in Japan and the US.196 In the U.S., about 400,000 PlayStation 3 machines were available when they went on sale Nov. 17 and 100,000 available on the Nov. 11 Japan launch date. Although Sony had initially counted on shipping 4 million PlayStation 3 machines worldwide by the end of the year, they could only manage 2 million.197

This also means that Microsoft's Xbox 360, which was launched the years before, would enjoy another Christmas without facing a challenge from Sony in Europe. Also the Nintendo's Wii console, which was release autumn 2006, has a major opportunity to establish a stronger position on the market. Only a few months later the Nintendo consoles were sold out and the company had problems with supply, since a demand like this was not anticipated.198

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192 money.cnn.com
193 www.wikipedia.com
194 news.bbc.co.uk
195 www.eetimes.com
196 money.cnn.com
197 www.iht.com
198 news.com.com
What Sony did was to make sure that the launch of the PlayStation 3 was bigger and better than the previous consoles and started before the release to introduce UK retailers to the new games console. Some were hoping to begin taking pre-orders for the console.199

What is seen in figure 27 is that during the first announcement of delay the share dropped approximately 5 percent and the second delay in September the drop was just about 3 percent.

### 8.2 Social

A social risk could be the loss of key personnel or loss of image towards the stakeholders. In this subchapter the risk of a strike is being presented in the West Coast lockout and the strike at General Motor and how this affected the connecting companies.

#### 8.2.1 The effect of the strike at General Motors

In the summer of 1998, two strikes at General Motors parts plants led to shutdowns of over 100 other parts plants, which caused closures of 26 assembly plants, finally resulting in vacant dealer lots for months.200 The strike started just as the big summer sale season and the dealers were affected by the slowed shipment of new cars. More than 100,000 UAW workers from 23 factories participated in the strike.201 The shutdowns reportedly cost General Motor some $500 million a week. The battle virtually shut down General Motor's North American production and cost the Number one automaker $2.2 billion.202

In any automotive strike, seat makers are nearly always the first suppliers forced to shut down. That is because suppliers typically ship their seats several times a day, on a just-in-time basis. In this case, Lear Corp and Johnson Controls got hit by the strike; hence General motor being their main customer resulted in the companies could not distribute their products.

199 news.bbc.co.uk
201 www.pbs.org
202 www.cnn.com
Lear Corp., a supplier of automotive interior systems based on net sales, does 27 percent of its business with General Motor, is no exception. The Southfield, Mich., supplier had to close three of its automotive interiors plants. When looking at the share value of Lear it is a dip in value during the strike in 1998.\footnote{Sherefkin, R., Sedgwick, D., (1998)}

As can be seen in the share value of Lear Corp, the big drop in the summer of 1998 is approximately 34 percent. Another drop is followed afterwards but the reason for this decline acquires further investigation, if it in fact is also a result of the strike.

Meanwhile, Johnson Controls Inc. inactivated two seat plants in Indiana and New Jersey, plus a components plant in Tennessee. Johnson Controls, whose automotive group is based in Plymouth, Mich., obtained 11 percent of its revenue from General Motor last year, according to the company's financial report.\footnote{Ibid.} Also in this company’s share graph there is a distinguished dip during the summer of 1998.

\footnotesize{Figure 28: Lear corp., share value}
Johnson Controls were also affected by strike, with an affect on the share value. The drop here is not as high as Lear Corp but does still measure around 20 percent.

Not just the distributor of General Motor got affected by the strike; Jack Hanna owns a small restaurant across from a GM plant in Arlington, Texas, forced to shut down during the strike. "I’m just waiting for them to come back. It’s about 45 percent of our business, so we cut down our sales, our employees. We’ve cut back a lot."%205

8.2.2 West Coast Lockout

In 2001, ports on the U.S. West Coast handled around 253 million tons of cargo. This cargo has enormous trade significance, imports and exports constitute some 183 million tons of cargo. The traded cargo was worth just over 300 billion dollars, or 42 percent of all U.S. waterborne trade and more than half of all containerized cargo moving in and out of the country.%206 The economic importance of these facilities, particularly to the export-oriented economies of East Asia, is undeniable.

All 29 US West coast ports closed September 29, locked down by Pacific Maritime Association (PMA), the port operators association, in response to a slow down by members of the International Longshore and Warehouse Union (ILWU).%207

The lockout of 10,500 members of the International Longshore and Warehouse Union basically blocked U.S.-Asian trade from Sept. 27 and caused an estimated $2 billion in damage a day to the U.S. economy.%208

%205 www.cnn.com
%207 dbacon.igc.org
%208 Ibid.
The lockout left millions of dollars in cargo sitting on docks up and down the west coast, or on ships at anchor in the harbour. Retailers, manufacturers, agricultural and other food producers have been particularly affected by the shutdown. The lockout came during the peak season for shipping consumer goods for the holiday shopping season. It also disrupted the flow of parts needed for assembly lines. Millions of dollars of fruits and vegetables were rotting while waiting to be shipped. The work stoppage also disrupted freight transportation systems across the world, as about 200 ships remained anchored off the coast waiting to load or unload cargo. This resulted in problems for truckers and railroads across North America.

The port shutdown occurred in a critical month, October, when imports are generally at their highest as American retailers rush to obtain deliveries for the important Christmas sales season. The October-December period normally accounts for 40 percent of retailers' annual sales.

Even when the ports were reopening there would be a long time until the goods would be flowing frictionless through. The time to get the goods of the affected ships and handling the new arrivals would take over six weeks and this would be with the highest speed of the workers, which is probably not possible after a disruption like this.

A company badly affected by the port lock out was, the banana and other fresh fruit company, Dole. At this moment the company was not listed and therefore no graphs can be shown. The predicament the company was faced with is a good example in this thesis.

As a result of the port closures, Dole has had to divert loaded vessels bound for Los Angeles to alternative ports in Mexico. The diversion of its ships resulted in increased shipping, transportation and labour costs, supply chain disruptions and, in some instances, the inability of Dole to supply its products to customers throughout North America. In addition, multiple containers of California-grown fresh vegetables never reached Dole's overseas customers.

In an effort to minimize the economic impact to Dole and its customers of the West Coast labour dispute, on Thursday, October 3, 2002, Dole filed a complaint in Federal District Court in Los Angeles seeking the release of cargo and equipment detained at the Los Angeles port.

209 dbacon.igc.org
210 Ibid.
211 Ibid.
212 Ibid.
213 havenworks.com
214 Ibid.
since the lockout. Dole estimated in court filings that approximately 12.4 million Euros of bananas and other fresh products were at risk of spoilage at the Los Angeles port due to the labour dispute. In addition, fresh fruit and vegetables throughout Dole's supply chain may be lost due to ongoing disruptions. This afternoon the Federal District Court denied Dole's motion for immediate injunctive relief.  

October 8th, Dole had identified 1.8 million dollar in estimated losses due to spoilage, increased shipping and transportation costs and lost sales. These losses are expected to continue at these rates until the West Coast ports are fully operational.

8.3 Natural/ Hazard
Natural disasters of various kinds affect all the parts of the world. It can be in form of hurricanes, earthquakes, floods or pandemics. Even though statistics are often made in the different areas, natural disasters are often hard to predict.

8.3.1 Foot and mouth disease closes boarders in UK
In late spring and summer of 2001, foot-and-mouth led to the slaughter of more than six million animals and is estimated to have cost the UK as much as £4bn. Although the disease did not taint the meat, consumers in many regions avoided beef nonetheless. MacDonald’s saw a year over year $300 million decline in European and Asian sales in the first quarter of 2001.

British leather production dropped by 50 percent as million of potential infected cattle were slaughtered. This disrupted the material flow of leather to the supplier of leather to the manufacturer such as Nike, Louis Vuitton and, Jaguar and other car manufacturers (car seats). Hence the manufacturer had to look to alternative supply of leather. The loss of many customers has resulted in the U.K. leather producers never recovering.

Pittards plc produces technically advanced leather for many of the world's leading brands of gloves, shoes, luxury leather goods and sports equipment. They are suppliers to for example Louis Vuitton and the outbreak of the foot- and-mouth disease affected them noticeable. The

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215 www.dole.com  
216 www.bbc.com  
217 Sheffi, Y., (2005)  
218 www.wikipedia.com  
219 Sheffi, (2005)
company, which usually takes half its cattle and sheep hides from British sources had to look overseas to supply customers. The company had to get suppliers from Asia and this was increasing the costs. Also some of the previous suppliers could not fulfil the agreement and Pittards had to take these costs too.\textsuperscript{220}

Robert Tomkinson, Chairman of Pittards, commented:\textsuperscript{221}

"2001 was one of the most challenging years your Company has faced in its 175 year history. In the first eight months of the year the challenge was to maintain our service to our customers when supplies of hides and skins were severely disrupted by BSE in Europe and foot and mouth disease (FMD) in the UK. In the last third of the year, the challenge was to manage our production capacity and costs following the sharp drop in demand in the aftermath of the September 11 terrorist attacks in the United States."

One of the buyers, Luis Vuitton, who is owned by the company LVMH, saw a drop in the share value after the outbreak of the Foot and Mouth disease and this can be seen in the graph below in figure 32. From the march, when the outbreak started to the end of the year the drop in share value was approximately 46 percent.

![Figure 32: LVMH, share value](http://us.finance.yahoo.com)

Also effected by the lack of skin, was Ford Motor. They could not produce their cars due to the lack of skin for the car seats. They saw a drop in its share value, around 50 percent (see figure 33). It can be discussed if it is solely the FMD that results in the share value drop of these two big companies but this massive deceede had probably a contributing factor

\textsuperscript{220}www2.hemscott.com
\textsuperscript{221}Ibid.
8.3.2 Hurricane Katrina hits the Gulf Coast

The devastation that the hurricane Katrina, in the end of August 2005 caused, when it hit the Gulf Coast can still be seen two years later when families, communities and companies try to recover. Some companies did not survive while others came out even stronger after the hurricane. Experts say that it is due to the Business Continuity plans and recovery plans that the companies had.\footnote{Britt, P., (2005)}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{hurricane_katrina.jpg}
\caption{Figure 34: Hurricane Katrina\footnote{www.wikipedia.com}}
\end{figure}

Hurricanes are a semi-frequent occurrence in the Gulf States. Therefore companies can learn from earlier disruptions caused by a hurricane and get better prepared for the next one. One company that was well prepared for Katrina was Wal-Mart. Wal-Mart learned from earlier
The value of a business continuity management plan from a shareholders perspective

hurricanes that they needed better visibility on the condition of the stores and the whereabouts of their employees. It needed to become better prepared to track lost power, network coverage and cellular phone communications after a disaster.224

For example, using a strategy of supply chain resilience, Wal-Mart was able to bring 70 percent of its stores in the Katrina-affected area back in operation within 48 hours of the disaster.225 They had also located 97 percent of the employees displayed but the hurricane and offered them job in alternative stores.226 This impressive agility was not a result of prescience in anticipating a Category 5 hurricane, but because supply chain resilience is core to its business model.

By the time Katrina appeared on the horizon, Wal-Mart had an operations centre and crisis management team in place, ready to make decisions about prioritising activities and resources. The operations centre has a dashboard system which shows at a glance the status of each store in terms of damage, employees injured or at risk, whether communications platforms are running, whether they are running on landlines, satellite systems, and if a store is on mains power or generators.

Before Katrina made landfall, 45 trucks loaded with relief supplies were prepared and ready to roll at the company’s huge distribution centre at Brookhaven, Mississippi. Amongst them were truckloads of water and ice, which were sent with police escorts to New Orleans. Wal-Mart knew from sales data captured in the aftermath of earlier hurricanes which lines surge immediately after a natural disaster. They have noticed that customers stock up on bottled water, flashlights, generators and tarps. Afterwards they buy chainsaws and mops. But there has been surprises too, customers also loads up on strawberry poptarts, probably because they preserve well.227

In total, the company donated $20 million to disaster relief in the Southern states and dispatched 100 truckloads of free merchandise (clothing, nappies, baby wipes, toothbrushes, toilet rolls etc) and food for 100,000 meals. 150 internet ready computers were also dispatched to refugee centres. Meanwhile the company had set up emergency lines for employees to call in and which could also connect them to family members. In the event the call centre was quickly overloaded with 2,500 calls per day, so a second call centre had to be established, followed by a website where messages could be posted, firstly for Wal-Mart families, but this was then opened up to the wider public. It received 40,000 messages and 2 million hits. The company also despatched staff to emergency reception centres to look for Wal-Mart employees.228

Katrina closed 126 Wal-Mart stores, and some were looted in New Orleans. Around 20 remained closed almost a year later, but the company promised jobs for all its employees somewhere within the network. In the short term it set up mobile mini-stores, including mobile pharmacies, to support communities along the Gulf Coast. It had learned from previous experience that the pharmacy system is crucial during an emergency to fill prescriptions for people displaced by the storm. The mobile pharmacies were connected via

224 www.continuityforum.org
225 www.compete-resilience.org
228 www.continuityforum.org
ICT links to a group of pharmacists at Wal-Mart’s Head Quarters in Bentonville Arkansas, who worked to prepare prescriptions because the demand at the mobile sites was so high. In response to enquiries for this study a spokesman for Wal-Mart emphasised that despite the planning, new lessons were learned from Katrina. He stressed that “although it goes against the grain to admit it, the biggest learning that came out of Katrina for them was local empowerment”. A central operations centre was essential to co-ordinate requests from stores affected, but this soon became filled because of the scale of the disaster. At that stage a strong message went out from Wal-Mart’s CEO to managers on the ground to "do whatever you have to do". This empowered the local store managers to do whatever they needed to do locally (giving away food, water, clothing etc). This could be quickly backed up centrally by sending through the right products to the affected areas.229

Local officials, such as Philip Capitano, mayor of Kenner, say Wal Mart’s trucks rolled into his city with supplies several days before the Red Cross and FEMA. “The only lifeline in Kenner was the Wal Marts stores.”

Even though the company had high costs resulted to the aid they provided to the people hit by the hurricane the company gained from the situation. Wal Mart has in prior days had problem with increasing the company’s image, classified among other things of being a wrecker of small-town-shops, this changes after Katrina.230 From the end of August when the hurricane hit the Gulf Coast and in the following two months the share rate of the company increased with 19 percent.

![Figure 35: Wal Mart, share value](http://www.continuityforum.org)

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229 www.continuityforum.org
230 www.cnnmoney.com
8.3.3 Kobe earthquake shakes Toyota

Another natural disaster that affected a big company was the Kobe earthquake in January 1995. Kobe Earthquake, measuring 7 on the Richter scale, killed nearly 6,000 people, injured over 16,000 and destroyed over 55,000 buildings in the city. The damage from the earthquake disrupted major transportation routes and facilities, destroyed a majority of the port operations and stopped a majority of business operations for many weeks. The earthquake is now known as The Great Hanshin Earthquake.

When Sumitomo's metal manufacturing plant in Kobe closed due to loss of water and gas, most Toyota Motor plants (located in other parts of Japan) had to close as well. Toyota relied almost exclusively on Sumitomo for brake shoes. The Just-In-Time inventory management system meant that Toyota (and others) held little inventory and relied on frequent shipments of parts. Toyota's vulnerability to a supply cutoff -- operating with only minimal inventories of parts -- caused the company to halt production at most of its plants in Japan. Toyota lost production of 20,000 cars, costing it an estimated $200 million in revenue.232

As can be seen in the share value graph in the following picture there is a drop in Toyotas shares by approximately 20 percent in the beginning of year 1995.

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231 www.disaster-resource.com
232 www.industryweek.com
8.3.4 Gudrun storm paralyses southern Sweden

Sweden is not spared from natural disasters. Gudrun was a powerful storm which hit Denmark and Sweden on 8 January 2005. The storm also goes under the name Erwin that was chosen by the German Weather Service, while the storm was named Gudrun by the Norwegian Meteorological Institute. Sustained wind speeds of 126 km/h (35 m/s) with wind gusts of 165 km/h were measured in Hansholm, Denmark - the same strength as a Category 1 hurricane. At least 17 people died in the storm.233

A company, which image got badly damaged during the after match of the storm was Sydkraft, today E.ON. Even though the technical part of the plan worked out as planned the media handling did not. The company’s image got badly hit in the media and by the people. Sydkraft was not listed at the time and no share value dip can be shown but the case still shows that even if the company is working according to plan in the technical/ operational part, the impact, following a disruption can still be severe.

The storm caused a lot of financial damage in Sweden, where the forest industry suffered greatly from damaged trees, as more than 7,500,000 cubic metres of trees were blown down in southern Sweden. This was a huge blow to the lumber industry and the government had to pay out enormous insurance money to the victims. About 341,000 homes lost power in Sweden and several thousands of these were out of power for many days and even weeks in some cases, as about 10,000 homes were still without power after three weeks.

The crisis plan was set into action on Friday the 6th when there were indications that bad weather was heading towards Sweden. Sunday the 8th a crisis group met, where everyone had a special role and a log book was used to write down all the events and actions. Twice a day prognoses was set and information went out to the company and media. This had a consequence that sometimes a bit too much information was circulating and it was hard to sort out the most important ones.

No one was prepared for the Gudrun storm, the ordinary crisis plan was not sufficient for the pressure the organisation was exposed of. Sydkraft called in people from Norway, Finland, Polen, Germany and England to help with the restoration of the grid. In all, 2700 extra

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233 www.wikipedia.com
234 www.eon.com
personal was set in. The use of different nationalities off course caused problem together with
the inability to reach the customers neither by phone, TV, Internet or post.235

After the storm the Swedish Rescue Service needed a couple of hundred electricity boards to
be able to handle the electricity and heating support in the affected areas. The department
went out with a request from European Union. 24 Hours later several countries has offered
help. Sweden chose to accept help from Germany and Czech Republic.236

But the awaited help was about to be held up in the giving countries. Neither the Rescue
Service nor the different municipalities had the funds for the transports and according to the
EU rules the receiving country pays for the transport.

“By the time we asked for help, we had no routines in place to handle this kind of situation in
a fast and efficient way. One of the issues was who would pay. This could seem trivial at a
moment like this but these kinds of questions needs to be handled before a catastrope occurs
and in this case it hadn’t”, says Kjell Larsson, chef for International department, Rescue
department. Kjell also believe that there is a certain unwillingness to accept help from other
countries.237

The only way to get the economical help from Germany and Czech was to lend money from
someone else. The privately owned electrical company, Sydkraft, today E.ON, helped with
paying cost of the transport. After this, the Rescue service has in charge to investigate how
Sweden can be better in accepting international help. 238

So why did Sydkraft get the bad publicity that they got? It was often that newspapers or
customers were blaming Sydkraft for the situation they were in. According to Bengt
Svensson, Chief Risk officer, the Media handling was not efficient at the Gudrun storm. The
Technical part of the crisis plan worked considered the size of the crisis, but the handling of
Media was not proficient. During the storm the personnel from E.ON, placed at the different
municipalities, were in charge of the media handling, even without sufficient training. This
resulted in too much information and sometimes inaccurate information being handed to the
Media.239

The bad publicity was also a result of people and Media not knowing who was responsible of
what. The Gudrun storm had a wind speed over 28 m/s and therefore considered a force
majeure. In events like this municipalities is considered responsible for the people in the area.
This was not clear at the time Gudrun occurred and Sydkraft was blamed for the people being
trapped and without electricity. The responsibility Sydkraft had was to get the electricity out
to the client but no need to provide with extra power unit, blankets or extra shelter. Even so,
Sydkraft applied many people with extra help, according to Bengt Svensson. “In a situation
like this, you help each other, even the different competing companies cooperated”.240

236 www.dn.se
237 Ibid.
238 Ibid.
240 Ibid.
After the storm Sydkraft evaluated their media handling and wrote down guidelines and restrictions in the process. Also the municipalities were informed of their responsibilities in case of a force majeure. The result of these changes was shown in the storm Per, that occurred the following year.\textsuperscript{241}

A year after the Gudrun storm there was another storm called Per. This storm was not as strong as Gudrun but still caused a lot of damage in middle Sweden. This time E:ON who had bought Sydkraft was prepared. The communication between the different municipalities and the Rescue department were improved and there were clear areas of reasonability’s.

The most important factors for E:ON is the ability to provide electricity and at a low price and with high certainty. Another thing that they strive for is being environmental friendly. As it is now the private customers get their electricity through water power and the companies get it thru nuclear. By trying to be as environmental as possible the branding of the company might strengthen.

E.ON does not have a clear supply chain. The electricity is bought on an exchange trade between the different suppliers and thereafter distributed to the customers. Therefore a disruption at one place, result in E:ON buying electricity from another supplier.

Today E.ON considers their largest risks to be natural hazards and terrorist attacks. When it comes to the terrorist attack the company protects itself by higher the ability to access the areas. By trying to put the wiring under ground and replace the skylines the risks of trees falling on the lines are reduced. As Bengt Svensson mentioned, the natural hazards have been there before but with global warming there is no longer any frost in the ground to keep trees standing and therefore the outcome is more severe.\textsuperscript{242}

\section*{8.4 Legal/ Political.}

So what if there is a crisis that can not be predicted by weather channels or statistics. What if the disruption is caused by people that the company is doing wrong because of different belief or politics? How should businesses respond to boycotts? The lessons of the past 20 years suggest that companies can no longer view themselves as detached from political events. For years companies have tried to ignore Peter Drucker's assertion, made more than half a century ago, that business enterprise had become the "constitutive institution of industrial society". Today there is growing evidence that business and society have merged to the extent that political and cultural studies should be as much a part of the corporate learning curve as SCM.\textsuperscript{243}

\subsection*{8.4.1 Mohammed pictures affects Arla}

So what if the disruption is out of you control? What if the company loses millions of dollars because of a political event that you can not control? That is what happened to Arla Food, Danish- Swedish dairy products producer. They lost over a $1.35 million each day when loosing a $450 million export market in the Middle East in January 2006 due to the tumult caused by cartoon caricatures of the Prophet Mohammed.

\begin{flushleft}
\textsuperscript{241} Svensson, B., (2007-05-24) \\
\textsuperscript{242} Ibid. \\
\textsuperscript{243} Donkin, R., (2006)
\end{flushleft}
The value of a business continuity management plan from a shareholders perspective

Arla's initial response was to lay off 100 workers and place advertisements in Arab newspapers attempting to disassociate the company from the actions that had sparked the protests, but with no result. A market that had taken 40 years to build had been all but destroyed within five days.244

The 12 cartoons appeared originally in the Danish newspaper Jyllands-Posten already in September, but it was in January when Norway and other European countries started publishing the cartoons that the boycott grew to a riot in the Islamic world. Jyllands-Posten apologised for any offence caused, but refused to apologise for publishing the cartoons, citing its right to freedom of expression. Violent protests resulted in attacks on Danish embassies and the clearing of Danish products from supermarket shelves. Shoppers not only approved, they policed supermarket shelves and demanded the removal of Danish goods. The Saudi Arabian boycott particular hit Danish business hard with threatening 2 billion US$ worth of export. In Egypt the big supermarkets stopped selling Danish products. Mobile phone messages were passed around the Islamic countries such as Saudi Arabia, Kuwait, Qatar, Bahrain and the United Arab Emirates, all the way to Indonesia, encouraging people not to buy Norwegian or Danish products. Also French and Swiss stores started to stop selling Danish products in these countries, and also publishing the statements to counter rumours that their products were Danish.

Since then, the Muslim world has taken the extraordinary step of boycotting almost all Danish industries, including investment, consultancies, service contracts, exports, transportation facilities and local production.

Product boycotts are not new, but in this case it was organised, widespread, politicised and quite devastating in its impact. Anti-Nordic reaction swept through Islamic countries, sucking away trade in the downdraft.

There are no tried and tested damage limitation strategies because the campaign is extraordinary. Marianne Castenskiold, spokeswoman for the Confederation of Danish Industries, says: "The situation is extremely difficult because so many countries are involved in the boycott. In Iran, for example, the president has severed all trade links with Denmark, while in Saudi Arabia companies have mounted the attack. And because it's so widespread, we don't know the full extent of what's happened."

Arla has appealed to Muslim countries to reconsider the boycott through full-page advertisements in Arab daily newspapers. The Danish government has refused to apologise on behalf of the newspaper, despite pleas from chief executives of Danish companies. On February 3rd, the company said that sales in the Middle East had stopped completely, costing the company two million US$ a day. Soon after the boycott began to affect Arla's sales, the Danish government met with Muslim ambassadors and the newspaper and the government issued apologetic statements. Unfortunately, by this stage, the issue had gone out of control.

The full extent of the impact on the Danish economy is unknown, but Dankse Bank estimates Danish goods worth Dkr10 billion ($1.6 billion) annually are threatened in 20 Muslim countries.

244 Di.se
In April 2006, the company said that its products are being placed back into stores in the Middle East. Before the boycott, it supplied 50,000 stores in the area. It has announced that many of its largest clients in Saudi Arabia will start selling its butter and cheese on April 8. Arla has started sponsoring humanitarian causes in the Middle East in order to win back trust from consumers.245

A year after the cartoons was first published in the newspaper; Arla has gained 35 percent of its sales in the Middle East. The goal is so reach the same numbers as before the event. Experts believe that this is not possible since competitors now has had a chance to grow in this region and are stronger than before.246

Arla went from being the largest supplier in the region to not selling a single product and the recovery are going slow. Barry Wilson, a leading expert in the dairy branch, means that it is impossible to reach the 50 percent recovery before the year end, which now is the first goal for Arla. One of the reasons for his doubt is the competition that has now been able to fill the empty shelves where Arla originally ruled. American Kraft Food was one of the competitor that was quick to claim the costumers by flying in good to the countries where Danish products were boycotted.247

Finn Hansen, Arlas CEO in Middle East, believes that Arla will never gain the strong, leading, position that they had before the Mohammed incident but hope to be able to grow towards what they had before the boycott.248

In the share value graph shown below there is a strong decline when the boycott started in January. From January to April, when the products were put back on the shelves, there is a drop of totally 32.9 percent. There are also signs of a drop when the pictures were initially published. If this is just a coincident of if the stakeholders started to react this early is unclear. The drop in September to October was 13 percent.

![Figure 38: Arla Share value](image)

245 www.wikipedia.com
246 Di.se
247 Ibid.
248 Ibid.
8.5 Terrorism
A new categorisation, to the four prior mentioned, is Terrorism. Acts of terrorism is getting more common and more discussed in the world and companies are getting more aware of the risks associated with this.

8.6 9/11 attack
One of the most known terrorist attacks in the modern days is the attack on the World Trade Centre. On Tuesday morning of September 11, 2001, nineteen terrorists allied with al-Qaeda hijacked four commercial passenger jet airliners. Two of the planes were crashed into each of the twin towers, the third plain was crashed in the Pentagon, and the fourth in rural Somerset County, Pennsylvania. In addition to the 19 hijackers, 2,973 people died, another 24 are missing and presumed dead. The victims were predominantly civilians.

![Figure 39: The attack on WTC](image)

During the 9/11 attack towards the World Trade Centre the Ford factory had to temporary halt several of their assembly lines from time to time as trucks loaded with components were delayed at the Canadian and the Mexican border due to the closure that the government had ordered right after the event.

In addition to the terrible loss of life and property destruction, the Sept. 11 terrorist attacks wreaked chaos with the nation's supply chains. Authorities responded to the emergency by implementing a broad array of security measures that grounded air cargo planes, prevented ships from docking at seaports, and stalled trucks at border crossings. Retailers couldn't get needed merchandise, and manufacturers suffered parts shortages. No one has measured the attacks' increasing financial impact on supply chains, but the cost will certainly be measured in the millions.

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249 [www.lse.co.uk](http://www.lse.co.uk)
250 [www.wikipedia.com](http://www.wikipedia.com)
251 [Ibid.](#)
252 Sheffi, Y. (2001)
253 Mello, A., (2001)
Toyota nearly closed stopped its production at its Sequoia SUV plant in Indiana due to a supplier was waiting for steering sensors shipped by airplane from Germany, but the air traffic was closed down.\footnote{Sheffi, Y. (2001)}

Parts shortages caused Ford to shut production lines and temporarily shut down five North American assembly plants Monday after the attack because of the parts shortages as trucks loaded with components were delayed at the Canadian and Mexican borders as a result of the closure made by the government.\footnote{www.bbc.com} Ford and other manufacturers were vulnerable to transportation disruptions because they operate a “Just-in-Time” (JIT) strategy, keeping material on hand for only a few days and sometimes only a few hours of operation.\footnote{Sheffi, Y. (2001)} According to Hedberg at Cardo and Björkmarker at Finnveden, there is still a growing trend, not solely in the car industry to strive for JIT- and Lean- thinking in Sweden. A contributing factor to the growing trend is the pressure for low prices from the customer due to the fierce competition within production industries. Also, to achieve a working JIT policy; the personnel needs to be flexible.\footnote{Svensson, B., (2007-05-24), Björkmarker K., (2007-05-28), Hedberg, M., (2007-05-29)}

These disruptions were not caused by the attack itself, but rather by the government’s response to the attack: closing borders, shutting down air traffic, and evacuating buildings throughout the country.

Ford is not abandoning its JIT system, on which it has spent millions of dollars, but will begin stockpiling engines and other key parts at some U.S. plant locations to prepare for future transportation disruptions.\footnote{Keenan, G., (2001)}

When looking at the graphs for the different companies that were affected by the attacks on World Trade Centre 2001 fact that the whole country’s stock market was altered has to be taken in to consideration. The different graphs shows decrease in value but how much is from the attack and how much is because of the disruption is hard to tell.

The effect of the World Trade Centre attack can be seen in the drop of 56 percent in Fords share value. What needs to investigate further is the connection with the share value drop in the country.

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\end{flushleft}
Honda of Canada Manufacturing Inc. had to cancel the second shifts at its two assembly plants in Alliston, Ont. The production at the plants is to assemble minivans, sport utility vehicles and compact cars. The Canadian manufacturer, which ships about 60 per cent of its Odyssey minivans, Acura MDX sport utility vehicles and Civic compacts by truck, had at one point 22 trucks carrying its vehicles stuck on Highway 401 near Windsor.\textsuperscript{259}

Also this manufacturer was affected badly by the attack and this resulted in a drop of 42 percent as shown in figure 42.

\textsuperscript{259} www.theglobeandmail.com
By September 13, Daimler-Chrysler announced they would have to close an assembling plant on the following day because their supplies were stuck on the north side of the border. They had also reported parts shortages and production by General Motors and Honda has been scaled back in Canada. The problem, that many other companies experienced also, laid in getting the components and parts over the Canadian and Mexican borders. The delay for the trucks at the boarders were 12-15 hours which might seem short but due to the JIT strategy this resulted in working half shift in some factories while closing other.260

The affect from the disruption in the supply chain resulted in a drop of 19 percent. What is different with this manufacturing company is that they quickly rise in their share value again.

260 www.bbc.com
So why does Daimler Chrysler recover quite quickly compared to the other companies described in this case? A further investigation is needed to get the exact reason and the need to compare with other companies and the market value of the country is needed.

58 percent of business suffered from disruption following the attack, with some 12 percent saying that their organisation had been severely disrupted. Management which demonstrated strength and leadership under such trying circumstances won the confidence of investors and generated value for shareholders.  

As a result of the collapsed towers, the damaged nearby buildings and the closure of American borders several companies were affected. After the 9/11 attack you could see a pike in recovery planning according to Tom Sobocinski, a federal account executive at SunGuard Recovery Service. Mats Hedberg, Cardo, could also tell a significant change in the growing of Risk Management after 9/11. Even in Sweden, the subject was brought up as top priority.

In Sweden, the risks of terrorism are not considered high. Companies interviewed mention extremist groups but does not seem worried. According to Bengt Svensson, E.on, “the way to protect the company is to invest in safety measures such as cameras and restricted access”.

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261 Chartered Management Institute (CMI), (2002)
262 Dean, j., (2001)
263 Mats Hedberg, (2007-05-28)
9 Analysis

In this chapter an analysis is made based on the information presented in the previous chapters. The chapter is divided into Risks, Supply Chain Management, Business Continuity Management, and Shareholder Value. In appendix 12.1 an analysis overview is being presented that has been used as a frame for this chapter.

9.1 Risks

Risks are everywhere, in every additional part in the supply chain, every partner and every measure taken to reduce cost and slimming of the processes. The goal for the company should be to find them, before they hit the company and result in disruptions. The companies who are seeking the risks and manage them have a bigger chance of surviving a crisis. Risks assessments in the company is relevant due to the lower buffers which result in higher probability and higher impact, such as financial or other damage, in case of a disruption.

When treating the risks it is also important not to treat them as silos. One risk at one side of the supply chain can trigger another and result in a ripple throughout the chain. Since the risks are often connected throughout the chain; mitigation one risk can aggravate another.

Two dramatically different outcomes from one event, in the Philips fire case, demonstrate the importance of proactively managing supply chain risks. A disruption could have a catastrophically or successful outcomes depending on the reaction from the company.

When comparing the risks in the cases researched, there is a majority in disruptions due to a technical, operational or hazard risk. Often, the companies are hit with technical failure or fire; this is also according to the interviews, the most feared risk in Sweden. That these risks are more looked into when it comes to Swedish companies might be a consequence of the rarity in terrorist attacks and hazards, even though Swedish companies have become more aware of these risks since the Gudrun storm.

The fact that there is a majority in technical/operational risks might come as a result of products getting more complex in its design and containing numerous parts. Another fact is the machines being pushed to the limit, to produce maximum quantity in the shortest amount of working hours, as a result there us a higher risk of machines breaking down.

The fact that the products are containing more parts leads to a more complex supply chain and increased risks. In a large supply chain, many parts might be outsourced to other countries where higher hazard risks or political risks exist. The increasing amounts of earthquakes and floods affecting the companies might be as a result of the companies spreading their processes over the globe or global warming.

The third most common risk is the social risks. There are, in this study, two events of a supply chain hit by type of this risk and in both cases the disruption is due to a strike. Personnel are today more aware of their right and with the help of unions the effect of a conflict between the personnel, the union and the company might have large consequences. Therefore, it is of big importance that the company has a close relationship with the workers and having regular check-ups to make sure there is no discontent.
A company that got affected by discontent, but from the customers, was Arla in the case of the Mohammed pictures. Legal risk is just being presented in this case but it describes how a company can be hit hard by an event they were not able to control. I do believe this will be a growing risk due to the cultural differences in the world plus the companies spreading their processes in form of outsourcing. Cultural differences also increase the risk of a terrorist attack, which today is not as common as it might develop differently in the future. It is here important for the company to understand the culture that they outsource to, and have spokesmen (preferable with the knowledge of the other culture/country) ready in case of a dispute.

Risks are everywhere and are growing in likelihood and impact. Technical/operational risks are being joined by new type of hazards-, legal-, social risks and way to attack a company at the weakest point.

9.2 Supply Chain Management

How many times have you stood in front of an ATM, displaying signs of impatience because it takes almost ten whole seconds to receive your money? We are in a society where we are used to get what we want fast and in a convenient way. Companies have problems planning their supply after the fast changing demand together with watching the fierce competition and product variety. The company that is quickest in predicting the demand of the customers, and getting the products on the shelf first, is often gaining in market share.

The customer does not only have the short timeframe as a demand, the technology is also getting more and more complex. The need for getting the latest innovation in technology, results in the supply chains increasing in complexity hence more parts are included in the product. As a result of this there are more links in the chain that can be broken.

Higher customer demand and advanced technology often results in higher costs due to more warehouses for raw material. The companies try to lower these costs by using JIT, Lean production or Built to order thinking. This results in lower buffers and therefore lower costs, as lowering the buffers results in higher risks due to decreased flexibility. Focusing on reducing inventory and excess capacity and on taking up slack in the supply chain has tighten the various links in the supply chain, leaving little room for errors. When doing interviews with different companies I realised that leaving JIT and lean thinking is not an option to the companies since the customers want the products at a low price. My suggestion is instead to find a balance between the slimming of the production and the size of the safety stock.

Some companies have focused on single-sourcing strategies to reduce purchase prices and administrative costs of managing the supplier base, but by this increased the vulnerability of supply chains, since a single supplier may be unable to deliver on time. Some of the companies interviewed use single sourcing but state that they have additional suppliers. What need to be investigated is that the cooperation is sealed by a contract and not just loosely discussed. The company can also convince the supplier to have a BCM plan to insure reduced likelihood and impact in case of a disruption.

The complexity of a supply chain is also increased due to global sourcing; the large number of supply chain partners, the need to coordinate many tiers of supply chains, and long lead times. Globalisation today, companies get more variety in customers, but also fears competition and increased risks. Outsourcing in other countries results in border crossing and other countries
that also increase the risks. With the outsourcing, different rules and cultures need to be taken into consideration when mapping the risks that can threaten the company.

When having a complex supply chain containing many suppliers there is a need of information sharing throughout the organisation. Companies today have a fear of sharing information in case of this ending up in competitors hands. The trust between the supplier, distributor, and the company need to be increased so risks due to lack of knowledge are reduced.

The 12 cases that have been researched in this study can be divided into two groups; the first one is when there has been a disruption in the upstream supply chain and the other group is containing a disruption in the downstream supply chain.

The upstream disruptions can be seen in the cases of Philips, Airbus, Nike, Sony, FMD, Kobe earthquake, The West Coast Lockout, and in the 9/11 attack. (For an overview over the cases see appendix, chapter 12.1)

Most of these disruptions were caused by a disruption at the supplier, as it is often difficult to get clear definition on who is responsible and where the disruption takes place. In the Philips case and the Kobe earthquake disruption is due to a factory being physically destroyed, here by a fire or earthquake. The other main reason of a disruption is the closure of borders, this happened both at the Foot and mouth disease and the attack of the World Trade Center. Due to these events the government closed the boarders and as a result, suppliers could not deliver the parts to the company.

The not so common disruption, in this study, is the software program flaws in the Nike case, and the delay in the Airbus 380, caused by design flaws in the parts, which actually can be discussed whether this is not a supplier disruption. What is certain in this case is the lack of communication between the supplier and EADS which resulted in mismatching design. The fact that there is only one disruption due to IT failure contradicts the fear that companies interviewed have.

The other group of disruptions is the downstream disruptions. The companies that has been hit by this is; Dole due to the west coast lockout, General Motors with a strike, Wal Mart with the Katrina hurricane, Sydkraft by the Gudrun storm, and Arla due to a boycott. What distinguishes Arla from the other cases in this group is that their disruption was caused as a result of lowered demand for their products. Instead did Dole, Lear Corp., Johnson Controls, Wal Mart and Sydkraft have the problem of customer or store being destroyed, out of business or closed, hence they could not deliver.

9.3 Business Continuity Management

In today’s world changing expectations are driving businesses. The hard environment, that has been mentioned earlier in the study, result in the stakeholders being less forgiving in case of a disruption. With the rough competition today the company can not afford to be out of business for a longer period. Regulations, customers, suppliers and shareholders expect companies to be prepared for business interruptions. It is therefore essential that comprehensive continuity plans are in place and fully tested. BCM is an increasing relevant concern for businesses in both the public and the private sector, where operational capacity
The value of a business continuity management plan from a shareholders perspective

and, even so, lives could depend on an organisation’s ability to function efficiently, even in a crisis.

BCM is about identifying what your business criteria, function and outputs are, identifying and assessing the threats to them and finally putting in place measures to eliminate, mitigate or manage threats. It’s about mitigating the risks from supplier to finished products, out to the customer.

Today the use of BCM plans are not common in companies. The BCM strategy started in the IT sector and the spread to other companies have not been noticeable yet. In Asia it is even rarer than in Europe and US. So even if the company itself has a well prepared and implemented BCM plan, the suppliers might not, and this could damage the company in case of a disruption. During interviews in Southern Sweden there is a growing trend and interest in BCM but still it is rare that a company has a well implemented BCM plan.

Main goal for a company, when implementing a BCM plan, might be to lower their insurance premium; this might occur but is not guaranteed. What is certain is achieving a better insight in the organisation and finding the weak links within the supply chain.

Often when new plans or processes are being implemented in a company the lack of initial effort is being made. This results in the plan only being half implemented and therefore not working efficiently. With many new activities, projects or reorganisations it is important to gain an understanding in the company why the changes is made. Secondly, it is vital that the plan is being rehearsed and not ending up in a bookshelf.

A BCM plan can not be implemented in an organisation without the support of senior management. Without the company leaders and the coordination between the divisions to get the same preparedness, probability is lowered to achieve a properly functional plan.

Having in mind when implementing the BCM plan is that “one size fit all” does not work in this case. Different companies have different risk factors and also different needs. The plan should be tailor made for each company. When the company has come up with a plan it is important not to sit back and relax but to test and train it. To have a plan that is not well tested is useless in a crisis situation. What I have noticed are that many companies have the patience to get a plan developed, tested but then do not update the plan which is another reason why a BCM plan might not work properly.

When implementing the BCM plan it is of significance not to focus on just the technology part of the organisation. The people, and the knowledge they possess, is also a source that needs to be backed up. During the Word Trade Centre Attack many companies could restore their files in back up computers but the knowledge of the people lost in the attack was gone.

In general a company’s goal is often to cut costs wherever possible. Many companies use techniques like JIT, BTO or Lean production. As a result of this the buffers are lowered and the risks enhanced. When the goal is set on reducing costs in the company, the units that it often downsized are the units that are not revenue producing areas and support services, hence BCM.
In the companies studied, only one of them has, according to experts, a BCM plan, that is Wal Mart. When looking at the different situations, the other companies have come up with a plan during the disruption or not at all. The companies might be more or less prepared for a crisis, but none of the researched has a fully written down, and implemented, BCM plan.

A company that have turned crisis into a gaining situation, apart from Wal Mart, is Nokia, in the famous Philips fire. The culture in the company could be the reason for the success in such a critical situation. Nokia had a quite aggressive approach when demanding the cooperation with the supplier and finding a solution. A “no” was not accepted and they gave the supplier a short time frame to come up with a solution. The culture in the Nokia organisation seems to be more “proud” then the competitor Ericsson, more aggressive in making certain that the company does not fail. Also Nokia seemed to be more able to change their product, to be more flexible. They could make product design changes, to work with the situation. A third reason for the success could be the distribution of power. In Nokia, the employees are encouraged to take actions in case of an unprepared event.

High resilience in a competitive market offers potential for positive long-term effects, creating market share gains in the face of a disruption. Nokia did just that, gaining the market share that the less resilient competitor, Ericsson, lost. A year after the disruption Nokia was actually higher in the sales value than before.

In Wal Mart’s case the company takes pride and has a determination to be prepared and ready for any changes or unexpected events. The image of the company was actually improved, as a result of the actions taken in the crisis. This is an important factor in BCM, to plan for the future, assessing potential threats and mitigate the impact of a disruption.

The result of the companies being active in finding risks results in good preparation in case of a disruption. Nokia and Wal Mart worked fierce in finding solutions and were both flexible when changes needed to be made. Another important ingredient is the communications within the company, and to the supplier and distributors. As a result of this, the companies were well informed during the event, of the situation and could react for possible changes.

So do Nokia and Wal Mart have an implemented BCM plan? According to information found, Wal Mart did, but in Nokia’s case no such information has been found. The both companies are well prepared and the culture in the organisation is to be “head on” if something out of the ordinary occurs.

The culture in Wal Mart; to be prepared and having their own departments for certain crisis handling, is a good example on how a company can be one step ahead in case of a crisis. In this case Wal Mart helped the people affected by the hurricane and gained the trust of the customers and the shareholders. Nokia gained a lot of respect from the other companies, as the contrasts on the crisis handling between Nokia and Ericsson was large. This event has become a famous case that is often used as example on how a company can be well prepared versus not, and the outcome of this. What saved Nokia in this case was the aggressive culture and pride to fight for the company and find a solution. The product was easier to redesign than Ericsson, but was this a coincidence? Nokia’s reaction and strategy was not at the moment a BCM plan, just plain better handling and maybe a lucky escape.
The case of the fire at Philips was an awakening for many companies on the outcome of not being prepared. Ericsson needed in this situation to be more aggressive in finding out the right scale of the incident and take action faster. This can be improved by, as mentioned above, distributing power in the company.

Being able to alter the product or demand by campaigns is an alternative way to keep market share. In Nokia’s case the reaction and the outcome was a good example of success. But now when the competitor has learned from its mistake, is it enough to be just well prepared the next time a disruption occurs. To keep advantage in a coming crisis, Nokia needs to have a more well designed and rehearsed plan to stay ahead.

A company that managed to get all the technical aspects up and running after the disruption, but still got affected by reduced image was Sydkraft (now E.ON). Even though the company fulfilled all the requirements, they still got hit by bad publicity by media and angry customers. Main reason for this was the flaw in media handling. The spokesmen from the different municipalities representing Sydkraft did not have sufficient media training which resulted in wrong, and too much, information being given out. Today the company has investigated the crisis and altered its communication strategies. Municipalities have been informed on areas of responsibilities and spokesmen from E.ON, for media coverage, have been selected.

Sydkraft learned its lesson of not having trained personnel in handling the media and also the need of supplying the media with the right and sufficient information. The information needs to be honest, correct and in right dosage. A “no comment” is not an alternative. There can be no room for speculations from the media’s side.

The rest of the companies studied; found themselves stranded in a situation without a plan for recovery. Different measures were taken and all the companies are today still running but some more successfully than others.

Lear Corp. and Johnson Controls (General motor case), Toyota (Kobe), Ford, Honda and Daimler Chrysler (9/11) found themselves in a situation where there was no escape. The supplier or the distributors could not deliver or receive, and as a result of this, the company had to halt their production; factories were closed or running on half speed until further notice. In a situation like this, an additional supplier or distributor would have saved the situation. A BCM plan would result in a back-up supplier who would be able to deliver parts in case of a disruption.

A company who managed to get a hold of additional suppliers was Pittard (FMD case), but to a higher price and longer lead time. This affected both the LVMH group and the car industry. If a cooperation with these additional suppliers would have been prepared before the event, the cost would have been set fixed with prewritten terms. In this situation the demand for skin was increasing while the supply decreasing, hence higher prices. Increasing costs also hit the Dole company in the west coast lockout. Due to the closed harbour and the fresh products, Dole had to reroute to another harbour which resulted in higher costs.

Two companies that found themselves competing, with a crisis hanging over their heads, are Airbus and Boeing. In this case the crisis is hitting Airbus while Boeing is collecting the profits from its main competitor’s problems. Due to failure in design, the Airbus A380 is announcing delay after delay. Lack of cooperation between the different processes in the
supply chain has resulted in mismatching design which resulted in an advantage for Boeing. In present time, Airbus is still being able to hold on to the majority of its original customers, this as a result of loyalty and patience of the customers.

Communication with the customers is utterly important in a situation like this. Losing the patience of the customers might be prevented by being clear and honest about the situation.

Companies which tried to keep the customers by investing in campaigns were; Arla as a measure to gain the trust of the eastern market again, and Sony to keep the demand for the new PlayStation 3 intact even though several delays. This might had been a solution for Nike during the i2 failure as a strategy to increase the demand for over stocked products.

When a strike or a boycott has hit the company, it is hard to get out of the situation undamaged. A risk like this has to be focused on before it actually occurs by working to lower the probability. If a boycott or strike is imminent, then you've already lost control of the situation and there is not much that can be done other then mitigating the outcome. Therefore, be proactive, not reactive. To calm the boycotters a spokesmen who radiate trust, can be presented to handle the media.

Cultural and religious sensitivities are heightened today in the world, and have political implications. As a result of this, global companies will have to become aware of the risks both in the company and through the whole supply chain. By finding the risks, the company can place the production in another area, or in larger companies’ case; they can move the production. Risks like this need to be prepared for since not much other than mitigating the worst of the impact can be done after the event. The important factor here is not to be surprised, be prepared.

An event like the 9/11, and of that size, is hard to predict and therefore to plan for. The problem with terrorist attacks is that they will rarely attack in the same area twice. They will try to find the weakest point in the company. Now for example US is prepared for an attack from the sky, they have tightened their security in airports, hence, it is not likely that the next hit is going to be in this area again but where the country is not prepared. UK was prepared for an attack on the airport but instead the terrorist focused on the subway and therefore had the element of surprise and caused large damage.

After the 9/11, Toyota has started having extra suppliers within the borders where the production plants are located. This is a solution in case of a closure of the borders or harbour lookout. But a supplier within the country can also handle the pikes in the demand; having one supplier offshore for the regular supply and one inside the borders for faster delivery in case of fluctuations, helps the company to continuing having a JIT approach. A strategy like this might have helped both during 9/11, west coast lockout and FMD.

What has been seen in the cases of FMD and 9/11 is that the way the government acted in these situations was not prevented by the companies. During the FMD, the government closed the border, preventing any companies that were handling with animals to ship their supplies. Likewise, no trucks could cross the border after the 9/11. This might have been an overreacting from the government side, but what is important is for a company to be prepared for this reaction. Having contracts and deals with suppliers beforehand prevents having to pay extra costs due to altering situations and demands during the crisis.
The BCM plan is all about learning from the past to prepare for the future. For survival, the company needs to identify the risks within the company but also the supply chain such as suppliers and distributors.

### 9.4 Shareholder value

Shareholder value relies on created investor expectations of future financial performance of the company. These expectations are based on corporate and financial information made available to investors, and will be revised as new information is received. The existing market value of a company, therefore, is dynamic, forward-looking and expectations-based.

Defining the collective view of a company or a product is branding. Branding is built on the reputation among the customers, product functionality, advertising and promotion. This is a vital component in building shareholder value. The brand distinguishes the company and its product from a crowded competitive market. A strong brand helps the shareholder value to remain stable.

Often, in looking at share value drop, there is an easier outcome for the companies with a prepared, honest and efficient management team. Better handling of the crisis by the management, the easier the hit is on the shareholder value. The way the disruption is presented in the media influences the shareholders and therefore an efficient media handling, which gives the right information and shows a strong management, is required. A larger disruption, such as a hazard or a terrorist attack that may result in casualties, might get the sympathy of the shareholder and the decrease gets smaller.

The company that got the largest drop in share value, resulting from a crisis, was Ford in the 9/11 attack (-56 percent) and in the FMD (-50 percent). Other companies with a large increase in shareholder value was LVMH (-46 percent) also during the FMD and Honda with a drop of 42 percent during the 9/11.

The companies with the largest decrease in share values all had a disruption due to the border being closed as a result of a catastrophe. While these companies got hit hard by the disruption, Daimler Chrysler only had a drop of 19 percent and quickly got the shareholder value rising again within a short period. Interesting would be to investigate why this company got a milder hit compared to the other. Could it be that the managers of Daimler Chrysler handled the situation better than the other companies mentioned?

The next in line is Ericsson, with a drop of 41 percent, due to the disruption caused by the Philips fire. This is a typical example on how a company can get affected by not having awareness of the big impact a small disruption, in one end of the supply chain, can have. The lack of initiatives resulted in the information not reaching higher management. The culture of the company resulted in the personnel not wanting to disturb the management for a disruption that, at the time, seemed small. The company hid from the problem instead of facing it.

The big contrast in the handling of the situation, when looking at Nokia and Ericsson, resulted in the big dip of the Ericsson share. The fact that the competitor handled the situation well while Ericsson did not, resulted in losing the trust of the shareholder.
The company who has the lowest drop in share value after a disruption is Sony with the delay of the PlayStation 3. The first drop was only 5 percent and the second 3. So why were the shareholders more patient during this event?

One fact that needs to be presented is that Sony produces other products besides Play Station, which resulted in a smaller drop. Another reason for the steady value is that the product was considered worth waiting for according to the customers. By being delayed the waiting might in fact even have increased the value of the product. It was now considered a more special product since it had a waiting time, and even sometimes a waiting list. The effort put into campaigns might also have limited the fluctuations in the share value.

What can be seen in the Sony case and also the Airbus delay is that the second drop, for the second announcement is milder than the first. Shareholders are more prepared for the second announcement and therefore the drop is not as big. They might have been more prepared for the second delay but also in talking to the media the second time and this could have resulted in the smaller drop. In the two delays the shareholders are more patient when it comes to the PlayStation than the Airbus A380. This might be as a result of the difference in the product. Airplanes are associated with a lot of safety rules and therefore a flaw might not be as tolerated.

Consequently, the share value is effected by the disruption in the company. The size of the drop is depending on the customers and shareholders patience, the product, but most important; the impression shareholders get of the management team during the crisis and especially the announcements to the media.

9.5 Connections between SCM, BCM, and Share Holder Value

When studying the connection between the SCM, BCM and shareholder value, the conceptual framework used during the study is the theory of Hendrics and Singhal (presented in chapter 1). The strategies used in the supply chain affects the tangible and intangible costs which in hand results in the changes in shareholder value.

![Figure 43: The connection between SC and shareholder value](image-url)
By having a flexible and resilient supply chain, the risk of disruption is limited; hence the shareholder value can be kept at a constant level. The connection between the risks, supply chain disruptions, shareholder value and BCM is presented in the picture below.

![Figure 44: The connection between risks, supply chain disruptions, shareholder value and BCM](image)

The risks, on the left side of the layout, are affecting the supply chain and the likelihood of a disruption. In case a disruption occurs, there will be an influence on the resulting share value. By implementing a BCM plan into the company the outcome may differ.

The impacts that the BCM can have on the company are; reducing the likelihood of a disruption and reducing the impact after a disruption. By reducing likelihood, the disruption might not even occur, but if, even so, the disruption takes place, the plan can reduce the impact of the crisis.

Reducing the likelihood is done by identifying risks and creating awareness in the company of the different risks. By communicating the plan to the personnel, the awareness is created in the company and a disruption may be prevented. An example such as informing the production department which machine is the critical, or which supplier is the key supplier, result in the personnel being more alert if a disturbance occurs in these areas. The BCM process provides information on key suppliers or key production processes in the company. The awareness can also be increased by documenting the previous disruptions, even the smallest ones, to learn from the past and prevent the same from happening in the future.

If the disruption occurs, the BCM plan will reduce the impact of the event, by having a clear recovery plan to reinstall the production but also a plan when communicating with the stakeholders and media. The recovery plan helps the company to faster deal with the different steps that need to be handled directly after the event. The personnel have different areas of responsibility, due to the plan, and there will be no uncertainty of duty during the crisis. The communication with the media helps the company to give a clear picture of the situation and present a strong management and gain the confidence from the shareholder.

The problem with getting approval of the plan from the companies is that BCM contradicts SCM. SCM is often about slimming of the processes and saving money caused by unwanted buffers, while BCM is working towards having safety stock in case of a disruption. Trends towards JIT and low-cost outsourced production are still growing strong. This results in a higher risk and increased probability of a disruption.
The BCM plan does not implicate that the company should go back to full warehouses. Only to have a clear picture on how much safety stock is needed and an idea on how long the company can last on the stock after a disruption and the patience of the customers. A demanding customer and severe competition demands a different plan than a company in a softer situation.

The chain is just as strong as its weakest link. A company might get hit hard by a disruption even if there is an existing, implemented and rehearsed plan in the company itself but the supplier or sole distributor lack a contingency plan. Therefore the company gains from informing their suppliers and distributors of the plan.

A BCM plan is not a one size fit all. Every company is different and has different factors weighing in, for example the product. Can the product be sold at a later time or is it like a flight ticket, which can only be used once. Every company has different risks and different awareness and therefore every plan has to be tailor made. Also the plan is not a one time deal. The plan needs to be rehearsed and upgraded together with the changing of the supply chain and the personnel.
The value of a business continuity management plan from a shareholders perspective
10 Conclusions and recommendations

The area of enquiry is during this chapter being discussed and the questions answered in the best mean possible. Further recommendations and problems during the research are being displayed.

10.1 Questions and answers

The main questions that in the beginning of the study were set out to be answered, are in this chapter presented.

What are a Supply Chain and Supply Chain Management?

Supply Chain is in this study being defined as three or more units linked together by the upstream and downstream flows of products, services, finances, and information from a source to a final customer.

SCM is the coordination of materials, information, and finances as they move in a process from supplier through manufacturer, wholesaler and retailer to the final consumer. SCM involves coordinating and integrating these flows both within and among companies. It is said that the ultimate goal of any effective SCM system is to reduce inventory, but in case of an interruption still be able to get a hold of raw material.

Trying to slim the processes as much as possible is still often the goal in the production. The techniques used for this are for example Just In Time, Lean production and Built to Order. Even though the companies have been presented with situations, such as 9/11, that sets the company in a severe crisis due to no buffers, there are hesitations in leaving these concepts due to increased costs that would appear when setting in safety stock. Increased information in the supply chain can to a certain degree replace stock.

The companies are today faced with a more competitive environment with a higher and more fluctuating customer demand, increased complexity in the supply chain due to a more multipart product design as a result of the higher technology and a higher trend in globalisation, outsourcing and partnership, which all result in higher risks of disruptions.

These drivers require a flexible supply chain with owners who contain a willingness to be one step ahead in case of changes. Companies that are always on alert for fluctuations manage to mitigate the impact of a disruption.

Companies might feel it easier in an administrative way, in having single sourcing. By trusting only one supplier increases the risk of a disruption, but the cost of having several does not appeal to the companies.

What is Business Continuity Management?

The Business Continuity plan is the plan to ensure ability of an organisation to provide service and support for its customers and to maintain its capability before, during, and after a business continuity event. Business Continuity Management (BCM) is the ongoing management of the business continuity plan and insuring that it is always up to date and
available plus the ongoing management of operational resilience and process availability within an organisation, with the aim of ensuring that the organisation experiences the minimum possible day-to-day disruption.

The BCM project contains different steps:

- BCM programme Management. Appointing the right people for the project.
- Understanding the organisation. Identifying the key products, services, critical activities, and the supporting sources.
- Determining business continuity strategy. Applying the right measures to reduce the likelihood and the impact of critical events.
- Developing and implementing a BCM response. This is validated by exercise and review.
- BCM exercising, maintaining and reviewing.
- Embedding the plan into the culture of the company.

Not many companies, come acrossed, have a developed BCM plan. Companies have started implementing recovery plans or crisis plans but to get the company back to where they were, contingency plan, is not common.

The BCM concept is not common in companies and almost nonexistent in Sweden. There is a growing trend but still very unlikely that a company has an implemented and trained BMC plan.

**What kinds of risks are companies facing nowadays?**

Companies interviewed fear the risk of machinery breakdown or IT crash, also defined as technological disruptions. These are the most common risks in Sweden and therefore most feared. But the increase of natural hazards in the world has now also hit Sweden with the Gudrun storm that paralysed southern Sweden.

Natural hazards can no be limited in likelihood but they can often be some what predicted. By using statistics to find effected areas, the company can avoid building factories there or prepare extra in these regions, hence limit the likelihood of disruption. A company which is well prepared is Wal Mart. The company needed to have stores in the affected area, during the Katrina hurricane, even though higher risks, since customers needed to be reached. They limited the impact of a disruption by being a step ahead in case of a natural hazard.

Social and Legal risks are affecting the companies in form of strikes, boycotts and political changes. It is hard to limit the likelihood in situations like these. Strikes can be somewhat avoided by having a close relationship with the personnel and regular communications. In boycotts and also legal risks the company has to focus on mitigating the damage as often the situation is out of the hand of the company.

A risk that is growing and getting more attention is the risk of terror attacks. Companies are outsourcing to other companies with other cultural and religious beliefs. But also extremist inside the own country with other views can affect the company. The company can reduce the likelihood by having increased safety and also by being open and listen to the surroundings.
Looking at different kinds of cases where a crisis has occurred in the company, what is outcome of this event?

There is a drop in shareholder value between 60 percent down to 5 in the different cases, but the average drop is 20 percent when a disruption hits the company.

What affects the outcome of the share values is how the management reacts and handles the media. Another factor is the importance of the product, if it is the main product of the company the share value is hit harder.

If the disruption is due to a natural hazard or other risks that the company cannot be blamed for, the shareholders are more forgiving. The shareholders are less forgiven if the company is hit by a scandal or the situation is compared to the competitors who handle the situation in a more effective way.

Even though there are clear connections between the disruptions and the drop of shareholder value, the companies lack in recovery and continuity plans. Many of the cases show that the companies have to make up plans as they go and this results in higher costs due to alternative routes or costly suppliers.

My assessment is that the existence of a BCM plan in these situations would have prevented extra costs and drop in share value. The companies would have had a strict plan to follow, areas of responsibilities would have been mapped out and action would have been taken earlier.

This can be seen in the Wal Mart case. They went into the crisis with preparedness and determination and came out with a stronger image and higher share value. They managed in the situation to protect their stores but also help the people who were hit by the hurricane.

According to this thesis, what would a company gain from having a Business Continuity Plan in place?

One goal in the study was to find the connection between the SCM, BCM and shareholder value. The connection found was presented in the analysis and is again brought up in the picture below.

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**Figure 45: The connection between risks, supply chain disruptions, shareholder value and BCM**

Supply chain disruptions are affected by the risks that the company is exposed to. By studying different cases, there is a connection between the supply chain disruption and the loss (or in
some situations, gain) in share value. By having a BCM plan implemented in the company the likelihood of a disruption occurring can be lowered as the impact after if the disruption takes place.

The rationale is that if supply chains were more reliable and responsive they would not have experienced the disruptions, and hence, would not have experienced the loss in shareholder value. So by having a BCM plan to prevent the supply chain disruption or mitigate the outcome the loss of shareholder value can be prevented...

10.2 Recommendations

10.2.1 Further reading and research

The subject tackled in this study is a new and upcoming topic that will affect majority of companies within around five years. Companies face more and severer risks that result in the company having to be prepared for disruption for survival. Today the most referred authors in the subject is Sheffi, Singhal and Hendriks, and therefore their publications are being recommended as a starting point when studying this subject further.

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10.2.2 Managerial recommendations

The importance while implementing a BCM plan is to consider the need in the company. There is no need to start with a large BCM plan covering the whole company if there is not even a crisis plan implemented or low risk awareness in the company. The project needs to be started small and then built on until the plan is fully implemented. Start with the most important parts and get these implemented and rehearsed first.

Just by starting with the basis in a BCM plan gives the company an awareness of the risks and where to focus the attention. By doing this; the largest or the most common risks can be reduced in likelihood and perhaps prevented. When this step is working fully, the next step towards a fully designed BCM plan can be taken.

Personnel are often tired of new plans and changes in the company. It is here important that the personnel is a part of the changes so there is an understanding why the plan is implemented. This reduces the scepticism and results in risk awareness throughout the whole company.

10.3 Limitations

Due to the time limit in the study the data collection of the different cases are mainly collected from the Internet. This results in secondary data that might not be as objective. This also leads to the cases presented are mainly public ones. The company with a BCM plan might recover fast from the disruption and the then never gets public and therefore data is
hard to get a hold of. Therefore the outcome of a company having a BCM plan is often in the study speculative.

When comparing the different cases, the situations and factors alter. Ideally the different cases would consist of two companies having factories burning down, one with a BCM plan and one without. This of course is not common and therefore the comparison between the cases is speculative. The closest to the ideal situation is the Philips case, where two companies was hit by the same disruption.

There are difficulties comparing the share value drops to the fullest due to certain factors. A company might have more products than the one hit by the disruption, which might result in a lower drop. Another factor is the market value in the country. This is hard to exclude and therefore the sole effect from the disruption can be hard to decide.
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12.1 Analysis overview

Excel was used to get a better overview over the different cases in the study.

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*Could also be described as lack of communication though the design flaws might be a result of this...
12.2 *Interview questions*

**Definitions**

How would you define Supply Chain Management?

How would you define Business Continuity Management?

How would you define a disruption?

How would you define risks?

**The company**

What is your job description?

What are the company’s processes?

Is the company listed?

What are the techniques used in the company? (JIT, Built To Order, Lean Production?)

What do you believe the trends of these techniques are today?

How long the company’s stock last if would there was a severe accident and the production was stopped?

**Risk**

Greatest fear when it comes to Supply Chain Disruptions?

What are the risks that a company faces today?

What has this company done to prevent Supply Chain disruptions?

**Disruptions**

Has the company been affected by a disruption (in the supply chain)?

If yes, what happened/ the cause?

What was the effect?

What measures were taken?

Lessons learned from the event?
Was the event public?

How did the public react to the disruption?

How would the result have been different if the company would have had an implemented BCM plan?

Have you had a disruption where you see a clear connection to the dip in share value? If so, how big difference and how long time till recovery back to “normal” stage?

How do you believe you can prevent the dip in share value as a result of a disruption?

BCM

What is the companies view on BCM?

Is it common among other companies, in Scandinavia/ rest of the world, you think to have a BCM plan?

How can a BCM plan help the company?

How could a BCM plan affect the Supply Chain?

How would/is responsible for a BCM plan in the company?