Environmental Risks in the Swedish Pulp and Paper Industry

A study on environmental risk identification, mitigation and stakeholder drivers towards environmental initiatives

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Abstract
Climate change and the ever growing frequency of natural disasters and extreme weather conditions are issues of high interest in present times and are considered to be one of the biggest threats facing mankind. These prevalent issues associated with environmental risks can eminently cause implications towards corporations, not least when the frequency and intensity can impact their operations and finances. Recent happenings confine with the increased importance and urgency to address matters of environmental concerns, not least when advocates fear that mankind is heading into uncharted territories, when the affect towards corporations and society are unknown. Subsequently, the increased stressed conditions related to our environment are thought to elevate the magnitude and severity of environmental risks that can result in economic havoc. This calls for a great understandings of environmental risks and their potential impact on corporations, thus it was of essence to detect which environmental risks that permeate the business environment, identify risks highlighted by the chosen corporations and elucidate potential mitigation strategies towards addressing these risks. With this stated, it is of value to consider environmental risks in light of corporate strategies to help overcome the risk of economic loss.

The objective and focus of this study was to identify what environmental risks that are identified by large Swedish corporations within the pulp and paper industry. More specifically, attend to the different environmental risks and mitigation strategies in terms of addressing prominent risks that can affect corporate finances. Further the aim was to see if the corporations perceive the natural environment as a stakeholder or what drivers initially influence them to adhere to environmental interests, this influenced by the stakeholder theory. An additional objective was to see if any differences existed between the risks placed ‘on the agenda’ by the media for the given industry and the specific corporate risk identification. This objective was derived from the agenda-setting theory. In order to meet these objectives, annual reports, other relevant sources and publications of the largest corporations within the pulp and paper industry in Sweden were examined. This in order to acquire the information of necessity to answer the stated research question: What environmental risks do large corporations within the Swedish pulp and paper industry identify and how are these managed, and what stakeholders influence the corporations to adhere to the natural environment?

The findings revealed evidence that corporations placed emphasis on presenting environmental risks and different mitigation strategies to prevent the chance of financial loss. The most apparent risks that were found constituted of: raw material risks, production risk, climate change, facility risk, forest risk, restoration cost risk and insect/animal pest risk. Further, we found similarities between the risks acquired from corporate data and the elucidated risks for the pulp and paper industry prevalent in media. Subsequently, it was found that only one corporation chose to explicitly state the natural environment as a stakeholder, though other key drivers towards influencing the corporations towards adhering to environmental concerns were found, key drivers such as: inputs by internal and external stakeholders through substantiality analysis, different laws, policies and regulations, trend spotting, their own perceived social responsibility and also through pressure by media.

Key words: Environmental risks, risk management, pulp and paper industry, stakeholder, climate change, environmental management systems, agenda-setting theory, stakeholder theory.
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1 Introduction

This introductory chapter will give the reader a background and insight into the subject of environmental risks and risk management. The research area of environmental risk is presented along with the usage of the stakeholder theory and agenda-setting theory. Further, one can read about this study's direct purpose of exploring large corporations within the pulp and paper industry in Sweden and their identification and management of salient environmental risks.

1.1 Background

1.1.1 Climate Change and its Impact on Corporations

In present times, notions of issues in relation to climate change, renewable and available energy, greenhouse gases and aspects that concern human rights and regulations have become increasingly apparent (Weitzman, 2011, p. 277). The highlighted issues in terms of human responsibility and the environment that we live in is a vital and ever growing matter of concern, not least regarding the attention it has received in light of corporations. Researchers and environmentalists have enhanced the value of human activity on earth, hence the responsibility we obtain to generate and preserve an as good environment as possible, not least for future generations to come. The recent climate conference in Paris amplifies the present importance of matters concerning global warming, this to immerse and engage in a global climate arrangement. More than 195 countries have engaged in the UN Framework for the convention of climate change and submitted national plans for reducing greenhouse gas emissions, which indicates its prime importance. (UNFCCC, 2016). UNFCCC (2016) further elucidates that the actions to reduce greenhouse gas and emissions will help generate a sustainable future for the world's citizens. During the past years, we have also seen an increased interest and actions aligned with matters associated with the climate, not least due to the growing understanding of society (UNFCCC, 2016).

With that said, in today’s society, climate change is therefore seen as one of the biggest issues facing mankind. It threatens to fundamentally change the way society works, and requires corporations and the social actors operating them to rethink their management of issues related to the natural environment. There is a need for us to realise our impact on the environment and issues in terms of sustainability, but we also need to understand what impact changes in the environment and other environmental risks can have on corporations and their operations through a corporate perspective. Environmental risks come with environmental changes, risks that eminently can affect corporate finances and cause unforeseen costs if the risks are not fully identified and assessed by the corporations. Heil (2016) states the relevance of approaching environmental risk when this specific risk area has become increasingly apparent, and not least due to the substantial numbers and intensity of environmental disasters that permeates our environment. To further emphasise the value of highlighting environmental risks through a corporate perspective, Heil (2016) amplifies that the increase in environmental risks can impact a wide distribution of financial loss. Hence, it is of considerable relevance that corporations and its human actors possess suitable risk managerial strategies to overcome the risk of financial loss.

Företagsfinland (2016) further strengthens the importance of assessing environmental risks in light of corporations when its prime objective is to secure the corporation's operations and prosperity. This can regard the identification of environmental risks and what can occur and why, the probability of occurrence and effects, what consequences
may arise, preparations for the prevention of risks, education and conducting strategies for accidents and other abnormal issues (Företagsfinland, 2016). Aon (2016) also highlights the fact that nearly all corporations are affected by environmental risks nowadays, and not only those who operate with dangerous materials. Examples of environmental risks that permeate the environment and are seen to affect corporations in a negative state are earthquakes, flooding, extreme weather conditions, volcanic eruptions and storms, these examples can further be categorised as natural disasters. A. Holgersson (personal communication, April 27, 2016), who works with environmental risks management at WSP, argues for the fact that more and more industries are prone to acknowledge what environmental risks and climate risks that can impact their corporation. Moreover, A. Holgersson (personal communication, April 27, 2016) elaborates that corporations can be exposed to indirect risks as well, for example, climate risks can cause accidents at other facilities or infrastructure and therefore consequently trigger a disruption of their prime operations. Weinhofer and Busch (2012, p. 122) define climate and environmental risks as “all potential negative impacts on business activities caused by the physical effects of climate change”. All elements imply costs and obligations for corporations that environmental risks entail (Aon, 2016). Consequently, this acknowledges the importance to present the underlying notion regarding environmental hazards and further the threat that environmental risks bear with it in terms of costs and obligations for corporations and the actors who operate these firms.

As illustrated by Weitzman (2011, p. 277) in terms of extreme tail events of the probability distribution function, one can see that the climate change implies threats towards our environment and the global conditions that can cause severe implications. Thus, the effects of climate change can cause implications not only for our natural environment and its components, but also for the people living in it, governments and corporations. The sheer speed of climate change is significantly impacting the planet, and the world is heading towards territories, which are highly uncertain (Weitzman, 2011, p. 277). Keeping this in mind, it is evident that we need to act today to change our patterns of consumption and alter our views on the economy, or else we will head further into uncharted territories where we do not know what the effect on society will ultimately be. Further, when connecting this towards corporate strategies, it is of essence to be aware of the ever-evolving and changing business environment and its eventual consequences. This when the appearance of risk elements can stress corporations and result in financial hardship. Alarming evidence reveals that the change in the climate has alternated tremendously over the last century, and in a much faster pace and at a greater extent than ever seen before (Asian Development Bank, 2013, p. 1). In that way, corporations are facing a great deal of uncertainty due to climate change and environmental risks. If managers in corporations do not consider these types of risks they can face costs and other issues that were not predicted, and hence a potential negative impact on their operations.

Threats coming from climate change have a crucial impact on our planet and this can be seen as a very important research area, however, in this study we aim to direct our view and attention towards the corporate side or these risks, the risks that eminently can cause a negative impact on the state of the corporations and their operations. Many studies have dedicated their focus towards the environmental impact of changing conditions and the human implications of climate change, but there is a lack of research related to the environmental risks that can directly pose as a threat towards the operations of larger corporations (Curtis & Oven, 2012, pp. 654-666; Huang et al., 2013, pp. 415-419; Raymond & Brown, 2011, pp. 653-678). Thus, it is of value for us to emphasise that the
growing attention and the awareness of issues of environmental concern can act as a sound basis, though we thereon place our focus on the risks that affect corporate operations. In that sense, the increased salience of environmental issues in general implies a growing importance for corporations to consider these concerns since they act as building blocks in society.

Both Stead and Stead (1994, pp. 28-29) and Porter and Reinhardt (2007, p. 22) acknowledge the importance for corporations and their managers to understand their own impact and relationship with the external environment. Porter and Reinhardt (2007, p. 22) further emphasise that issues related to climate change has to be addressed with strategic tools. In terms of addressing environmental concerns and their effect on corporations, there has been an on-going discussion surrounding attributes that determine which entities and groups that are inclined to be considered as stakeholders. Continuously, modifying towards our line of research, one could in some aspects argue that the natural environment is a stakeholder when the natural environment can be seen to provide a number of constraints in terms of business life, hence consequences related to environmental risks (Phillips, 2003, p. 134). Thus, the environment as a stakeholder can be seen from two angles, this when the environment can affect corporations through a number of constraints and simultaneously, corporations can in their turn affect the state of the environment. The environment as a stakeholder is a well discussed topic, and many authors argue that it is important to regard it as a stakeholder, or at least address the environments concerns (Driscoll & Starik, 2004, p. 55; Haigh & Griffiths, 2009, p. 347; Mitchell et al., 1997, p. 878; Phillips, 2003, p. 134). However, one cannot by this assume that all corporations regard the natural environment as a stakeholder, and there are some who argue that since the environment is not based on human-activity it cannot be seen as a stakeholder (Phillips, 2003, p. 136). Thus, it is of interest to detect if and to what extent corporations regard the natural environment as a stakeholder, or by elucidating what other stakeholders and factors influence them towards considering the environment. In that sense, it is of value to address the effect environmental risks can have on corporations’ ability to prosper and a precondition towards increased performance can simply taking stakeholder interests into account, hence the choice of the natural environment as a stakeholder.

1.1.2 Risk Management

When trying to understand how threats and uncertainties impact a corporation, risk management is the most vital business area. Looking historically, it was during the mid 1990’s that risk management became a more prominent concern, this after the collapse of Barings bank and the torn reputation of Shell, which caused the need for managing risks to explode (Nocco & Stulz, 2006, p. 8; Power, 2004, p. 59). Risk management has been proven by financial executives to be one of corporations’ most important objectives and is a crucial matter for managers in corporations to take seriously (Froot et al., 1993, p. 1629). Furthermore, Clarke and Varma (1999, p. 414) argue that globalisation has turned risk management into a critical issue for corporations, and having an integrated risks management approach can result in that firms achieve superior performance while simultaneously managing risks in a proactive way. They continue to define risk management as a strategic business process, which contains the two elements of stake and uncertainty (Clarke & Varma, 1999, p. 416). Thus, events with high uncertainty and high stake will consequently lead to very high risk and so forth.

Risk management concerns the act of identifying, quantifying and mitigating risks and events that might have negative or positive impact on an organisation, and can also be
seen as the management of uncertainty (Maylor, 2010, p. 219). In that way, risk managers take potential losses into consideration that can deteriorate and negatively impact the business's day-to-day operations and can diminish profits and result in financial hardship (Heil, 2016). Especially within larger corporations, risk management is of high importance in order to mitigate the propagation of financial disrupts and chocks, and due to the organisations’ important role in society, several regulations and standards have been formulated for them to follow (Vousinas, 2015, p. 383). Due to the increased regulations and standards that have been formed, managers of corporations must in that sense enhance their transparency to present their risk managerial approaches. When speaking of regulations and risk management, Power (2004, p. 61) describes that governments are creating distinct agencies in charge of regulating different functional areas, and that some of these agencies emphasise the use of a risk-based approach to regulations recently. This in turn leads to that organisations with high focus on risk management are regarded as low risk and will require fewer regimes of inspection and enquiry (Power, 2004, p. 61). Relating this to the subject of climate change and the environment, managers of corporations need to understand and analyse the uncertainty and potential threats that origins from these types of environmental risks in order to fully cover their whole spectrum of risks. This in order to make sure the firm is not faced with large costs or negative impacts that can arise from changes in the climate. The process of identifying and mitigating these risks to reduce the chance of a negative financial impact is therefore of value to address.

Anderson (2002, p. 153) contemplates that techniques related to risk management are seen as appropriate in terms of assessing and identifying increased costs in line with environmental risks. Further, Anderson (2002, p. 153) conveys that risk managers are more anxious in taking a long-term perspective while general managers place their attention on matters closer in time. Risk management can therefore be related to the act of reducing uncertainty of unexpected events, this in order to reduce any negative financial impact. With this stated, the meaning of risks in this research will focus on the negative impacts on business activities caused by the physical effects of environmental concerns. In a study by Weinhofer and Busch (2012, p. 124) they describe that the negative impact of climate change on corporate business activities can be related to the business activities of resource supply, production and product distribution. Further, the focus will be on how companies evaluate environmental risks related to their business and how these risks can affect and hinder the company from achieving their financial objectives. Thus, risks in this case is not seen as the opportunity to earn reward from investment and derivatives, but rather the risks that arises from environmental matters and that affects the firm in a negative sense.

Related to risk management, Dowd (1998, pp. 166-202) divides risks into five categories: business risks, market risks, credit risks, operational risks and legal risks. Thus, different types of risks can belong to certain groups. Due to the relative limitation of research on environmental risk management it is hard to know what category these types of risks belong to, and one could argue that they belong to more than one. To elaborate on these five categories: business risks relates to risks connected with a specific industry or business (Dowd, 1998, pp. 166-168). Market risks are connected to changes in market conditions, price fluctuations and interest rate changes are examples of this (Dowd, 1998, pp. 166-168). Furthermore, operational risks are not surprisingly related to corporate operations, and are connected to failures due to mechanical problems or human error
Lastly, legal risks are related to that contractual obligations are not met by other parties (Dowd, 1998, pp. 186-202).

1.1.3 Growing Importance of Environmental Risks
Heil (2016) emphasises that the subject of environmental risks is gaining increased attention, and it is becoming an elevated area of importance within the field of risk management. This not least due to the environmental disasters that are causing great threats to different areas in the world and can result in a wide dispersion of losses (Heil, 2016). This can further be backed up by A. Holgersson (personal communication, April 27, 2016) who states that it is apparent that an increased amount of corporations adheres to environmental and climate risks nowadays due to their potential negative impact on their operations. It has also been shown that various regions and sectors of business are affected to different extents by this change in the climate and due to subsequent climate risks (Weinholfer & Busch, 2012, p. 121). VTT (2016) acknowledges that environmental risks can be incorporated in all elements of the business line, from the acquisition of raw materials and facilities, the production, transportation, the construct of properties and so on. It has been emphasised that it is important for corporations and their management to be aware of the potential risks coming from climate change, and also to understand what impact these risks can have on their operations (Arnell & Delaney, 2006, p. 227).

1.1.4 Environmental Risks within the Pulp and Paper Industry
Environmental risks are apparent in our natural habitat and has received a greater amount of attention in present times placing the topic on the agenda based on salience and magnitude through several media distribution channels. We therefore see it of essence to adhere to the risks that the climate bears with it and their effect on corporate operations, and not least within the industries that are perceived to be highly exposed to climate threats. The ongoing climate changes that permeates the natural environment is seen to consequently result in a dispersion of risks that affect large areas of the earth. It has been seen that the agriculture and forest industries are industries that are highly affected by the climate change, and that environmental risks can have crucial consequences for corporations within these industries (Klimatguiden, 2010; SMHI, 2014 b). The main reason for why these industries are highly exposed to risks in relation to climate change and extreme weather conditions as floods, storms, snowstorms, landslides, earthquakes, forest fire and heat waves, are due to their dependency of the natural resource of wood and soil, that stems as crucial raw material for these industries (Klimatguiden, 2010; SMHI, 2014 b). Thus, one can argue that corporations that are highly dependent on different raw materials are especially exposed to environmental risks, and it is therefore important for these corporations to manage this type of risks.

An industry that is very prominent and important in Sweden due to the large access of wood is the pulp and paper industry (Keskitalo et al., 2016, p. 2). Furthermore, this is an industry that is highly connected to the previously mentioned forest industry and is therefore exposed to risks related to the raw material wood. SMHI (2014 a) states that the role of the Swedish forest will further increase in importance, due to the investments in fossil fuels, which indicates that this is a very prominent and important industry to explore in Sweden. Corporations within this industry are dependent on wood for their production, even if they own areas of forest themselves or if they are dependent on external forest suppliers. Therefore, they are directly or indirectly exposed to the same or similar environmental risks connected to the industry of forestry. SMHI (2014 b) describes that the most prominent environmental risks associated with forestry and agricultural are: increased rainfall, decreased ground frost, decreased quality of the wood due to faster
growth and newly developed animal diseases due to increased mean temperatures. Other risks apparent within this industry are insect pests, storm damages and fires, thus a range of risks that can directly be associated with extreme weather conditions that are seen to arise from climate change. Subsequently, these risks stem as a sound foundation in terms of addressing if corporations within the pulp and paper industry in Sweden find them to be of importance and further, if they adhere to other environmental risks that can be seen to result in a negative financial impact to their operations. In that sense, it stems as a good industry in terms of observing environmental risks.

As can be noticed, the pulp and paper industry are dependent on the well-being of forest and wood and are therefore exposed to direct and indirect risks that come from climate change that affects the forest industry. Therefore, it is interesting to seek how managers in corporations within the pulp and paper industry in Sweden claim to manage these and other environmental risks, and what risks they identify related to their operations’ and the natural environment. Furthermore, all corporations in this specific industry have some sort of production facility, which also makes them exposed to several other risks mentioned in the above section such as landslides, floods, earthquakes and fires (Davidsson et al., 2003, pp. 28-32). This together makes this industry an interesting sector of business to research in terms of climate change and environmental risks in Sweden. Additionally, it is worth stating that the corporations that we intend to address are well established and highly international. With that said, they may outsource some production or import materials for their operations and in that sense we intend to exclude the risks that we perceive not to be in line with environmental risks that encircle corporations in the pulp and paper industry Sweden. An example could be the currency risk that can stem as a substantial risk for corporations.

Connecting this to Dowd’s (1998, pp. 166-202) previously mentioned division of risks into five categories: business risks, market risks, credit risks, operational risks and legal risks. The focus on climate change and risks coming from the natural environment in this study and the attention on risks impacting the operations, one could argue that these risks examined are mainly belonging to the operational risk category, and also somewhat to the business risk category, primarily due to the focus on the particular industry of pulp and paper. Further, when looking at corporations with a clear production function and that have high dependency on a specific raw material, this could also relate to market risks.

Davidsson et al. (2003, p. 30) argue that Sweden is a part of the world that has been spared from the most vital natural disasters, though many authors point out that the most frequent environmental risks in Sweden are related to floods, storms, snowstorms, landslides, earthquakes, forest fire, and heat waves (Dagens Nyheter, 2011; Johansson et al., 2008; Paper Province, 2015; MSB, 2016). Thus, it is important to stress that environmental risks are present all over the world, and even though their level of severeness can differ from place to place they are important to consider in order to reduce the risk of unpredicted costs and general uncertainty. Davidsson et al. (2003, p. 39) state that accidents or disorders due to environmental risks are often calculated in terms of losses associated with injuries on employees, property or loss of production. These type of losses can be reduced by using different risk analysis techniques (Davidsson et al., 2003, p. 40).
1.1.5 The Stakeholder Theory and Agenda-Setting

When assessing environmental risks and its eventual impact on corporations’ finances, we believe that it is of interest to address our research field through the lens of the stakeholder theory. We will utilise the stakeholder theory by using it as an overarching theory to perceive if the corporations, that stem as our main source of information, take the natural environment into consideration, hence see them as a stakeholder or explore if other stakeholders or factors influence them to adhere to the environment. The stakeholder theory is often associated with value maximisation and states that corporations should distinguish their stakeholders and take their interests into account (Jensen, 2001, p. 8). Stakeholders are considered to be all actors that can be affected or affect the corporation’s operations and success (Jensen, 2001, p. 9). Driscoll and Starik (2004, p. 55) and Philips (2003, p. 146) acknowledge the natural environment as an important corporate stakeholder in the sense that the natural environment is thought to bring forth constraints that can be harmful for the business, and further when the environment is seen to provide economic and political value. To strengthen, advocates such as Haigh and Griffiths (2009, p. 347) argue that the environment should be considered, not least when it is seen to be easy to identify and also due to the current presence of issues in relation to climate change. Haigh and Griffiths (2009, p. 357) further elucidates the importance due to the concern regarding the financial damage, unpredictability and increased frequency of natural disasters and extreme weather conditions. Though, one can also comply with the fact that the natural environment per se does not explicitly need to be stated as a direct stakeholder, but can be worthy to consider when the natural environment is seen to have legitimate claims though it may not attain the same amount of power as a direct stakeholder (Mitchell et al., 1997, p. 878).

In that manner, it is of essence for us to highlight that we intend to place our attention towards identifying what stakeholders and factors influence them to take the natural environment into consideration and see to the environmental interests. To exemplify, corporations may implement environmental initiatives based on tensions from municipalities, government agencies, other stakeholder groups, and environmental activists among others. As can be seen in these examples, corporations can be influenced by other stakeholders and factors rather than the environment per se. Seeming that we imply that the environment can be seen as a stakeholder, it is therefore of value to address the environmental risks that permeate the business climate, this when they can impact the corporation's operations. Moreover, corporations may oblige to the interests of the natural environment, thus indirectly see it as a stakeholder though it is not explicitly stated. The stakeholder theory intends to benefit both parties and the assessment of the environment's interests can help the corporation prosper whilst simultaneously safeguarding the environment. Though, the assessment of environmental risks may favour the natural environment as a result from corporations’ becoming obliged to assess the environment when they can gain benefits in terms of reduced economic havoc, thus strengthen the choice of adhering to the natural environment. Conclusively, we therefore enhance that focus is placed on matters of attention to reduce the chance of corporations suffering financial damage due to environmental risks and the benefits the natural environmental gain in return is considered as a spill over effect.

We further integrate notions in line with the agenda-setting theory when addressing corporate environmental risks, which entails that the media coverage of environmental issues can establish an ‘agenda’ and in effect influence the audience of the urgency linked towards the highlighted issues (Anderson, 2011, p. 535). Hence, there exists a correlation
between the amount of exposure and the importance of the news coverage (McCombs & Shaw, 1972, p. 185). This approach has seen too manipulate the public concern and portray the importance of economic, social and political agendas (Shaw, 1977, p. 97). With that said, the increased agenda of environmental issues and the increased salience and attention might strengthen the need for corporations to address the environment. This when it conveys the importance when taking core interests into account in terms of generating corporate strategies. The effort to confirm to stakeholder interests welds and unifies the corporation and all involved actors to conspire and strive towards an excellend working environment and the result of this can lead to an increased economic and corporate performance and a reduction of costs aligned with unforeseen events due to handling of environmental threats (Freeman et al., 2004, p. 364).

Conclusively, fundamental issues regarding climate change stems as a threat to society and has been set on the agenda due to an increased amount of media coverage. This has in that sense increased the value of assessing environmental risks. Not least through the exposure of environmental threats and also from a reputational perspective that can, if bad decrease the demand for products, hence affect finances (Brown & Deegan, 1998, p. 22). In that manner, we perceive it to be of relevance to address these environmental issues in light of larger corporations within the pulp and paper industry in Sweden and examine if these threats are seen to impact their operations. Identifying corporations’ identification and evaluation of environmental risks and elucidating their mitigation strategies towards these risks can build a solid foundation in terms of understanding the risks associated with the environment to avoid unforeseen losses.

So, the utilisation of the agenda-setting theory will help us elucidate the environmental risks that are seen to be ‘on the agenda’ in the near past and are seen to encircle the environment in the upcoming years, specifically related to forestry and by that the pulp and paper industry. By searching environmental risks that frequently arise in media and other distribution channels, we can objectively assume that the salience of these risks help managers at corporations and stakeholders to acknowledge their importance and continuously help influence what matters to think about, this due to the magnitude of the portrayed risks. The environmental risks that are most apparent in media for the pulp and paper industry that we intend to compare with our chosen corporations are: increased rainfall, decreased ground frost, decreased quality of the wood due to faster growth and newly developed animal diseases due to increased mean temperatures (SMHI, 2014a). Other risks apparent within this industry are insect pests, storm damages and fires, thus a range of risks that can be directly associated by extreme weather conditions that are seen to arise from climate change (SMHI, 2014b). These are the risks that will be of prime focus in this study, due to their appearance on the agenda and are therefore the risks that are perceived to be of high importance and value for corporations within the pulp and paper industry. Alongside the risks placed ‘on the agenda’ we intend to detect other environmental risks that the corporations identify as important, in terms of reducing the risk of financial loss.

1.2 Research Gap
The subject of risk management is not new within the field of business studies, but it has proven to be one of corporations’ most important objectives and it is a part of their business model that has to be taken seriously (Froot et al., 1993, p. 1629). Even though the subject per se is not new, one has to understand that new elements of risk management present themselves from time to time. Since risk management is a vital part to understand
and consider in order to manage uncertainty and to prevent potential losses and negative impacts of corporate operations, we believe it is important to keep developing the area of research. Furthermore, the notion of environmental issues and climate change is in the same way as risk management not particularly new, however, it has gained increased attention during the years (Weitzman, 2011, p. 277). This has led to an increased amount of research and literature on the subject and one can undoubtedly say that it is a topic that concerns the whole world and its population. Though, the focus of research on environmental issues are frequently directed towards a green and environmentally friendly perspective, but in this research we want to highlight the problems the matter can cause corporations in terms of financial losses, and what types of threats they face due to the changing climate and other apparent environmental risks.

As mentioned, there are quite well-elaborated literature to be found within the area of environmental issues, however, there seems to be a lack of knowledge related to how corporations address environmental risks to prevent a disruption in finances. This merely concerning their risk managerial strategies towards identifying environmental risks and how they mitigate them. Moreover, we failed to find studies aimed towards acknowledging if corporations and the actors who operate them perceive the natural environment as a stakeholder, thus sees to its interest and also what factors influence the corporations to take the natural environment into consideration. With this said, we intend to fill the research gap by acknowledging the attention corporations place on environmental risks that can disrupt their finances and also to whom, and to what extent they regard the natural environment as a stakeholder.

To strengthen this, authors such as Anderson (2009, p. 6) highlight that there are a limited amount of studies and research overall that has placed its main attention towards environmental risks from a risk managerial perspective. Anderson (2009, p. 6) also emphasises that authors have not even recognised the need for it and have instead placed focus on books in relation to sustainability. Further, the previously mentioned study related to the process of managing climate risks that was conducted on companies within the electricity-producing industry, gave implications that there is a further need to research these types of risks within other industries to expand the knowledge on the subject (Weinhofer & Busch, 2012, p. 139). Moreover, we have not been able to find extensive research related to risks corporations are faced with due to this, and no specific ways of managing these types of risks, even though one could find research with focus on specific environmental risks, for example flood risk management, climate change adaptation related to the water supply industry and climate change effect on food production, amongst others (Arnell & Delaney, 2006, p. 228; Parry et al., 2004, p. 53; Parry et al., 2004, p. 53; Plate, 2002, p. 3; Weinhofer & Busch, 2012, p. 121). Due to the importance of risk management within firms and their operations, we believe that it is of essence to emphasise this gap of knowledge concerning what environmental risks corporations adhere to and manage that can imply a negative impact on corporations’ operations. Moreover, if corporations see the natural environment as a stakeholder and what factors influence and make then place attention on considering the environment when trying to avoid financial losses. This not least when A. Holgersson (personal communication, April 27, 2016) acknowledges that corporations nowadays have increased their attention in terms of acknowledging environmental and climate risks that can negatively impact their operations.
To further strengthen our gap of knowledge related to environmental risks and their management within large firms, Heil (2016) highlights that environmental risks is a subject that is increasing in importance, and should be seen as a vital area within the field of research. This indicates a need to further explore the subject and increase the understanding of environmental risks. As could be noticed when searching for environmental risks in Sweden there were clear risks to be found published by several media distribution channels and governmental agencies, hence risks that are put on the agenda. However, there was not any extensive research conducted on the subject of environmental risks and how and why corporations manage these risks in Sweden.

Over the world there has been research conducted on climate change and its relation to agriculture and forestry (Gebrehiwot & Van Der Veen, 2013, pp. 29-44; Guo & Costello, 2013, pp. 452-468; Hoa et al., 2014, pp. 15-32; Keskitalo et al., 2016, pp. 1-19), however, we have failed to find research related to what environmental risks that are managed, and more specifically within in the pulp and paper industry in Sweden. Even though we aim to detect environmental risks within the geographical sphere of Sweden, it is important to denote that the risks we are looking at are also present within other geographical areas, though to different degrees and can cause other implications (Guo & Costello, 2013, p. 452). Also the fact that the corporations may operate internationally to a great extent, hence concede with other risks such as currency and price risk though we intend to solely focus on the risks apparent in Sweden encircling environmental concerns. In that sense we exclude risks that are more evident in an international business environment and only focus on the geographical sphere of Sweden.

Large firms within the Swedish market tend to have large market capitalisation, which allows environmental risks to impact their operations to a greater extent compared to smaller firms when natural disasters can disrupt greater areas on the supply chain such as resource supply, production and production distribution (Weinhofer & Busch, 2012, p. 124). Moreover, we utilize the notion of agenda-setting theory to help us clarify which environmental risks that are set on the agenda. The magnitude of these risks informs the audience about which risks that should be addressed and one can therefore apply similar explanations towards the choice of corporations. With that said, we are interested in exploring the largest corporations in Sweden within the pulp and paper industry when they achieve large extent of media attention when they are important actors in Sweden and withhold a large market share. Also, when exploring environmental risks for large corporations, we found that they have a substantial involvement in risk management practices compared to smaller firms, hence a more extensive effort placed on risks (Frank, 2008, p. 7). Thus, due to large corporations’ involvement in risk management actions, we believe that research on this type of corporation will provide knowledge that can be of use in terms of overlooking if they see the environment as a stakeholder and how they identify and manage environmental risks.

1.3 Research Question
This conclusively leads the research question that lies as a sound foundation to this research. The question is:

What environmental risks do large corporations within the Swedish pulp and paper industry identify and how are these managed, and what stakeholders influence the corporations to adhere to the natural environment?
1.4 Purpose
The focus in this research is not directed towards corporations’ environmental impact, but rather on how the corporations are affected by climate change and threats from the natural environment that affect their operations, hence environmental risks. The main purpose of this research is to gain insight and increase knowledge regarding what environmental risks corporations within the pulp and paper industry in Sweden identify as important and that can negatively affect their operations, these risks potential impact and subsequently investigate how these risks are managed. In that way, acknowledge their risk managerial strategies in relation to environmental risks. Further, we aim to understand what factors and stakeholders influence the corporations to consider environmental concerns. In this research we also have the sub-purpose of increasing the understanding on what environmental risks corporations within the pulp and paper industry detect and perceive as important, and seek if differences exist between the selected samples’ of environmental risks placed on the agenda by the media and governmental actors.

Moreover, our research can help expand the knowledge of risk management related to environmental risks and risks coming from environmental threats within the pulp and paper industry in Sweden. Due to the role risk management plays in large firms we believe that it is essential to continue to develop and research within the subject, both for firms to gain knowledge on what type of environmental risks that exists and how they can be identified and managed, and also for researchers within this field in order to provide a base for future research. Since climate changes are not predicted to disappear within the near future, it is important for corporations to incorporate environmental risks in their risk management practices to reduce the risk of them negatively impacting their operations. Hence there is a need to understand more about environmental risks towards corporations in order to incorporate them into risk management practices.

Conclusively, it is our main intention to highlight that we focus on salient environmental risks and the corporations’ process of risk management through a corporate risk identification and mitigation perspective in terms of reducing the risk of financial loss. In that sense, we solely place prime focus on the environmental risks effect on corporations’ performance, and not on the preservation of the planet. Naturally, the perseverance of the planet could be a positive outcome due to the handling of environmental risks but this is nothing we intend to place our prime focus on. Therefore, an identification of the risk factors associated with the environment within the pulp and paper industry can reduce the chance of loss, not least when the handling of environmental risks is of value to secure the corporation's’ operations and prosperity (Företagsfinland, 2016).

1.6 Audience and Contributions
Our main intention with this study was to attract attention of larger corporations within the pulp and paper industry in Sweden that possess a vast amount media attention, hence often on the agenda. In terms of our contributions, we believe that researchers within the given field of environmental risks and risk management would gain great insight in our study when we can help guide them towards a more clarified identification of salient risks that permeate the environment and that can affect their operations in a negative way. When provoking a clearer specification of environmental risks, regulators and environmentalists may find it easier to mitigate and control the risks when they would gain insight in how corporations, thus major actors, see these risks and what policies they implement to assess them. In that sense, regulators may acquire a greater intuition of what
environmental matters to thoroughly address. Also, due to the increased attention placed on environmental matters, we can elucidate if the corporations adhere to the environment and their risks, thus see them as a stakeholder. In that way, we can contribute to the research field of business and administration by exploring what factors that drive corporations to adhere to environmental risks and concerns by adopting the stakeholder theory.

Further, one cannot set aside the importance in terms of society as a whole and for future generations to come. This when actors today inevitably influence the state of the natural environment that future generations will coexist in, not least large corporations with political and social influence that are prone to set a good example. In that sense, the stimulation and addressing of environmental risks will strengthen the need of sustainable operations. Moreover, the natural environment per se can inherit benefits due to corporations’ identification of environmental risks and their risk managerial strategies towards addressing them. This when the increased attention placed on environmental risk exposure for corporations will imply a greater degree of perseverance of the environment, hence a spill over effect.
2 Scientific Methodology

In this section you can read about the scientific methodology and what underlying assumptions that serve as a base in terms of understanding the whole conduct of the research. The ontological consideration of objectivism with subjectivistic elements and subsequent epistemological standpoint of realism are presented and elaborated for the reader to understand how we as researchers view the world and our data. Lastly one can read about the ethical and social considerations taken in this research.

2.1 Pre-Understandings

Our fundamental drivers towards constructing a thesis surrounding environmental issues in relation to risk managerial strategies was derived from a substantial interest in areas that stems from finance and factors in association with risk management. Our profound interest in risk managerial strategies in light of corporate actions along with our knowledgebase obtained from previous studies in business administration has lead us to conduct our thesis within this stated field of research. The environmental aspect of our thesis can be motivated from an interest in environmental risks that can impact corporate finances along with an apparent increase in salience, which can regard our thesis topic as a “current trend”. Subsequently, a thorough and extensive literature search revealed a growing interest in environmental matters within corporate strategies which further emphasised our choice of subject.

We are currently students at the Master’s Program in finance at Umeå School of Business and Economics. Within our degree we also obtain a minor in management, which further stipulates our eagerness to implement a managerial aspect in relation to finance, this in terms of addressing how corporations identify and assess environmental risks. With this said, we have soon completed our fifth year at Umeå School of Business and Economics and throughout this time we have gained a considerable amount of knowledge surrounding business administration and our prime area, finance. So our educational background alongside our equal ambition and interest to attend environmental risks and its eventual financial impact though a risk managerial perspective gives us the tools of necessity to produce a good thesis and simultaneously increase the knowledge base and contribute to our main audience, large corporations within the pulp and paper industry in Sweden.

Moreover, our prior experience within thesis writing gives us a solid foundation and smoothens our writing process when we are well aware of structure and content along with expectations. In combination, these factors united has paved the way towards our field of research when exploring environmental risks that can cause environmental havoc in terms of corporate strategy.

2.2 Research Philosophy

When conducting research one has to take action towards understanding the underlying philosophical positions of the study. The reason for why it is important to specify the philosophical considerations related to the research is due to that these can be seen as the foundation for the whole execution of the study, and necessary in order to understand how we as researchers view the world, and what type of knowledge that is being used to answer the stated research question. By clearly defining what philosophical stances that are used, the general research design, together with a well-defined practical method one can increase the replicability of the study, which in turn increases the credibility of the research (Ryan et al., 2002, p. 8).
2.2.1 Ontological Considerations

In general, the ontological standpoint in this research is characterised as objectivism, however, one can argue that it also contains elements of subjectivism. This standpoint was derived from our perception that climate change and environmental risks are objective in regards to human actors. Thus, when researching this subject of risks that corporations are exposed to as a result from changes and threats in the environment we argue that cannot take a subjectivistic standpoint when these risks are not dependent on the human mind. It is therefore legitimate to assume that the risks that come from climate change are not dependent on the social actors who manage them. However, it is important to note that what risks that are managed, and how these are managed are subjective in the sense that they can be individually valued from corporation to corporation. An example of this could be derived from Peter et al (2004, p. 1350) statement that people tend to view risk and benefits as negatively correlated, though the reality shows evidence of the opposite. Thus, people might value risks differently depending on their personal views. Though, since we are interested in what risks the corporations identify and how these are mitigated, we are not placing focus on the managers’ personal belief about risks. To specify, the concept of ontology is the research philosophy that is related to the nature of reality and how we as researchers view the world (Ryan et al., 2002, p. 13).

Saunders et al. (2012, p. 131) describes objectivism as the stance in which the belief is that social entities exist in a reality that can be regarded as external to social actors, which partly is in line with what is believed in this research. The two most fundamental approaches of ontology are the two mentioned above: subjectivism and objectivism, though, one has to understand that it is possible to have standpoints that lays between these two approaches, as is the case in this research (Morgan & Smircich, 1980, p. 942). Even though we place this research within the objectivism spectrum it can be argued that some parts of it have subjective qualities. In this type of research where the the corporations published information about risk management was used as data, with a focus on risk identification, mitigation and stakeholder drivers, we did not aim to look at subjective meanings about the subject in an in-depth way. If, however, we would have been more interested in exploring the managers’ subjective feelings and perceptions the fundamental subjective standpoint is more appropriate. Though, since we believe that this type of information is built on initiatives of managers and employees, and that these humans are constructing the corporations, we still argue that this research contain some subjective elements even if it is in a general sense characterised as an objective study.

2.2.2 Epistemological Considerations

Derived from the manly objectivistic ontological consideration, realism was the epistemological standpoint in this research. In contrast to the research philosophy of ontology, the epistemology concerns what type of knowledge that the researchers consider as acceptable knowledge for that particular study and it also relates to how we learn and gain knowledge (Ryan et al., 2002, p. 11; Saunders et al., 2012, p. 132). Saunders et al. (2012, p. 140) position the epistemological stance of realism between positivism and interpretivism, and is the philosophy related to using observable phenomena to provide credible data. In this research when annual reports and other published information was used to study the subject of environmental risks and its drivers, one can connect this to us using observable phenomena as source of acceptable knowledge. Furthermore, the focus in this research was to examine environmental risks and their subsequent management within the context of the pulp and paper industry. This
is also in line with the philosophy of realism, where one can use this stance to focus on explaining phenomena within context or contexts (Saunders et al., 2012, p. 140).

Ryan et al. (2002, p. 9) describe that research within the field of finance and management are commonly accepted as being social scientific and connected to social issues, rather than exploring natural phenomena. Even though this research is related to the natural environment and climate changes, hence natural phenomena, we argue that identification of risks and their mitigation is related to exploring social phenomena. In this research we aimed to explore what environmental risks corporations within the pulp and paper industry identify and then link these to the environmental risks that are seen to be salient in media to detect similarities and differences. This could be related to finding a relationship between these variables from the observed data, hence is also in line with using a realistic approach (Morgan & Smircich, 1980, p. 492).

2.2.3 Research Paradigm
To continue understanding the underlying research philosophies of a study one can view them through the concept of research paradigms (Saunders et al., 2012, pp. 140-142). Burrell and Morgan (1979, p. 21) describe that the paradigms: “[...] define four views of the social world based upon different meta-theoretical assumptions with regard to the nature of science and of society”. The four different paradigms that researchers can adopt are known as: radical humanist, radical structuralist, interpretive and functionalist (Burrell & Morgan, 1979, p. 22). These four paradigms move along two dimensions, the regulation-radical change dimension, and the objective-subjective dimension (Burrell & Morgan, 1979, p. 21). The paradigm most suitable for this study is the functionalist one, which is based on trying to understand society in a way which generates knowledge, that can be put to use (Burrell & Morgan, 1979, p. 28). This paradigm is positioned on the objective end of the objective-subjective dimension, and further on the regulation spectrum of the regulation-radical change dimension (Burrell & Morgan, 1979, p. 22). Moreover, according to Burrell and Morgan (1979, p. 28) this is the dominant paradigm for organisational research, and suits this study since it is based on rational explanations of human affairs and assumes rational human behaviour. Thus, in this study we aim to understand corporations’ in the pulp and paper industry’s exposure to environmental risks and examine how these are managed. In that sense we are assume rational behaviours of the actors managing and identifying these risks, and further we aim to get insight into the subject of environmental risks that can provide knowledge to the research area. This might help develop future risk managerial strategies towards environmental risks.

2.3 Research Approach
The theoretical base used in this study was the stakeholder theory and the agenda-setting theory. These two theories were used as a lens in terms of understanding why corporations assess environmental risks, and also why they consider threats from the environment in the first place. With these theories as a base when exploring and searching for relevant literature on the subject, we formed the theoretical framework, which guided the direction of our study throughout and it also helped us establish a knowledge gap which we intended to fill. Therefore, the research approach used in this study is known as deduction (Hyde, 2000, p. 83; Saunders et al., 2012, p. 144). A deductive approach is commonly characterised as one where you start with theory often derived from a literature search, and from that design a research strategy to test this theory (Hyde, 2000, p. 83; Saunders et al., 2012, p. 144). Moreover, Blaikie (2010, p. 86) describe that it is important that the theory has to be expressed as a deductive argument, and the summation of the theory constitutes what is to be explained by the research.
In general, people tend to have a view that quantitative research adopts a deductive research approach, while qualitative research adopts an inductive approach (Hyde, 2000, p. 82). However, this might be true statistically, but it does not accurately describe the processes adopted by research in qualitative and quantitative research in practise (Hyde, 2000, p. 82). As can be seen in this case, we conduct a qualitative research with focus on knowledge and understandings but we utilise a deductive research approach. Since the process of this research began by viewing theory on environmental issues and risk management, and building a theoretical framework based on the accumulated literature, and from there on find the knowledge gap we intended to fill, gathered data to explore and fulfilled the purpose of the study. In that manner, one can categorise our research as deductive. As in the case for both induction and abduction the process begins with collecting data to explore a phenomenon, this was not the case for us. However, the subject of environmental risks and their impact on corporations’ is seen as a new area within research and it would have been interesting to conduct a study using an inductive or abductive approach to be able to explore the subject in another way. Though, the deductive approach was the most suitable way of conducting this research based on preconditions we had when starting the process and also considering factors such as time and resource limitations.

2.4 Research Strategy

In this research where we aimed to gain knowledge on environmental risks and how these are managed within large corporations in Sweden, we see these large corporations in Sweden as one case when exploring the particular industry of pulp and paper corporations, and we explored their published information in an extensive and deep way in order to reach this knowledge. The data collected from each corporation was be summarised and further compared and analysed against the existing literature on the subject in order to gain as much knowledge as possible. This type of strategy can be characterised as a case study (Saunders et al., 2012, p. 179).

The general definition of a case study is when you research a subject or phenomena within a certain context, or within a number of contexts (Hyde, 2000, p. 83; Saunders et al., 2012, p. 179). Since we aim to explore environmental risks and its management within the context of large firms within the pulp and paper industry in Sweden this is a suitable strategy to have in order to explore the subject in the best way and also to be able to answer our research question. Furthermore, when trying to answer “how” or “why” questions, like in this study, Yin (2009, p. 2) states that it is favourable to use a case study design, especially when studying a current phenomenon within a real-life context. Like mentioned previously, researching environmental risks within the context of the pulp and paper industry is a good example of how the epistemological stance of realism was present in this study.

Eisenhardt and Graebner (2007, p. 26) state: “Sound empirical research begins with strong grounding in related literature, identifies a research gap and proposes research questions that address the gap”, and this is suggestively related to having a deductive approach. In this research we utilised a case study, which some authors described to be connected to an inductive research approach (Eisenhardt & Graebner, 2007, p. 26). However, we argue that this deductive approach and case study strategy used could help us conduct a sound study which provided us with the wanted qualitative data in order to answer our research question and fulfil our main purpose.
2.5 The Research Design

This research is characterised as a qualitative research, and the aim was to explore the identification and management of environmental risks within the pulp and paper industry in Sweden and also to gain understanding on why these risks are managed. We aimed to gain understanding on what stakeholders and other potential factors that were the drivers for environmental initiatives, and also to examine how the environmental risks that are identified by the corporations differ from the risks that are seen to be ‘placed on the agenda’ by media. The intention was therefore to gain knowledge and understanding in the subject of question, and we argue that this was preferably done with a qualitative design. From this qualitative design one can derive our ontological and epistemological standpoints of objectivism and realism, from which we view that corporations are exposed to external environmental threats that can affect their operations. Hyde (2000, p. 83) describes that qualitative enquiries often takes the form of case study, to study a phenomenon within a certain instance or a small number of instances in an in-depth way. This strengthens the motivation for why this subject is studied qualitatively with a case design strategy.

Despite the qualitative design, the other main research design is known as quantitative research. Bryman (1984, p. 77) describes quantitative research as the design to use when you apply a positivistic and natural science approach to research social phenomena. This is seen to rely on fixed measurements, hypothesis testing and little fieldwork involvement (Bryman, 1984, p. 78). As can be noted, this was not the case in this study, since we were more interested in what environmental risks that were seen to be of importance and how these were managed, together with what stakeholder drivers laid as a ground for the initiative of managing these.

Bryman (1984, p. 78) further describes qualitative research as attributed to phenomenology and symbolic interactionism. Even though the data collection in this research was not conducted by interviews with the managers who manage risks at corporations within the pulp and paper industry, we believe that the information they publish represents good data on what environmental risks they identify, how these are mitigated and what drivers that influence the corporations towards engaging in environmental initiatives. Since corporations in general are required to be transparent in their operations by publishing annual reports and other published information about their business, we argue that the information they publish is a good way of understanding certain aspects of the business. When aiming to gain understanding on what environmental risks the corporations find important these risks should also be included in their published information to their stakeholders. In the same manner, corporations might want transparency regarding the way they are managing these risks. This is information that is highly relevant for several stakeholders, and not least investors or potential investors. Thus, we believe that the understandings and knowledge aimed for in this research were gained from collecting the data from the corporations published information.

2.6 The Nature of Research Design

In this deductive research we constructed a theoretical framework based on previous literature related to the subject of environmental risks with a funnel towards environmental risks within the pulp and paper industry. This was in some sense used as a template of the construct of the followed data gathering and subsequent analysis.
Therefore, the nature of the research design could be known as descriptive, when we collected data with a specific focus which was decided beforehand in order to attain an understanding and insight into environmental risks in the context of corporations’ in the pulp and paper industry. According to Saunders et al. (2012, p. 171) the descriptive research design is used when aiming to attain a correct profile of situations, persons or events, and it is emphasised that you need a clear picture of the phenomena you are collecting data about before you do it.

Even though this research can be characterised as a descriptive research, we argue that it contains exploratory elements in terms of exploring environmental risks outside the spectrum of salient risks through the agenda-setting theory. One can further motivate the use of an exploratory research design in this study by the relatively limited amount of literature that is to be found within the field of environmental risks and how these are managed, which paves the way for us to explore the subject and gain knowledge on identified environmental risks and their subsequent management. The exploratory research design is commonly used when you aim to understand a problem, or the nature of a problem, and is seen as relatively flexible and adaptive to changes in terms of changing your direction of your study depending on what you find out (Saunders et al., 2012, p. 171). From this definition of exploratory research one can argue that the nature of the research design in this study cannot be regarded as completely exploratory, but only that it contained some elements of it.

2.7 Ethical Considerations

It is of importance to oversee ethical and social considerations when conducting research. One way to assess potential social and ethical implications is to discuss four different prospects that Diener and Crandall (1978) present, the prospects concern harm to participants, lack of informed consent, invasion of privacy and deception. These aspects are primarily connected with qualitative research and in that manner it is of value for us to thoroughly assess them when we utilise ourselves or a qualitative approach.

When research is conducted from public records, the process of informed consent can be seen as both time-consuming and slightly unnecessary, this when it concerns the relationship between the social actors in our research (Diener & Crandall, 1978, p. 39). Seeming that we extract data from publically available data in form of annual reports and web pages, we can exclude this ethical risk when we do not interact with any social actors within our empirical field of research. Subsequently, even though we utilise a qualitative approach, we do not interact with any participants, which to a high extent excludes the ethical risks of harming the included parties and also a potential invasion of their privacy. However, one must be aware of the risks that our interpretation of data and analysis could be harmful if done incorrectly. Further, the issue of deception can also be eliminated when we base our data source one publically available data.

Bryman and Bell (2011, p. 139) further indicate that there are other ethical principles worth taking into consideration when conducting an empirical study and these consists of the impact of data protection, reciprocity and trust and lastly elements in line with conflicting interests. In that sense, we do devote attention towards confidential and ethical factors when we chose to utilise and stipulate our study on data that is available to the public when we gather the data through the use of the enterprise database Retriever Business and annual reports and also web pages. When utilising publically available data, this elevates the value and credibility of our research when any person is entitled to use
our sources of data and obtain the same data collection. Further, we extend the usage of the available data and can take advantage of our sources to generate and contribute to our research field when increasing the amount of knowledge surrounding environmental risks in corporations.

It is also of value to address matters in line with reciprocity and trust, when one can convey a degree of openness and honesty towards all involved actors (Bryman & Bell, 2011, p. 141). This notion is most often made use of to infer that inequalities are eliminated or at least reduced between participants and us researchers and in that sense elevate eventual benefits. We consider this aspect of high importance, not least when the large Swedish corporations in manufacturing industries provides us with the data of necessity to be able to see if they address the environmental risks that are placed ‘on the agenda’ and what risk managerial strategies that are implemented to address them.

Continuously, one may conclude that it is unethical to not address and direct our attention towards the environmental well-being and the perseverence of our natural habitat when we instead choose to solely explore how corporations economic state can be disrupted due to environmental risks. With this said, we intend to contribute to our field of research by exploring environmental risks and their subsequent management in corporations within the pulp and paper industry in Sweden. In that way, a greater knowledge base surrounding potential environmental risks can eliminate costs for corporations and simultaneously as a consequence contribute to a more preserved environment. Worth stating is also that it is most usual to direct attention towards the corporate side when conducting research within the field of business administration.

When placing focus on the social considerations we as authors withhold when conducting our research, it is of importance for us to stipulate that our main intuition is to generate a more comprehensive insight into the risk managerial strategies within corporations. This when identifying and elucidating environmental risks to reduce the chance of financial loss. With this said, we intend to raise the degree of transparency and understanding of the effect of environmental risks for corporations that a wide range of social actors can take part of, not least corporations and stakeholders. Further, with the accumulated data that we intend to retrieve from enterprise databases and web pages, hence publically available sources, we aim to present a fair representation of the data published by corporate managers to provide our audience with credible and valid results and knowledge based on our findings. In that aspect, we will not angle our study in any way when we will legitimately present our observed findings as they are. This will be done through a summary of accumulated and observed data through annual reports and web pages, which we believe will show a good perception of corporations’ environmental risks and managerial strategies to mitigate them.

We believe that our generation of knowledge will be able to play an important part in research in terms of identifying and assessing environmental risks in light of corporations. In that way, we see it of value to convey an honest and well-grounded perception of our study not least when Diener and Crandall (1978, p. 151) emphasise the value of knowledge gained scientifically and its dependence on observations and not only opinions. This is of essence to accumulate an elevated knowledge base to the natural world. Other non-ethical aspects or also of importance to address when distortion of findings can eminently decrease people's trust so researchers should express honest results (Diener & Crandall, 1978, p. 151). Seeming that we attempt to address a field
where there exists a lack of knowledge and data regarding environmental risks, it is of high importance that we prevail results that are well grounded when we aim to contribute to our field of research and further smooth the path towards further studies within the research area. Finally, another social consideration we addressed was the distortion of reported findings when great emphasis has been placed on researchers in terms of objectivity (Diener & Crandall, 1978, p. 160). This factor has been enhanced when researchers may miss communicate their findings to better fit potential expectations and deliberately alter data. Deliberate errors and distortion of findings is something we believe is highly counterproductive when we intend to gain valuable knowledge and contribute to our empirical field of research.

2.8 Selection of Literature Sources
When retrieving the literature of relevance for our given topic regarding environmental risks in light of risk managerial strategies, we utilised both primary and secondary sources to give us a sound foundation. According to Saunders et al. (2012, p. 83) primary literature is the sources related to data collected from first-hand experiences, and in this research this related to direct communication with risk manager through email and some other publications in forms of reports. Secondary literature can consist of research journals, newspapers, government publications and websites (Saunders et al., 2012, p. 82). In this research most of these types of secondary sources were used. For instance, with the use of the agenda-setting theory, we thoroughly examined prevalent news and other media distribution channels to elucidate environmental risks that are seen to be ‘on the agenda’. Related to this, we mainly used sources such as SMHI (2014 a; 2014 b) and Klimatanpassning (2016) and Skogsstyrelsen (2016) which are seen to be credible sources in the area of meteorological issues. In that sense, our theoretical framework is fully stipulated on both primary and secondary sources and gained primarily through the search of two main fields, environmental risks and risk management. These prime pillars led us towards obtaining peer reviewed sources of essence in terms of making use of credible sources of value in terms of appropriate content.

A substantial amount of our accumulated literature was retrieved through the use of Emerald and Business Source Premier (EBSCO), which elevates the validity and content of our thesis when the articles and peer reviewed. Moreover, EBSCO was of prime essence for us when the articles obtained constitutes of scholarly journals of a business and economic manner. This further fits our preferences when we write within the field of business administration. Additionally, Google Scholar has been utilised. The keywords that we used to accumulate the literature of relevance for our study constituted of: risk management, risks, environmental risks, environmental risk management, environmental issues, climate change, climate risks and climate risk management.

Subsequently, to compute our empirical study we made use of the data source Retriever Business, which is available at the Umeå University library. This enterprise database was used to gain information of necessity from annual reports of large corporations within the manufacturing industry in Sweden. The data we made use of was customised to fit our preferences and thereon extracted and available for us to analyse.

2.9 Time Horizon
The time horizon of the study is a factor that is of value to bear in mind, this when it is of essence to determine what place in time the observations take place. You can place focus on happenings at at specific point in time or apply a broader perspective to accumulate
data that can eligibly represent findings, this through a more extensive time horizon. This study was conducted with a cross-sectional research design, seeming that we aimed to look at the subject of environmental risks within the pulp and paper industry at a specific point in time. This can be backed up by Saunders et al. (2012, p. 190) who emphasise that the approach to observing events at a specified point in time is seen as cross-sectional. Furthermore, Bryman and Bell (2011, p. 62) emphasise that the cross-sectional design is most often apparent in quantitative studies but qualitative studies can also entail types of cross-sectional design. As in this qualitative research, we focused on the most recent published information in relation to environmental risks by the corporations, and one can thus regard this as focusing on the subject in present time, since we did not explore backwards in time to see how this has looked previously and only used updated publications as our source of information. Due to the time constraints that were present in this particular research, it seemed logical and most interesting to explore this subject as it looked now in order to contribute in the best possible way to the field of research. Moreover, in line with this Saunders et al. (2012, p. 190) speak of the fact that most academic writing can be considered as cross-sectional due to a substantial time constraint so therefore focus is primarily directed at a phenomenon at a specified period in time. Seeming that large importance has been placed on the issue of climate change and natural disasters nowadays, this not least due to the climate conference in Paris (UNFCCC, 2016) and UN frameworks, makes this topic of essence to study in present times. The need to manage environmental risks are therefor also apparent, however, we argue that the handling of risk and certain techniques might not alter that much and is not equally dependent on the time period of when this research was conducted.

2.10 Summary of Methodological Stances

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Figure 1. Methodological standpoints
3 Theoretical Framework

This theoretical framework will provide an insight into the subject of environmental risks, how risks in general are managed, and a focus towards the environmental risks that are placed on the agenda in Sweden. Further, one can in this chapter read about the role of the environment as a stakeholder and gives a background and solid motivation to the use of Stakeholder Theory and Agenda-Setting Theory.

3.1 Environmental Attention

In light of our conducted study, it is of value to address the environmental concerns that permeate the environment to justify the importance to address corporations’ and their identification and risk managerial strategies to avoid financial havoc. Not least the managerial perception regarding what environmental risks to take into consideration that can potentially affect their finances, and further how to mitigate these detected risks. There is no doubt that environmental issues and concerns have increased tremendously during the last few decades. This can be confirmed by famous and influential environmental advocates such as former U.S. Vice President Al Gore and other authoritative authors. For instance, Schmidt et al. (2013, p. 1245) state that elements in regards to climate change has been on the news agenda for a longer period of time and has during the years increased in terms of importance. When speaking of Al Gore, he is the author of the famous documentary that entails the science of global warming and the compelling case against the environmental threats that global warming is causing the planet and has caught a vast amount of attention (Al Gore, 2016). This, according to the agenda-setting theory will have a large impact on the public awareness and feelings towards environmental issues, which in turn will have an impact on governments and corporations et cetera. The theory of agenda-setting will be elaborated further in the next section. Al Gore (2016) argues that the fundamental threats aligned with global warming is evident, man-made and enhances that the consequences can and will be cataclysmic if we, the actors on earth, do not act now. Moreover, we are taking part in a technical upspring merely concerning the technological innovation that has speared, which allows researchers to capture, store, process and display a dispersed range of phenomena concerning environmental and cultural issues (Gore, 1998, p. 89). Gore (1998, p.89) emphasised already in 1998 that we should seek a long term perspective by bringing forth a wide dispersion of data concerning our planet and history and challenge major actors such as experts, governments, industries, academia and non-profit organisations. Though, when taking a corporate standpoint, it is of high interest to regard the ongoing changes that encircles our natural environment and the risks that it bears with it. Not least in terms of the industry in which the corporations operate within, this to elucidate the risks of value, reduce the impact and create a more sustainable business environment. However, when addressing the environmental risks, it becomes apparent that the managers themselves evaluate the threats that they believe they are most exposed to and adapt their corporate strategy thereafter. More in line with our study, we see it of interest to detect the salient risks within the pulp and paper industry and explore if managers within the given industry identify and mitigate similar risks and moreover, what risks they detect and perceive to be of value to them.

Conserve Energy Future (2016) further enhances that our environment is invariably changing and as we perceive these changes, so does the urgency to constantly become increasingly conscious of the issues encircling these changes. People need to increase their awareness of the environmental concerns that permeate our planet, not least due to an incursion of natural disasters, weather patterns, warming and cooling periods et cetera
Additionally, Conserve Energy Future (2016) clarifies the urgency in terms of achieving attention when we lie at the edge of a severe environmental crisis. However, it is also important to adhere to the impact climate change and environmental issues can have on corporations. Especially when the corporations operate in this ever changing environment. In terms of media attention, Schmidt et al. (2013, p. 1233) entails that the coverage concerning climate change has increased in all observed countries, and that an increased attention has been explicitly high within countries that are dependent on carbon and are stipulated under the Kyoto Protocol. Moreover, Schmidt et al. (2013, p. 1233) state that political institutions are troubled by the mitigation and adaption towards environmental concerns and concludes that media coverage has a prominent role as they act as central agents in terms of distributing information and accelerate the awareness regarding these matters. Another vital issue to embrace is that mass media distributes and acts as a central forum in terms of knowledge generation and it is shown that most knowledge is obtained through media coverage (Anderson, 2011, p. 535). The notion that media distributes topics of high salience to the public is linked towards the agenda-setting theory which will be explained further. In that sense, a detection of the most salient risks within the pulp and paper industry in Sweden can stem as a sound foundation in terms of exploring if these risks are taken into consideration by their risk managers, the risks that media promotes as ‘on the agenda’.

Thus, it is of essence to understand the underlying assumption that the topic of environmental risks and exposure is of high salience today and is of great importance for the wellbeing and perseverance of our planet. This notion acts as a fundamental basis in terms of pointing out the importance of addressing the risks that the natural environment bears with is, not least in light of corporations that can become exposed to risks that can serve to be costly, thus disrupt their finances. More specifically, it is of interest for us to explore which environmental risks that the corporate leaders within the given industry emphasises as important and further observe if they elucidate similar risks as the risks that are prone to be of greatest magnitude for the pulp and paper industry given in media.

3.1.1 Stakeholder Theory
Value maximisation is something that is widely discussed in terms of corporate objectives and a concept that most often appears within this field is the stakeholder theory. Stakeholder theory implies that corporations have several stakeholders and should take interests of all these into account when initiating decisions within a firm (Jensen, 2001, p. 8). Moreover, the stakeholders concern all actors, groups or individuals, which can extensively affect or be affected by the success of the firm (Jensen, 2001, p. 9). In contrast to the economic concept of wealth maximisation, stakeholder theory directs its prime attention towards inferring that managers should serve “many masters”. Phillips (2003, pp. 2-3) confirms the above by stipulating that corporations are one of the most powerful social entities and are highly dependent on all involved parties for their success and not least when some parties can be of harm. Donaldson and Preston (1995, p. 68) speak of the fact that analysts to the stakeholder theory state that all people or groups that have legitimate claims and interests towards a corporation naturally obtain benefits though there is no prime priority in terms of placing interests of one party over another. They explicitly state through a derived model that the main stakeholders that are seen to arise within corporate structure are investors, suppliers, customers and employees (Donaldson & Preston, 1995, p. 68). Donaldson and Preston (1995, p. 69) further expand the previously derived model and apply other stakeholder, among them governments, political groups, investors, trade associations and communities. Further, authors such as
Rowley and Moldovenanu (2003, p. 204) other elevate different actors and consider *environmentalists, employees, communities, human rights organisations and charities* to also influence corporate actions. As can be noticed, there are several stakeholders that corporations could regard and consider, and different corporations value different stakeholders differently.

Stakeholder theory does also imply a range of decision making and conflicting interests, not least when all actors wish to maximise their utility and wealth which inevitably generates competing preferences. For instance, customers wish to attain low prices, high quality and service whilst employees urge for high wages, good working conditions, medical benefits and so forth (Jensen, 2003, p. 13). With that said, a vital factor that ought to be of essence towards the stakeholder theory merely concerns a trade-off between these demands when the stakeholder theory fails to provide a conceptual specification towards how to deal with these trade-offs (Jensen, 2001, p. 14). Additionally, Carroll (2009, p. 60) also elucidates the importance that corporations ought to consider interests of individuals and groups who interact with the corporation. Carroll (2009, p. 60) further describes stakeholders as those who interact with the corporation or has interdependencies, and further those that affect or are affected by corporate strategies. In relation to the previously stated, it is prone to say that stakeholders can potentially help or harm the corporation, merely financially speaking.

Freeman et al. (2004, p. 364) confine with the above stated and explain that the stakeholder theory encircles the assumption that values acts as fundamental in terms of doing business and implies that corporations should enhance the value creation in light of their stakeholders. Freeman et al. (2004, p. 364) state that distinguishing their main values and confining in what actually brings their stakeholders together drives the corporation forward and results in an increased economic performance. Adhering to all stakeholder interests results in economic value creation when people and all involved actors come together to cooperate and excel their core interests (Freeman et al., 2004, p. 364). In that manner, corporations must establish and foster relationships, inspire stakeholders and construct communities where everyone works in the same direction to be able to deliver the value that is promised by the firm (Freeman et al., 2004, p. 364). With that said, stakeholders are prime actors in terms of profit generation but Freeman et al. (2004, p. 364) emphasises that profits are seen as a result to a unified corporate strategy and not as a key driver.

### 3.1.2 Stakeholder Influence on Environmental Actions

In terms of addressing the stakeholder theory, like mentioned one topic of discussion is whether the natural environment should be considered as a stakeholder or not. Haigh and Griffiths (2009, p. 347) debate this, and state that the natural environment in their eyes is seen as a direct stakeholder, not least when climate change is brought to attention. With that said, it is important to note that a stakeholder does not have to be specifically stated as a direct stakeholder for a corporation to adhere to its interests when they can be seen as an indirect stakeholder. This can be backed up by Mitchell et al. (1997, p. 878) who concludes that an indirect stakeholder can have legitimate claims though it is not directly seen as a main actor. Thus, in that sense, we do not fully imply that the environment should be regarded as a direct and dependent stakeholder for the managers to take it into consideration but more that the managers can decide to take other stakeholders interests into consideration, and there among environmental concerns. Indirectly, the stakeholders
can oblige the corporations to adhere to environmental interests when the stakeholders can be affected and strained by the state of the natural environment.

A vast amount of attention and critique has been placed on the topic of the natural environment as a stakeholder and debates have become protracted and merely surrounds how inclusive the scope of stakeholders should be (Haigh & Griffiths, 2009, p. 347). In essence to our study and towards debating the natural environment as a stakeholder, Haigh and Griffiths (2009, p. 348) state that the apparent notions due to climate change has become of increasing concern for corporations due to the negative financial impact and the unpredictability of an increased amount of natural disasters.

Haigh and Griffiths (2009, p. 357) also acquire arguments to see the natural environment as a stakeholder when it can enable corporations to understand the services that our natural environment can provide and generate opportunities to work with them and create mutual benefits. To further question the natural environment as a stakeholder, other arguments arise from the fairness-based theory that only human beings can act as stakeholders when they are the only ones capable of creating essential obligations for the status of the stakeholders (Phillips, 2003, p. 143). This view, however, does not imply that managers have to take the environment into consideration and instead, they ought to consider the environment within their corporate strategies for two main reasons, this even though the natural environment does not qualify as a stakeholder through this perspective (Phillips, 2003, p. 144). These two reasons concern the fact that the environment may imply moral considerations despite it not being a stakeholder and further, the stakeholder obligations will govern managerial diligence (Phillips, 2003, p. 144). But in the end, according to literature there is not that much disagreement when defining what type of entity that can be considered as a stakeholder (Mitchell et al., 1997, p. 857). This not least when people, groups, organisations, societies, institutions and also the natural environment are all entities that qualify as stakeholders (Mitchell et al., 1997, p. 857). Even though Mitchell et al. (1997, p. 878) regard the natural environment as a stakeholder and highlight that it can be considered as an indirect stakeholder when the natural environment is seen to lack power but still has legitimate claims, thus becomes dependent upon others and for their claims to be settled, other parties must provide guardianship. In that sense, the natural environment per se does not explicitly need to be established as a direct and dependent stakeholder for the managers within the corporations to adhere to their interests. Seeming that the natural environment still is seen to have legitimate claims, other stakeholders can essentially imply their will to consider the natural environment within the corporate strategies.

Driscoll and Starik (2004, p. 55) also discuss the stakeholder theory and integrate arguments in terms of organisations and the natural environment when they debate what actors can stem as a stakeholder. Driscoll and Starik (2004, p. 55) emphasise that most stakeholder theories have arrived at the point where the natural environment has achieved stakeholder status, though it is still debated whether it should be one of the corporation's primary stakeholders, which a few academics are reluctant to agree with. Many corporations nowadays uphold and view environmental sustainability as a value though the natural environment receives less attention as a direct stakeholder and not least when academics suggest that when it comes to trade-offs, corporations rank the environment low (Driscoll & Starik, 2004, p. 56). Though, Driscoll and Starik (2004, p. 56) place great value in prevailing and providing a strong basis by arguing that the natural environment should be a main stakeholder of a corporation and speaks of stakeholder identification
and salience when the natural environment is places ´on the agenda´. Moreover, another alternative approach to perceive the natural environment as a stakeholder is taken by Haigh and Griffiths (2009, p. 357) who convey that a greater understanding of the strategic landscape can help forecast how different environmental concerns and climate risks will affect corporations. The notions stipulated by Haigh and Griffiths (2009, p. 357) can help conclude that the natural environment per se does not have to be explicitly stated as a direct stakeholder for the corporation to adhere to its interests. A contextual understanding of the impact and awareness surrounding environmental matters can solely act as a strong standpoint in terms of taking environmental interests into consideration, hence indirectly act as a stakeholder.

Seeming that the environment is seen as a fundamental factor to the wellbeing of society, the corporations are seen to have an obligation to see to the natural environment, which should be taken into consideration when applying corporate strategies (Phillips, 2003, p. 146). Thus, the stakeholder theory can be applied as an overarching theory for our field of research when we intend to clarify that a corporation should place great attention towards all stakeholder interest in terms of generating a sound corporate strategy. This when we intend to address the corporations’ identification of environmental risk and the risk managerial strategies and further proceed and seek if, or what stakeholders influence them to consider environmental concerns, hence detect if the environment is seen as a stakeholder or if other stakeholder parties influence the corporations to oblige to environmental concerns. In that sense we share the thoughts of Freeman (2004, p. 364) who amplifies that attention should be placed on distinguishing a corporation's stakeholders and identifying their values when this unifies the corporation and results in economic performance when all actor collaborates to excel with their interests. To elaborate, we intend to see the natural environment as an important stakeholder and not least see how and if corporations address the environmental risks that are placed on the agenda for the pulp and paper industry and if we can elucidate what stakeholders and actors drive the corporations to address these concerns, directly or indirectly.

Even though many authors entail that the natural environment shall be seen and qualified as a stakeholder, there are advocates that state the opposite and argue if the inclusion of the natural environment as a stakeholder can be considered as a viable method in terms of elevating the corporations’ economic performance. Barter (2011, p. 11) speaks of the fact that authors critique the inclusion of the natural environment as a stakeholder when they argue that “nature cannot be dehumanised nor can humans be denaturalised”. Phillips (2003, p. 136) states that the natural environment has been excluded due to that stakeholder theory is through some people’s eyes only based on human-activity. Other authors state that if the natural environment is to be seen as a stakeholder, a new paradigm should be enforced by collaborating between ethical and political considerations (Barter, 2011, p. 11). This paradigm should place earth or life first with the use of humans as an integral and intertwined element (Barter, 2011, p. 11). Moreover, Phillips and Reichart (2000, p. 186) argue that the use of the natural environment can be problematic when the use of the fairness approach to stakeholder theory cannot be applied to non-humans, thus the natural environment, which therefore excludes the possibility of the natural environment being a stakeholder. The fairness approach merely entails that groups accept benefits from cooperation and the obligation to fairness arises when the parties are engaged in a mutually beneficial deal (Phillips, 1997, p. 51). Conclusively, Barter (2011, p. 12) advocates that the argumentations against the use of the natural environment as a
stakeholder is a question of epistemology and if humans and the environment can be viewed separately or intertwined and inseparable.

3.1.3 Agenda-Setting Theory and Media Coverage
The fostering of knowledge and the distribution of information regarding environmental concerns leads us into the agenda-setting theory. Not least when Anderson (2011, p. 535) promotes media and brings forth the notion that they attain a prominent agenda-setting effect in terms of influence and the communication of the portrayal aligned with the urgency linked towards environmental matters. Agenda-setting theory indicates the apprehension that there exists a profound correlation between the emphases the media covers on particular matters and the importance associated with these matters by the audience (McCombs & Shaw, 1972, p. 185). In that sense, media may set the “agenda” and help determine important issues based solely on the amount of attention and information provided encircling the specific topic. Scheele and Tewksbury (2007, p. 11) entail that the audience form attitudes from matters that are most salient and further enhances that the theory of agenda-setting is based on how the news that is conveyed portrays and helps the audience understand issues.

McCombs & Shaw (1972, p. 185) notes that “[...] the press may not be successful most of the time in telling people what to think, but it is stunningly successful in telling its readers what to think about”. In that sense, though the media can be seen to have a small amount of actual influence on the direction or magnitude of the audience attitudes, it is thought that the media has the ability to set the agenda concerning political and economic issues, which affects the salience of attitudes towards the stated topic (McComb & Shaw, 1972, p. 177). Hunter et al. (2013, p. 26) describes that the process of agenda-setting arises when media informs its audience what matters, hence the more attention placed on a matter, the increased importance that matter seems to have. Further, media can on behalf of the extent of coverage on some news tell the public how to think, thus attain the power to influence on issues that matter (Hunter et al., 2013, p. 26). Additionally, Hunter et al. (2013, p. 27) incorporate stakeholders and prevails that leaders of organisations ought to grasp the increasing impact stakeholder media has over organisations’ strategies and that they can convince others the importance of certain subjects and how to respond. Though, critique towards this approach concerns the fact that it is not defined in which way media influences the relationships among management and stakeholders (Hunter et al., 2013, p. 27). Shaw (1977, p. 97), who has formally developed the agenda-setting theory, infers that media has also manipulated the public concerning political, economic and social matters and that it may not in effect be a matter of influencing the audience attitudes but instead on their cognitions and cognitive changes. Even though media is seen to set the ‘agenda’ one cannot conclude how influenced corporations and other actors are to the salience of certain topics. With that said, we cannot assume that corporations take all salient matters into considerations, though we can argue that they can be highly influenced by what is emphasised in media.

In terms of technological evolution, it is seen that the internet has changed the ways of communicating when the use of email, online news, forums and chatrooms has revolutionised the way one interacts and has opened the door to new territories (McCombs, 2005, p. 544). This paves the way for an increased amount of salience aligned with a wider range of different agendas and this leads us to question under what circumstances certain attributes dictate the way one thinks and speaks of the salient subjects (McCombs, 2005, p. 546). McComb (2005, p. 544) describes framing as the
process of attributing the salient object when it describes what is under consideration though it also places attention on the way of communication and its public and how the information is presented (McComb, 2005, p. 546).

Other issues that arises concerning agenda-setting theory concerns the nature of the salient subjects and that the less amount of exposure and experience one has to the subject, the greater chance that they would depend on the media to supply them with information and a suitable interpretation (Brown & Deegan, 1998, p. 25). Brown and Deegan (1998, p. 25) mention authors that have placed subjects into different categories according to what manner people had personally experienced them and issues with a higher degree of personal relation was termed ‘obtrusive’ whilst matters with little personal contact were termed ‘unobtrusive’. Thereon, Brown and Deegan (1998, p. 25) found that the audience exposed to news coverage placed a considerable amount of reliance on the media as a source of information, mainly concerning obtrusive issues. In that sense, agenda-setting was not prevalent for a number of obtrusive matters when people can rely on real-world circumstances and interpersonal discussion in terms of information and in the case of unobtrusive issues (included matters aligned with the environment), one relies on information achieved by the media (Brown & Deegan, 1998, p. 25).

In that sense, the wider dispersion of technological channels to distribute news coverage can have had an impact on conveying the importance of environmental concerns. This when environmental issues have been on the ‘agenda’ more than ever in present times. With that said, corporations may feel inclined to address these topics and assess environmental risks more than ever due to an increased attention and knowledge of the subject as a result of a news coverage. Corporations may in that sense feel obliged to address topics of high salience to fulfil the interests of their stakeholders. Thus, one can also argue that this can result in higher transparency of environmental matters, for instance within annual reports and other corporate publications. If strategies to assess environmental risks are not taken, a loss can be at stake when unforeseen costs can arise, hence negatively affect the financial state.

Agenda-setting theory can help us elucidate environmental risks that are placed on the agenda in present times. In that sense, we can through an extensive search find apparent environmental risks that are frequently portrayed and associated with our area of research. Thereafter, we can explore if our dataset takes these salient environmental risks into consideration, the risks that the agenda-setting theory conveys are of relevance today through the magnitude of distributed information.

3.1.4 Integrating Stakeholder Theory and Agenda-Setting Theory
When fully evaluating and understanding the fundamentals and underlying notions of the regarded and presented theories, one can attempt to integrate the stakeholder theory with the agenda setting theory. This to confine in what the audience is exposed to while simultaneously striving towards adhering to stakeholder interests when this can extensively impact the corporation's performance (Jensen, 2001, p. 8).

Distinguishing stakeholders’ main values and interests is seen to be of high importance when this brings the involved actors together and helps the corporation prosper, hence increase the economic performance (Freeman et al., 2004, p. 364). When applying intuitions from the agenda-setting theory, media coverage and other distribution channels, this can help societal actors, whom can be regarded as stakeholders, to adhere to certain
topics which can foster as important issues that they may consider important for corporations to address. McCombs and Shaw (1972, p. 185) enlighten this by confirming that media can set the ‘agenda’ and advise the audience in terms of determining important issues of interest. Further, McCombs and Shaw (1972, p. 185) notifies that the distribution channels are lucrative in telling its audience what to think about. For our study, this may very well imply an increased attention for stakeholders in terms of them expecting corporations to direct attention to these prevalent interest, hence tell the corporations to place attention on environmental risks and their potential impact on their operations. Even though the environment cannot communicate verbally per se, one could speculate that the increased salience regarding environmental concerns and present research can be the environments indirect way of communicating its expectations for corporations to adhere to their interests, the safeguarding of the planet. This is of essence when we imply, along with support from Phillips (2003, p. 134), Driscoll and Starik (2004, p. 55) and Freeman et al. (2004, p. 364), that the environment should be regarded as a stakeholder.

When intertwining the increased media coverage on environmental concerns and corporate performance, one can argue, connected to the agenda-setting theory, that the news influences the public on how to think and has eminently placed effort on influencing the audience interests, thus made environmental topics more salient. Consequently, along with the increased urge to direct attention to climate issues in present times, one can therefore assume that corporations can satisfy and supply the environment with its interests in order to benefit economically. Not least when the assessment of environmental risks can help detect unforeseen events. Moreover, the fulfilment of stakeholder interests can imply corporations to attend their interests, hence obtain mutual benefits (Phillips, 2003, p. 134). In our case, the identification of environmental risks can help corporations avoid financial losses and can consequently result in a greater preservation of the natural environment. This though we intend to attract attention solely at the avoidance of financial losses through a corporate perspective and highlight the environmental benefits as a spill over effect.

Thus, the increased attention towards the environment and environmental issues through the media has spread the subject of interest not only to individuals, but also to corporations. One can also assume that the media attention has led to that the public, there among stakeholders, have gained more knowledge and attained a closer relationship with environmental issues, which can affect the way they believe corporations should act. In that way, the salience of a topic generated by the notion of ‘agenda setting’ can inquire a greater interest for stakeholders to expect corporations to address the salient matter, and in our case the topic of environmental risks.

### 3.2 Risk Management

In terms of understanding how corporations tackle different risks, it is of value to understand how risk is defined, how risks are identified and further how corporations implement strategies to address these. Risk is a broad term and it can be used in different ways depending on who uses the term (Power, 2004, p. 60). People in general have a tendency to associate risk negatively, even though the benefits of risks and risky activities are positively correlated in the real world (Sokolowska & Sleboda, 2015, p. 1252). Similarly, Peters et al. (2004, p. 1350) also emphasises that people tend to view risk and benefits as negatively correlated, though the reality shows evidence of the opposite. As the real relationship looks, risk and benefit has a positive correlation, one example of this is that stocks with higher risk offers higher return (Peters et al., 2004, p. 1350). However,
it is important to note that the focus of risk in this study is on the negative aspects that follow uncertainty. Thus, the environmental risks that are being assessed are seen as risks that firms need to manage in order to reduce potential negative outcomes for corporations’ operations and finances.

In light of financial executives, risk management has shown to be one of corporations’ most important objectives, and it is a part of their business model that has to be taken seriously (Froot et al., 1993, p. 1629). Even though it has existed before, Power (2004, p. 59) states that risk management became more prominent after the year of 1995 and particularly after the collapse of Barings bank and the torn reputation of Shell, and this was the period when the risk management research area exploded. Similarly, Nocco and Stulz (2006, p. 8) also acknowledged the increased interest in risk management since the late 1990’s, and they describe that the positions related to risk management that are present today within firms were formed during that period. Thus, one can say that this was the time when risk management and risk management practices had its real breakthrough.

Risk management can be seen as the act of identifying, quantifying and mitigating the occurrence of risks and events that can have an impact on the corporation and create deviations from the planned course of action (Maylor, 2010, p. 220). Maylor (2010, p. 219) mentions that the consideration of risk is one aspect of managing uncertainty, and that it is of value to identify potential risks, and eminently analyse each one, hence evaluate the risks and allows them to be handled on an on-going basis. International Finance Corporation (2014, p. 19) also speaks of the objective and the prime importance of risk assessment and that it helps detect potential negative impacts in order for you to establish relevant and suitable strategies to address them.

Looking more closely into the managerial acts of identification, quantification and mitigation of risks, the process of identification eminently consists of the process of predicting the occurrence of eventual events and a predicted likelihood of the events appearance (Maylor, 2010, p. 220). This when the corporation’s leadership are prone to decide within their corporate strategy to as which risks to adhere to and further, which mitigation strategies to utilise. Further, after identifying the elements that are to be handled, the control and mitigation process steps in to ensure that the likelihood of the risks is decreased or mitigated, this procedure can include erosion of buffers or to outsource the risks (Maylor, 2010, p. 222). Also, the procedure of quantification is of value to determine how risky an event is and its potential impact and this can be done by the use of both qualitative and quantitative methods. These methods range from obtained perceptions and in-house brainstorming to distinguish an approximate perception of impact and severity to the use of mathematical methods such as sensitivity analysis and expected value (Maylor, 2010, pp. 223-225).

### 3.2.1 Risk Management in Corporations

There are two fundamental ways of managing risks in corporations, the first way relates to the management of one risk at a time on a decentralised and compartmentalised basis, and the second approach relates to the act of viewing all risks together within a strategic and coordinated framework (Nocco & Stulz, 2006, p. 8). The second approach described is more known as Enterprise Risk Management (ERM) (Nocco & Stulz, 2006, p. 8). According to Breasley and Showalter (2015, p. 37), ERM concerns the identification of the risks that are considered to have to largest impact on current business drivers and
strategic initiatives, this so that the management can prioritise and rank the identified risks. Furthermore, D’Arcy (2001, p. 2) acknowledges ERM as the latest name for the overall risk management approach towards business risks, therefore the term includes corporate risk management, strategic risk management, business risk management. It has been suggested that effective ERM can lead to firms developing long-run competitive advantages compared to managing risks individually (Nocco & Stulz, 2006, p. 8). Therefore, one could argue that management of environmental risks can be incorporated in the practice of ERM within corporations, though we have failed to acknowledge specification regarding what is currently included in ERM.

Liebenberg and Hoyt (2003, pp. 37-38) emphasise that ERM enables corporations to manage an extended amount of risks and that it is prone to increase risk management awareness which is synonymous to better operational and strategic decision making. Furthermore, Lundqvist (2014, p. 393) enhances that there is a general notion that ERM’s popularity in light of modern risk management perceptions has occurred from an acknowledgement of an enhanced pressure on corporations to holistically manage risk. Corporations nowadays face a vast amount and not least a wider range of risks. These risks can stem from issues in line with globalisation, climate issues, industry consolidation and deregulation and in that sense, ERM stipulates as a coping mechanism for the increased pressures that are placed on firms and their active managing of risk management (Lundqvist, 2014, p. 394).

Within the spectra of risk management, it is possible to use hedging and other derivatives to mitigate some risks. For example, if a firm is very dependent on a certain raw material, it can use hedging mechanisms to mitigate risks of price fluctuations or availability of that exact material (Froot et al., 1993, p. 1629). This is connected to our study in the way that the selected industry and companies are dependent the raw material wood, and have some sort of manufacturing.

Like mentioned in the introductory chapter, there are several different types of risks that corporations face, and according to Dowd (1998, pp. 166-202) these can be divided into five categories: business risks, market risks, credit risks, operational risks and legal risks. Looking more specifically into each category, business risks are related to risks of the particular market or industry (Dowd, 1998, pp. 166-168). Market risks are connected to changes in market conditions, such as interest rates, fluctuations in prices and exchange rates (Dowd, 1998, pp. 166-168). Moreover, credit risks firms face is related to risks of not receiving payments owed by debtors (Dowd, 1998, pp. 166-168). A corporation’s operational risks are associated with failures in the internal system due to mechanical problems or human errors (Dowd, 1998, pp. 186-202). Lastly, the legal risks are related to that contractual obligations are not met by other parties (Dowd, 1998, pp. 186-202). As can be noticed, the areas of risks facing corporations are many, however, we have failed to find any clear way of positioning a firms’ environmental risks, since they might be included in an indirect way in more than one category. For example, environmental risks could be related to the category of business risk due that the risks are business or industry specific. One can also assume a connection to the operational risks due to potential harm to production facilities or material. Furthermore, environmental risks could be related to legal risks in terms of changed regulation and restrictions that potentially causes implication for the corporation. Due to the focus on climate change and risks coming from the natural environment the focus will be on risks impacting the operations, hence the environmental risks that mainly are place in the operational risk
category, and also risks belonging to the business risk category due to the focus on the particular industry of pulp and paper. Moreover, one could also argue that the corporations within the pulp and paper industry’s dependency on wood could classify some risks within the market risks, and this in terms of fluctuations in raw material price.

Haushalter (2000, p. 107) states that there is no thorough explanation for utilising risk management as a corporate policy and questions still exist concerning to what degree a company hedges risk and what effect risk management strategies has on firm value. Haushalter (2000, p. 108) presents evidence entailing that there is a positive correlation between the amount of hedging and financial leverage and that this implies that risk management is implemented to ease financial costs. Within financial securities, organised future markets exist and the classic rationale is to promote hedging and allows one to transfer the risk of a commodities price change to actors who are willing to bear a greater extent of risk (Ederington, 1979, p. 157). In terms of environmental change, Simons (2011, p. 1) concludes that uncertainty is a problem and the uncertainty and disability to predict certain environmental evolvements results in bet-hedging, a risk spreading strategy. Bet-hedging is thought to occur mainly due to the uncertainty and difficulty in predicting environmental changes and is often associated with an insurance policy (Simons, 2011, p. 4).

Based on Klinke and Renn’s (2012, p. 282) work related to risk governance and the categorisation of risks, one can divide risks into three categories: acceptable risks, tolerable risks and intolerable risks. To specify, acceptable risks are related to risks with low probability and associated with minor impact if they were to occur (Klinke & Renn, 2012, p. 282). Hence, these risks are not perceived as necessary to reduce. Tolerable risks are commonly worth pursuing since they have higher probability and higher impact, but still within reasonable levels (Klinke & Renn, 2012, p. 282). Lastly we have the intolerable risks, which are risks that cannot be taken on due to their high probability and catastrophic impact (Klinke & Renn, 2012, p. 282). These risks must be managed. As this indicates, risks in general has to be evaluated based on probability and impact and handled thereafter.

### 3.2.2 Sustainability Risk Management

Sustainability is primarily built on three pillars; economic, social and environmental (Boström, 2012, p. 3; Duić et al., 2015, p. 1; Hansmann et al., 2012, p. 451; Schoenherr, 2012, p. 116). Within the research area of sustainability and risk management, one sees that the focus has been directed towards economic sustainability and somewhat towards environmental sustainability, though, in terms of social sustainability there has been less focus in regards to risk management (Anderson, 2009, p. 26). However, in this research the focus is not directed towards the social aspect of risk management, though we see this as another important angle of risk management that needs elaboration.

Sustainability risk management is according to Anderson (2009, p. 25) related to environmental and social risks, and has arisen due to the fact that corporations are nowadays being pushed to take environmental and social responsibility in consideration. This can further be connected to the Agenda-setting theory and stakeholder theory, in which one can explain the increased attention towards these factors due to societal pressure and the expectations of corporations to adhere to stakeholder interests to mutually feel satisfied. So, the need to identify and evaluate the corporation’s stakeholders and the topics placed on the ‘agenda’, which can affect societal interests,
can help the avoidance of financial losses. This when corporations are greater informed of environmental risks and as a spill over effect, helps attend to the environmental preservation. Further, corporations can absorb essential information from other parties that influence them to assert to environmental concerns. The collaboration and wellbeing of stakeholder parties can help detect and influence corporate managers in terms of elucidating which risks they feel of presence to address. With that said, it is also a question of what risks other actors associated with the corporation identify and feel of urge to attend to.

Anderson (2009, p. 26) further emphasises that sustainability risk management needs to be a vital component of ERM, which is a concept that was elaborated in the previous section. Different sustainable risks can be linked towards global warming, climate change, boycotts, environmental liability, ecosystems, social responsibility et cetera (Anderson, 2009, p. 26). In terms of sustainable risks, Anderson (2009, p. 26) enlightens the fact that there have been authors that have placed attention on the completion of books related to sustainability, but that there still exists a lack of research from a risk managerial perspective, and few seem to recognise a need for it.

In line with the notions of Stapler and Hall (2011, p. 4), Anderson (2009, p. 26) further speaks of sustainability risk management and that it can be related to and associated with the Triple bottom line (TBL). He emphasises that there is an importance in addressing all three prominent areas to maximise TBL, this when he elucidates that the costs in line with risks are subtracted from the financial performance (Anderson, 2009, p. 26). Easy put, if there is a reduction of risk costs aligned with environmental and social factors, eminently, the TBL will increase. The broad scope and exposures related to sustainable risks concern the risks mentioned above and Anderson (2009, p. 6) emphasises that factors associated with global warming and climate change is the most significantly spoken of risk and most widely approached in literature and business. This risk merely concerns that the earth’s atmosphere is increasing in warmth and will continue that way and emphasises that human activity is the main driver, this due to greenhouse gas, burning of fossil fuel et cetera. Other sustainable risks that arise in Anderson’s (2009, p. 30) research includes ecosystems which concerns water in lakes and rivers, forests and the pressure on these areas. Also, social responsibility poses as another sustainable risk in terms of treatment of human resources. Though, strictly in terms of sustainability risk management, Anderson (2009, p. 31) summarises the act of performing sustainable risk management as preparing reports, engaging in issues in line with waste reduction, greenhouse gases, usage of more efficient energy systems, anticipating changes in regulations, considering the environment in terms of production et cetera. As can be noted here, the sustainable risks that are in focus in this research are the risks that come from the natural environment, as a result of climate change and so forth, hence not on all risks associated with sustainable risks management.

From another perspective, SearchCIO (2015) describes sustainability risk management as a strategy used in business that aligns profit goals with the corporations’ environmental assessment and policies. Further, SearchCIO (2015) enhances that the major objective of sustainability risk management is to make the alignment as efficient to be able to grow a business while simultaneously seeing to the environment. The use of an effective implementation of a sustainability risk management system can enhance the chance of identifying aspects of environmental importance that can influence the supply chain,
operations and production (SearchCIO, 2015). Examples of prevalent issues can be climate change, renewable energy and changes in government regulations.

Even though research on sustainability, environmental issues and risk management are well elaborated, the research field of risk management in relation to environmental issues and risks is quite limited, and there seems to be a need for exploring the subject further which paves the way for our field of research.

3.2.3 Key Concerns of Risk Management
In this section of the thesis we have presented the research area of risk management and its relevance for this study. Conclusively, risk management is a highly important part of corporations and is used by them to deal with uncertainty, and can result in reduced risk of financial losses. The acts of identifying, quantifying and mitigating the occurrence of risks and unforeseen events that can impact the corporation are the three dimensions that are mostly related to management of risks. The focus in this research when collecting data is on the dimensions of identification and mitigation, due to the assumption that quantification techniques used are not published in the same way as the other two, and would require more extensive direct information. Throughout this part the underlying assumption and motivation for the importance of risk assessment is that it can help detect potential negative impacts. Moreover, it is important to emphasise that the focus of risk in this research is on the negative aspects that follow uncertainty.

3.3 Environmental Risks
As mentioned, the climate change in the world today is something that cannot be denied, and it is important for corporations to understand their own impact and relationship with the external environment (Stead & Stead, 1994, pp. 28-29). Though, one cannot forget how the climate change affects the firm as well, and the risks that arises from a change in the climate. Porter and Reinhardt (2007, p. 22) acknowledges climate change as having a growing part in corporate competition. They put emphasis on that this topic should be highly considered by firms and that the issue of climate change has to be addressed with strategic tools (Porter & Reinhardt, 2007, p. 22). This further indicates a need for corporations to address and manage environmental risks. Also not least when the awareness among corporate audiences is increased nowadays and this in itself can motivate corporate managers to adhere to the natural environment to fulfil the interests of other stakeholders. Thus, the natural environment per se does not have to be a direct stakeholder for the corporation to attend to its interests. The environmental risks that it bears with it should essentially be a strong enough initiative to initiate actions to reduce the potential impact it can have on corporate finances.

To further strengthen the approach towards researching environmental risks, Heil (2016) emphasises that environmental risks embodies a large and increasing area of risk management, not least due to a significant number and intensity of environmental disasters. Heil (2016) further states that the rise in natural disasters can result in a wide dispersion of losses in different areas. One example could be if managers at a corporation have to tackle issues in line with a reduction in production if raw materials become affected due to climate issues (Heil, 2016). Heil (2016) also refers to the fact that natural disasters can imply injuries or death of employees, hence a loss of human capital and also the need for the employer to cover benefits if they are absent from their jobs.

As was noticed when conducting the literature search on the subject of environmental risks, it seems to be hard to establish a clear definition of environmental and climate risks
in a general sense, and no clear description of what environmental risks that exists. However, Weinhofer and Busch (2012, p. 122) define climate risks as “all potential negative impacts on business activities caused by the physical effects of climate change”. This is in line with our previously described perception of risks as something that can impact the firm negatively. Furthermore, according to Dow et al. (2013, p. 386) climate risks and risk associated with climate change are increasing in scope, which further increases the need for managers to manage and adapt to these risks. We believe this research could provide knowledge on what environmental risks managers within the pulp and papermaking industry identify as important to adhere to, and how these are managed by the corporations. Further to see if corporate managers perceive the environmental risks that are seen to be most salient within the forest industry to be the same as the ones they take into consideration. We also aim to explore what stakeholders and factors that drives the corporations to adhere to environmental actions in terms of avoiding financial havoc. In our study, we intend to make use of the risks ‘set on the agenda’ and most salient in recent times for the forest industry, risks associated with extreme weather conditions and we have elucidated the most salient risks through an extensive search in different media distribution channels regarding most present and emphasised environmental risks in current times. These risks will be elaborated on further throughout the study.

Even though the climate is changing worldwide, Weinhofer and Busch (2012, p. 121) argue that various sectors of business and regions of the world are affected to different extents by changes in the climate and climate risks. This could be an indication that certain environmental risks are more relevant in some areas than other as well as for some types of industries. For instance, like mentioned in the introduction, SMHI (2014 b) and SMHI (2014 a) acknowledges that the industries of agriculture and forestry are highly affected by climate change, and that environmental risks can have crucial and complex consequences for firms within these industries. This acknowledged increased risk for corporations within these business sectors acts as the base for the selected industry of pulp and paper corporation that will be of focus in this research.

Like mentioned, Weinhofer and Busch (2012, p. 121) conducted a study where they aimed to explore electricity-producing organisations and their management of climate risks, in which they found out that firms tend to perceive climate change as a material problem for the firm, and that it can be hard to estimate the negative impact climate change can have on the business. Further, the authors found out that firms who manage these climate risks use the same process of managing these risk in the same way as any other risk (Weinhofer & Busch, 2012, p. 121). Continuing, Plate (2002, pp. 2-11) writes about risk management of floods as a part of firms’ operational risks. He describes that in a narrow sense flood management regards the process of managing an existing flood risk situation, and in a wider sense it relates to the planning of a system that can reduce the flood risk (Plate, 2002, p. 3). Further, Plate (2002, p. 3) states that in order to conduct a good risk analysis the firms can use hazard and risk maps, which are drawn by means of Geographical Information System (GIS). This can be connected to the previously described process of risk management within a firm, which consists of identification, mitigation and quantification risks (Maylor, 2010, p. 220). Arnell and Delaney (2006, p. 227) also emphasise that it is important for corporations to be aware of the potential risks that are connected to climate change, and also to understand the risks potential impact as well as defining a response for these.
Another study related to a specific environmental risk has focused on water supply companies in England and Wales, and how these adapt to climate change (Arnell & Delaney, 2006, p. 228). It was shown that awareness of climate change is high within this industry, and that regulators have forced these types of firms to consider climate change and its impact in a rigorous and consistent way (Arnell & Delaney, 2006, p. 228). Arnell and Delaney (2006, p. 228) could also see that the degree of concern about the impact that climate change could have depends highly on the geographical area they operate in and its conditions (Arnell & Delaney, 2006, p. 228).

Environmental risks are thought to be incorporated in corporations’ everyday operations and the ability to identify possible threats is of importance when natural disasters and environmental factors can become costly for corporations in terms of liabilities (VTT, 2016). VTT (2016) helps define environmental risks and concludes that they concern risks that target the health of individuals, the working environment, other organisms and towards the physical environment. Continuously, these risks can arise from waste, chemicals, gases, raw materials, oils, products, emissions in the atmosphere as well as emissions towards land and waterways (VTT, 2016). Environmental risks are also thought to emerge from effluent that can intoxicate waterways and also from the use of products that can be dangerous for the environment (VTT, 2016). Further, environmental risks of this kind can be hard to identify when they can be hidden and give rise to damage during a considerable amount of time which amplifies the importance to adhere to them. AIG Europe (2007) also defines environmental risk as something that causes impurities which can lead to direct damage, to a third party or towards the ambient environment and organisms therein. Continuously, all elements within the business line can be associated with environmental risks, all from the acquisition of raw materials and different facilities, the production, transportation, constructs of the properties et cetera (VTT, 2016). This further strengthens the value of adhering to environmental risks and the dedication placed towards implementing sound risk managerial strategies to help reduce the negative financial impact that may arise.

Related to what drives environmental risks, Chichilnisky and Heal (1993, p. 23) states that environmental risks arise mainly from human activity and that there are two prominent ways for society to respond to risks aligned with uncertainty, for instance future climate, emissions and so on. These are mitigation and insurance when mitigation refers to the act of measuring to reduce eventual damage and in terms of flood management, one way to mitigate is to build canals and drainage systems to reduce the impact (Chichilnisky & Heal, 1993, p. 24). Chichilnisky and Heal (1993, p. 23) further amplify that if certain procedures are taken to reduce climate risks, the risks become internal, thus decided by policies. In terms of insurance, Chichilnisky and Heal (1993, p. 23) state that it does not reduce the possibility of damage and merely concerns compensation to whom is victimised by an event. One thing that is sure is that environmental risks are substantially difficult to quantify and one may never be able to approximate the eventuality and effect of these risks (Chichilnisky & Heal, 1993, p. 24). The adoption of risk transferring is also apparent when assessing different risks. This occurs when a corporation decides to share its risk with an alternative party, for instance an insurance company by collecting policies that can cover certain risks (Heil, 2016). The concept of insurance is thought to be a vital method of risk managerial strategies when policies are seen to cover property risks as fire and natural disasters among others (Heil, 2016).
In terms of how environmental risks can affect different aspects in the value chain, Weinhofer and Busch (2012, p. 124) describe that the negative impacts of climate change on corporate business activities can be related to resource supply, production and product distribution. For instance, related to resource supply the firm can face the risk of that the supply of needed resources are interrupted or damaged in terms of quantity or quality (Weinhofer & Busch, 2012, p. 124). The production aspect is related to the risk of a disruption in production due to damaged production facilities as a result from natural disaster (Weinhofer & Busch, 2012, p. 124). Lastly, the product distribution can, just as the production, be affected by the damage of production facilities (Weinhofer & Busch, 2012, p. 124).

3.3.1 Governing the Adaption to the Environmental Changes

In one article, Storbjörk (2007, p. 457) addresses the importance and essence to adapt to different climate conditions and entails that it has become a vital element of governing climate change. Further, three challenges appear when fully grasping the need to broaden our understanding concerning how, when and under what circumstances, these are primarily the safety versus conflict in terms of political priorities which can concern the reduction of vulnerabilities for society, the decision of what to adapt to and finally, taking responsibility for the imposed actions (Storbjörk, 2007, p. 457). Managing risks aligned with climate change requests implementations of a diverged range of policies, programmes and different strategies at different levels and that municipalities and actors at a local area are thought to act as both the problem and solution to issues of climate change (Storbjörk, 2007, p. 458). Storbjörk (2007, p. 458) speaks of the fact that local and private actors, such as corporations, acts as main players in coordinating and facilitating different strategies concerning risks inherent with a changing climate. Moreover, Storbjörk (2007, p. 458) inquires that the risk management encircling climate risk can enhance the risk awareness for societal actors and can help generate a greater understanding and preparedness. Here, the strategies of risk management and the ability to plan are seen as crucial elements to the governing of climate risk. Finally, the identification of risk managerial strategies that can help diminish the vulnerability is an important concern for the future (Storbjörk, 2007, p. 467).

Further, in terms of applying a more socio-economic aspect towards reducing risks in line with climate issues, Thomalla et al. (2006, p. 39) entails that four different distinct research areas have been derived which consists of disaster risk reduction, climate change adaptation, environmental management and poverty reduction. Thomalla et al. (2006, p. 42) emphasise that impacts of climate change are hard to quantify when the variability can appear during a long period of time and can have large environmental and economic consequences.

When assessing the concept of risk management in light of corporations it is of value to understand how risk managerial strategies can be implemented within corporate strategy to address environmental risks, all to decrease the amount of financial exposure. So, when applying the process of risk management to the risk management of environmental matters, Anderson (2002, p. 157) states that the use of risk management can be especially effective in reducing environmental risk costs. When speaking of Anderson (2002), one can say that he is to be seen as a credible advocate when it comes to matters in relation to governing the adaption to climate change. Risk assessment approaches can help evaluate and identify eventual losses and can include questionnaires, check-lists, financial statements, interviews and other techniques (Anderson, 2002, p. 157).
p. 157) also entails that these techniques can be expanded to incorporate environmental risks. Further, another component that is seen to be of value to environmental management systems is loss control and reduction that can be used to control environmentally harmful events such as substances that can affect for instance the air and waterways when it can become tremendously costly and hard to extract (Anderson, 2002, p. 158). Other risk managerial elements of value to take into consideration is the procedure of crisis management which makes sure that risk managers develop plans in terms of crisis’s, such risks can encircle natural disasters as tornadoes, floods, hurricanes, fires etc. and also criminal and terrorist acts (Anderson, 2002, p. 158). Anderson (2002, p. 158) also states that environmental elements of this manner have recently been implemented in crisis management.

Another perspective to the environmental risk managerial process is claims management which concludes that environmental accidents are inevitable even though an implementation of loss control and reduction (Anderson, 2002, p. 158). This calls for risk managers to handle the environmental claims and says that environmental losses are not always evident in terms of defining liability and damages and that it can be troublesome in resolving them (Anderson, 2002, p. 158). Other areas that can result in loss exposure is the area that concerns product liability and issues in relation to addressing product quality control and liability risks. Programs in accordance to product liability control can be used to minimise liability and environmental claims (Anderson, 2002, p. 159). Finally, the most apparent and evident area for an involvement in environmental risk management is risk financing and state that environment insurance markets have evolved during the years, both in Europe and in America (Anderson, 2002, p. 159). In terms of environmental insurance, Anderson (2002, p. 160) says that if additional countries were to implement and adopt financial responsibilities through the use of legislation in an environmental manner, environmental insurance markets would expand further and play a crucial role when regulating and handling environmental risks.

3.3.2 Summary of Key Concerns regarding Environmental Risks

Within the previously presented section, we have elevated concerns in relation to environmental risks that acts as a sound foundation to this research. When addressing concerns associated with environmental risks, the topic of climate change is often salient and appears frequently. This not least due to the increased urgency and magnitude in present times when the number of natural disasters has increased and matters in relation to the changing climate is something that is often highlighted, not least in media.

Weinhofer and Busch (2012, p. 122) highlights the urgency to address climate risks and defines this risk category as “all potential negative impacts on business activities caused by the physical effects of climate change”. Further, other advocates speak of the importance of directing attention towards environmental risks when it is an expanding area of risk management, and also due to the significant number and intensity of environmental happenings and disasters. Moreover, environmental risks are highly apparent within the corporate business line, not least in the process of acquiring raw material, facilities, production, transportation among others. Along with these stated elements, environmental risks can also impact the resource supply, production and product distribution. This further strengthens the need to place our prime focus on environmental risks within corporations when they are apparent and can inevitably result in damaged finances. The importance of addressing environmental risks has left a strong intuition to incorporate risk managerial strategies within the corporation to address
environmental risks, this not least when natural disasters and other weather conditions can become costly for corporations.

3.4 Environmental Initiatives and Regulations

Seeming that prior literature has expressed and portrayed an increased salience and importance towards environmental issues during the past years, more regulations and environmental incentives have arisen to help attend environmental issues. Kleindorfer (1996, p. 196) promotes this and envisions three different stages when discussing the procedure of implementing regulations. The first stage concerns the specification of a standard that can arise by a regulator, a firm, interest from society or other potential actors. Further, the second stage encircles the procedure of determining a method for monitoring the performance and adhere to the success of the proposed standard and one way to tackle this stage is to set up internal procedures, for instance environmental management systems (Kleindorfer, 1996, p. 197). Finally, the third stage merely concerns different rewards and punishments that are incorporated to achieve and encourage compliance with the different standards. The punishments can cover fines and penalties that can influence the reputation in a negative way whilst the rewards can concern government benefits and subsidiaries as reduced regulatory inspection and can also arise from a positive deliverance of valuable information to interested actors (Kleindorfer, 2006, p. 196). Also, within the third stage, economical benefits can arise, mostly encompassing greater sales due to better reputation of engaging in environmental responsibility (Kleindorfer, 2006, p. 196). The greater sales can mostly arise within segments that are thought to be sensitive to environmental actions.

Rugman and Verbeke (1998, p. 363) also elevates the field of strategic management and regulations in concern to the natural environment, this mainly when it is thought to affect corporate strategy. Rugman and Verbeke (1998, p. 363) state that we have seen an increase of environmental regulations and also, an elevated societal notion that environmental issues can have a negative impact on manufacturing activities. In terms of economic performance, it is also known that an adoption of environmental standards and management systems can lead to advantages at the firm level and impose improved quality, lower costs and increased net benefits (Rugman and Verbeke, 1998, p. 364). Gilley et al. (2000, p. 1999) explore the impact of environmental initiatives on corporations’ economic performance and enhance that an improved environmental performance improves perceptions of corporations’ future economic state. Hence, reveals a positive relationship between environmental and economic performance and that stakeholders will entail positive notions towards an engagement in environmental initiatives, this also due to increased reputation (Gilley et al., 2000, p. 1215).

3.4.1 Environmental Management System

Nowadays, since the matters associated with environmental concerns has received an increased amount of attention, there has been a growing interest in implementing Environmental Management Systems (EMS). This can be linked to the increased salience environmental issues have received through the distribution of media coverage, hence placed on the agenda. Further, Bebbington et al. (2008, p. 345) elevates that environmental matters can affect the legitimacy through a damaged reputation if corporations fail to satisfy societal expectations. This is of value for us when a diminished reputation can affect a corporation’s financial state (Brown & Deegan, 1998, p. 22). This leads us towards enhancing the knowledge surrounding the implementation of certain systems, among them EMS.
To specify, EMS refers to strategic management approaches related to how the organization will address its own impact on the environment and it is used to gain control over their environmental impacts and helps them achieve their environmental goals (Daily & Huang, 2001, p. 1540; Darnall et al., 2007, p. 30). The potential benefits coming from EMS are pollution prevention, improved environmental performance, enhanced compliance, new customers/markets, increased efficiency, enhanced employee morale, enhanced relations, public and employee awareness of environmental issues and responsibilities (EPA, 2016). Moreover, it has been found that having a more sustainable business management one can actually enhance the economic performance of the firm (Stefan & Paul, 2008, p. 57). According to NASA (2014) EMS and risk management are similar activities, implemented to actively identify eventual positive or negative impacts from corporate operations. EMS is also seen to support acts of risk management to be able to cover and manage environmental risks (NASA, 2014).

Darnall et al. (2008, p. 30) enhance the fact that some researchers question the validity of EMS’s seeming that corporations can ultimately claim to adopt an environmental management system but do not take any actions to reduce environmental harm, thus claim to adopt the system to incorporate a sound trust and reputation, as it is “the right thing to do”. Further, Darnall et al. (2008, p. 31) explain the concept of EMS as a collection of internal policies, assessments and different actions that influence and affects the organisation and its association with the natural environment. The specifics, features and overall content of the EMS varies substantially amongst organisations but the main intuition and notions are consistent, thus the establishment of an environmental policy and the assessment of internal impacts of the organisation's operations in relation to their environmental impact (Darnall et al., 2008, p. 31). Along with this, the EMS provides a framework for generating goals to diminish environmental impacts, administer and contribute with resources and training workers etc. (Darnall et al., 2008, p. 31). Also, organisations that adopt EMS, can benefit from increasing and improving their compliance, which as a result can increase and influence their corporate image and generate an increased amount of profits (Darnall et al., 2008, p. 32). Further when incorporating notions of EMS with risk management, the Australian Government (2004, p. 9) acknowledge the analysis of environmental risks as a process within EMS, and is used to capture of all environmental impacts. This give clear indication that management of environmental risks are included in practises of EMS.

There is a wide discussion on whether involvement in environmental practices are beneficial for organisational performance or not. Several articles show results that indicate that these types of environmental initiatives actually affect organisational performance in a positive way (Melnyk et al., 2003, p. 344; Pagell & Gobeli, 2009, pp. 290-291; Schoenherr, 2012, p. 125). Thus, there is evidence showing that having sustainable strategies and goals affect the firm in a positive way, which motivates the need of research within the area of sustainability. This can also be backed up by Stefan and Paul (2008, p. 57) who state that environmental protection is most often viewed as some sort of burden implemented on firms by the government and which is mostly regarded as a cost, rather than something favourable for the firm (Stefan & Paul, 2008, p. 57). However, Stefan & Paul (2008, p. 57) also conclude that having a more sustainable business management can actually enhance the economic performance of the firm (Stefan & Paul, 2008, p. 57).
ISO 14000 is a standard that is often implemented within environmental management systems. ISO 14000 is a series of management system standards that is issued by the International Organisation for Standardisation (ISO) which covers issues for environmental performance (Kleindorfer, 1997, p. 194). ISO 14000 is seen as an endeavour to establish an international standard for environmental management which foundation lies on the notion that better environmental performance can be accomplished when aspects in accordance to the environment are systematically identified and managed (Pokinska et al., 2002, p. 585). Moreover, ISO 14001 is a newly developed standard and has become the most utilised international standard in terms of implementing EMS and is seen as a standard to manage a corporation's synergy with our environment (Heras-Saizarbitoria et al., 2013, p. 88). Since its launch in 1996, the standard has continuously grown and been implemented in a vast amount of countries and has proven to be a cornerstone concerning a corporation's approach in terms of handling the environmental performance (Heras-Saizarbitoria et al., 2013, p. 88). Another set of requirements related to ISO 14000 is the Eco-Management Audit Scheme (EMAS) that has evolved from the efforts of the European Union in the EMAS (Anderson, 2002, p. 154). Kleindorfer (1997, p. 200) explains that the main difference between EMAS and ISO 14000 lies in the fact that EMAS has more stringent and additional elements, amongst these that a certification statement and information regarding performance should be made public.

So, when connecting this to our study it may be of value to take the environmental management systems into account, not least when NASA (2014) and the Australian Government (2004, p. 9) highlight its importance in line with risk management in terms of detecting potential impacts. Furthermore, EMS can help the corporations’ to create a more sustainable environment, thus an adaption to the changing climate change that can be seen as a mitigation strategy. This can further be backed up by Storbjörk (2007, p. 457) who claims that adaptation to changes in climate conditions is important and has become a vital element of governing climate change. In that sense, an implementation of environmental management systems can imply operations towards a greener a more sustainable environment, hence adaption towards the ongoing climate change. The adaption and initiatives towards sustainable operations would in that turn help reduce the environmental risks that can stem as a consequence, hence be regarded as a mitigation technique. Storbjörk (2007, p. 457) further enhances that the majority of the corporations see it as favourable for their operations to adapt to changes conditions and changes in the natural environment. So, in that way initiatives to engage in management systems, and there among ISO 14000, can be favourable for the corporations in terms of protecting themselves against environmental risks, thus financial losses that can arise.

### 3.5 Environmental Risks in Sweden

In this section, we intend to present the most salient environmental risks that are prone to encircle Sweden, this to achieve a greater understanding of what environmental threats that are seen to appear in magnitude and frequency in the overall business environment. Thereon it is in our main interest to explore what risks that appear most frequently and are inclined to permeate the industry of pulp and paper in Sweden. This when it is of value for us to overlook the corporation's environmental risk identification and mitigation strategy to observe if the corporations pay attention to the risks that are thought to be of relevance for their industry, and further if they elevate any other environmental risks of necessity in terms of reducing the chance of suffering decreased finances.
3.5.1 Climate Change and Environmental Risks in Sweden

A report from SMHI, Naturvårdsverket and Energimyndigheten showed that the Swedish climate is changing, and it is continuing to change (SMHI, 2014 c). The report showed increased temperatures, increased downfall, shorter winters, and implied that this impacts several parts of the society and the natural environment to a high extent (SMHI, 2014 c). The increase in downfall can be derived from increased mean temperatures and can cause troubles with floods (SMHI, 2014 c). Continuing, SMHI (2014 c) and Naturvårdsverket (2016, 25 April) emphasise that this increase in mean temperature also can have severe consequences for the agriculture and forestry sector. As can be noted the climate change is a current subject of discussion in Sweden, and large authorities have acknowledged these issues related to this changed climate. There are several goals of reducing the climate impact by the government to decrease risks of increased mean temperature, but as it looks today the set goals will not be reached (Naturvårdsverket, 2016, 25 April). As mentioned, the published report showed that the climate is continuing to change and one has to understand what effects this might have on society and as in the case with this research, how it impacts corporations that operate in the changing climate. In line with this, Johansson et al. (2008) elevates that Sweden has during the last ten years been faced with an increased amount of natural disasters and that everything points towards the fact that the amount of disasters associated with the environment are to increase substantially in the future. Similarly, higher temperatures, an increased amount of skyfall, landslides, floods and erosions are a few of the most serious risks linked to the climate change in Sweden (Johansson et al., 2008).

Related to this, it is important to understand that from industrial operations comes certain risks, and the characteristics of these risks can vary when some industries contain low probability risks with high consequences whilst other industries have a higher risk of suffering losses though with lower consequences (Davidsson et al., 2003, p. 28). Davidsson et al. (2003, p. 28) also elevates that industrial operations most often contain risk associated with noises, emissions towards the air, land and waterways and also risks from chemicals, fires and natural disasters. Johansson et al. (2008) further implies that it is a vital task for society to adapt buildings, infrastructure and societal structures to higher amounts of skyfall and that it is equally important to adapt society and new building constructs towards the climate conditions which can present itself in the upcoming 50 years. As noted by SMHI (2014 c) and Naturvårdsverket (2016, 25 April) the industries related to agriculture and forestry is facing risks related to increased mean temperature, which can cause severe consequences for the corporation within these industries.

When looking specifically at environmental risks in Sweden, Davidsson et al. (2003, p. 30) emphasise that Sweden is most often spared from the most vital natural disasters, and the most frequently spoken of environmental risks in light of Sweden contain landslides, earthquakes and storms, thus extreme weather conditions. The disorders that arises from these stated environmental risks have received increased attention in light of the snowstorms and floods that have affected the Swedish society during the past years (Davidsson et al., 2003, p. 30). However, even if Sweden might have been spared from extreme natural disasters and such, it is important to note here that the global climate is actually changing, and this have certain implications even in Sweden, as emphasised in the previously mentioned report (SMHI, 2014 c). The world-leading cluster within the forest bio-economy Paper Province (2015) speaks of environmental risks and their impact and states that an increased temperature on earth, elevated levels of downfall and changed patterns of downfall, higher flows and alternated seasonal variation in waterways are

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some of the effects that are thought to arise from the apparent climate change. It is also known that the effects climate change bears with it results in an increased temperature on earth, increased amount of downfall which affects us and corporations in many ways (Paper Province, 2015). Paper Province (2015) also states, as Davidsson et al. (2003, p. 28), that factors in relation to the climate affect the frequency and intensity of flooding, landslides and heat waves and more long term effects can imply an increased growing season and changed energy needs. To further elaborate on the environmental risks that are most apparent in Sweden in present times and future years to come, Dagens Nyheter has in late 2011, with the help of the Swedish Civil Contingencies Agency, presented a list of the most affected risk areas in Sweden. The risks that top the list are: flooding, storms, contagious diseases, landslides, earthquakes, forest fires, heat waves et cetera (Dagens Nyheter, 2011).

Conclusively, MSB (2016) contemplates that natural disasters and environmental risks appear every year and disorders in society can stem from different types of extreme weather conditions, which can be based on storms, extensive snow or flooding (MSB, 2016). To exemplify and present the salience of environmental risks in Sweden during the past year, MSB (2016) state the storms named Hilde, Simone, Sven, Ivar, Svea and Egon as a few that have occurred, and also two extreme skyfalls and one extensive flooding. These stated risks can be regarded as the risks most salient in general for the Swedish corporate environment. Within this study, the focus is on the specific industry of pulp and paper corporations. As such, some risks that affect this industry that we dedicate our interest towards are risks in line with insect pests, fires and storm damages, hence extreme weather conditions (SMHI 2014 a). Moreover, other risks associated with our given industry are thought to be increased rainfall, decreased ground frost, diminished quality of the wood, animal diseases and also changed conditions due to increased temperatures, in that sense issues in relation to climate change (SMHI, 2014 b). These will be further elaborated on in upcoming sections.

### 3.5.2 Economic Implications of Environmental Risks

The result due to accidents or disorders in corporations’ operations is often calculated in terms of losses, and these losses can be associated with injuries on employees, property, the environmental or loss of production (Davidsson et al., 2003, p. 39). These types of losses affect the economical results of the corporation and implies a diminished profit (Davidsson et al., 2003, p. 39). Even if the damage results in injuries on humans or on corporations’ properties, they consequently imply a substantial financial loss and this further generates an economical incentive to take help from different risk analysis which can help reduce the total amount and magnitude of accidents and disasters in the corporation's operations (Davidsson et al, 2003, p. 40). Though, Davidsson et al. (2003, p.40) elaborates by stating that a precondition for reducing accidents and disasters due to environmental risks and damaged finances is that the actual costs are known, which is not often the case.

### 3.5.3 Risks Apparent in the Pulp and Paper Industry

As mentioned previously, a sector that is highly affected by changes in the climate in Sweden is forestry (Klimatguiden, 2010; Naturvårdsverket, 2016m 25 April; SMHI, 2014 b; SMHI, 2014 c; SMHI, 2014 a). Related to this, Klimatguiden (2010) emphasises that climate change both impacts the raw material within production industries, as well for the industrial processes. This news article is related to Finland and its climate, however, since Finland and Sweden are positioned in the same sphere of the world one can argue that the climate and its subsequent risks exposures are similar. In the same fashion. SMHI (2014...
b) and SMHI (2014 a) acknowledges that the industry of forestry is highly affected by climate change, and that environmental risks can have crucial and complex consequences for corporations within these industries. Klimatguiden (2010), as well as SMHI (2014 b) points out that the forestry industry is very vulnerable to climate change, and this due to the natural resources it extracts and are dependent on wood. Thus, one can argue that industries dependent on raw material that are highly affected by climate change are indirectly exposed to crucial risks related to the natural environment.

Corporations in the pulp and paper industry are dependent on wood for their production, either if they own areas of forest themselves or if they are dependent on external forest suppliers. To specify, some risks that have been emphasised related to forest and agriculture that originate from climate change are: increased rainfall in the autumn and winter, decreased ground frost, decreased quality of the wood due to faster growth, and newly developed animal diseases due to increased temperature (SMHI, 2014 b). By having an increased rainfall, the need for drainage increases as a result, and this further has implications for the stability of the ground where agro machinery are supposed to operate (SMHI, 2014 b). Furthermore, the ground frost can lead to a higher forest sensitivity towards storms and also a decreased harvest season. Klimatguiden (2010) describes this ground frost as increasing the demand for storage of wood during the ground frost period. Moreover, it has been emphasised that elevated carbon dioxide levels can impact the quality of the wood, and that this is an area of research that needs to be further elaborated (Klimatguiden, 2010). Furthermore, Klimatanpassning (2016) also enlighten us with the risks of increased rainfall, risk of fires and increased temperatures due to climate changes. In the same fashion, Skogsstyrelsen (2016) contemplates that climate risks can lead to changed weather conditions such as; increased mean temperatures, insect pests, fires, ground frost and increased rainfalls.

Furthermore, SMHI (2014 a) states that the most crucial risks facing forestry is: storm damages, insect pest and fires. The increase in mean temperature combined with decreased ground frost is leading to increased risk of storm damages, and even though the small level of severe storms that the Swedish forest is exposed to, the effect on the forest is larger due to more storm sensitive forest (SMHI, 2014 a). As a result of storms and increased mean temperature the level of insect pests’ increases. Further, due to the increase in mean temperature and changes in weather patterns that are thought to encircle Sweden, it is therefore of importance to be well prepared when this can give rise to new animal diseases and different outbreaks (Klimatanpassning, 2016). Klimatanpassning (2016) further implies that climate change will result in a vast amount of climate sensitive animal diseases and it will be hard to distinguish their full impact. SMHI (2014 a) further claims that the number of forest fires can increase in the late 2010’s, partly due to increased mean temperature. As can be noted, there are a number of risks that are associated directly with the forestry, hence wood, which is the main raw material for corporations within the pulp and paper industry in Sweden. Thus, it is important to understand if and how these risks are managed within the most leading corporations in the industry, in terms of turnover.

3.5.4 Salient Environmental Risks
Due to the research made on extracting and understanding which environmental risks that are thought to encircle Sweden the past years and years to come, one can conclude that the risks portrayed were abundantly similar. Some of the risks that are stated by MSB (2016) are natural disasters that can arise from several types of extreme weather
conditions which can be based on storms, skyfall and floods. Further, Paper Province (2016) speak of risks associated with climate change that affects the frequency of floods, landslides, heat waves, et cetera. Moreover, climate change that consequently results in environmental risks such as increased temperatures, increased level of downfall, variation in waterways (Paper Province, 2016). Besides from these chosen sources, Dagens Nyheter (2011) listed the most present risks in Sweden and also risks that were perceived to still be salient in future years to come, these are floods, storms, diseases, landslides, earthquakes, fires and heat waves. In general, in Sweden, the environmental risks elucidated from substantial sources were floods, landslides, earthquakes, forest fires, skyfall, high temperatures and extreme weather conditions.

We can conclude that these risks are seen to be regularly spoken of for our chosen industry and can act as a sound foundation as risks salient in media, hence placed on the agenda. Therefore, the risks that we perceived to be most salient in media in light of the agenda-setting theory and the pulp and paper industry can be summarised as: Increased rainfall, changing ground conditions, decreased quality of the wood, animal diseases and also increased temperatures on earth (SMHI, 2014 b). Further, other risks that are associated with the pulp and paper industry are storm damages, insect pests and fires (SMHI, 2014 a). Klimatanpassning (2016) also speaks of similar risks in relation to forestry, namely increased rainfall, risk of fires and increased temperatures due to climate changes. Moreover, Skogsstyrelsen (2016) highlights that risks associated with forestry and wood and that can be seen today increased mean temperatures, insect pests, fires, ground frost and increased rainfalls. In that sense, we believe that we have grounds to assume that the environmental risks associated with increased rainfall, storms and fires can be regarded as extreme weather conditions. Therefore, we intend to categorise these found risks under the state of extreme weather conditions, conditions that can be seen to stem from climate change. So with the use of agenda-setting theory, we can elucidate these environmental risks that are seen to been placed on the ‘agenda’. The stated risks will thereon encircle our findings when we intend to see if our industry of choice address the environmental risks and how they intend to mitigate them, thus their risk managerial strategies.
4 Practical Method

In this chapter of the thesis the practical method is presented and one can read about the sample of large Swedish corporation in the pulp and paper industry to stand as a study object to examine environmental risks. Furthermore, in this section we will give insight into how the data was collected and consequently analysed.

4.1 Selection of Sample

One key aspect in order to succeed with research is the selection of sample (Eisenhardt, 1989, pp. 536-537; Ghauri & Firth, 2009, p. 31). Since it would have been too time consuming for us to gather data from the entire population of large corporations in the pulp and paper industry in Sweden, we selected a sample of firms to let them represent the population as a whole (Saunders et al., 2012, p. 260). Furthermore, the intention with this sample of corporations was not supposed to represent the whole population of large corporations in the pulp and paper industry in the world, but it was supposed to be a fair representation of the population in Sweden. However, we argue that this sample gave a good indication of what environmental risks that are present for corporations within this industry in the whole world, due to the dependency on raw material and forestry, hence corporations in other countries might be exposed to similar risks but to different extents. Though, this study does not intend to generalise the findings for all corporations within the pulp and paper industry over the whole word, rather to give good insight into the subject within Swedish corporations.

In research in general the two most fundamental sampling techniques are known as: non-probability sampling and probability sampling (Bryman & Bell, 2011, p. 176; Saunders et al., 2012, p. 261). The probability sampling technique is related to finding a sample where the chance of each case in the population are equal in terms of being selected (Saunders et al., 2012, p. 261). This type of technique is not suitable for a qualitative research like this one, and it would not have been possible to select a sample with this requirement. Therefore, in this specific research we used a non-probability sampling technique known as purposive sampling. Purposive sampling is related to the process of using the researchers’ subjective judgement when finding the sample, with the intention for this sample to be the most suitable in order to answer the research question and fulfil the purpose (Patton, 1987, pp. 51-52; Saunders et al., 2012, p. 287; Silverman, 2011, p. 388). Basically this means that we selected large firms within the pulp and paper industry based on their turnover, and thus selected the fifteen largest firms in the industry in Sweden.

4.1.1 Companies and Industry

When distinguishing how to obtain our sample to approach our field of research, we decided to place our main attention towards large corporations and, like mentioned, corporations within the pulp and paper industry. This was due to that large corporations tend to fully employ a risk manager which prime objective is to identify risks that can be seen as a threat towards the corporation's operations and implement necessary procedures to be able to protect against financial hardship. (Frank, 2008, p. 7). Further, Frank (2008, p. 7) states that smaller companies seldom have that privilege and that the risk managerial aspect in smaller firms often falls into the hands of the owner. Due to this, large corporations are prone to place a considerable amount of attention towards the risk managerial side of their operations compared to smaller corporations. Larger corporations will therefore pose as an appropriate sample when the chance of us being able to elucidate their definition and exposure to environmental risks will be greater. Larger corporations
are thought to need a comprehensive risk management strategy which further strengthens our choice. Kleffner et al. (2003, p. 57) verify this by stating that regulators in a vast amount of countries pressure larger firms in terms of increased transparency and the need for them to present better risk reports and also that they place an enhanced effort towards a more integrated and comprehensive risk management.

Colquitt et al. (1999, p. 43) also state that risk managers within larger corporations inherit more sophisticated risk strategies and utilises a wide range of techniques, all to increase the chance of smoothing out losses, to promote a greater degree of control and to address specific risks. Further, Colquitt et al. (1999, p. 45) concludes that larger firms most often designates an employee to handle and be responsible for the department of risk management and contemplates that smaller firms are less likely to acquire this luxury. With this said, the level of risk management integration increases with the size of the corporation which strengthens our choice of using large corporations when selecting our sample. This when we empt to make use of comprehensive risk management sections within financial reports to extract information entailing their exposure and mitigation strategies to environmental risks. Due to this, the choice of using large corporations for the probability of them incorporating more extensive risk managerial inputs is of relevance for us when we intend to accumulate the data from annual reports and other publications.

Continuing, like mentioned the focus in this study will be directed towards large corporations in the pulp and paper industry in Sweden. The reason for using this specific industry is due to its dependency on the raw material of wood and also that it has a production function. Thus, we believed that this sample of corporations within the specific industry would be a good way of studying environmental risks facing corporations in Sweden due to that corporations within the forestry sector are highly exposed to risks coming from the natural environment. The pulp and paper industry could in that sense be connected to the forestry industry and are therefore exposed to similar risks as that industry, and since forestry is known to be highly exposed to climate change due to the natural resource of wood and forest we found it to be of interest to explore it further (SMHI, 2014; SMHI, 23 April; Klimatguiden, 2010). This is further an important industry in Sweden due to the large area of forest that exists within the country, hence can be seen as an important industry related to natural resources that are extracted in Sweden.
Table 1. List of Corporations

<table>
<thead>
<tr>
<th>Corporation</th>
<th>Turnover (TSEK)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCA</td>
<td>104167000</td>
</tr>
<tr>
<td>Sandvik</td>
<td>89022000</td>
</tr>
<tr>
<td>CellMark Holding</td>
<td>20135543</td>
</tr>
<tr>
<td>Holmen AB</td>
<td>17297000</td>
</tr>
<tr>
<td>Ekman Invest Holding AB</td>
<td>11896962</td>
</tr>
<tr>
<td>BillerudKorsnäs Skog och Industri AB</td>
<td>11632000</td>
</tr>
<tr>
<td>Södra Cell</td>
<td>8466000</td>
</tr>
<tr>
<td>Metsä Board Sverige AB</td>
<td>6048203</td>
</tr>
<tr>
<td>Stora Enso Skoghall AB</td>
<td>4611000</td>
</tr>
<tr>
<td>Smurfit Kappa Kraftliner Piteå AB</td>
<td>3988251</td>
</tr>
<tr>
<td>Tetrapak Packaging AB</td>
<td>2999999</td>
</tr>
<tr>
<td>Domsjö Fabriker AB</td>
<td>2087418</td>
</tr>
<tr>
<td>DS Smith Packaging AB</td>
<td>1661196</td>
</tr>
<tr>
<td>Mondie Dynä AB</td>
<td>1597830</td>
</tr>
<tr>
<td>Rottneros AB</td>
<td>1592000</td>
</tr>
</tbody>
</table>

4.1.2 Procedure

In order to find our sample of large corporations to collect data from we used the data base Retriever Business, which allowed us to restrict the search to our specific industry of pulp and paper corporations and sort the list from highest to lowest turnover. Retriever Business is a database that contains an extensive amount of annual reports and other business related information on corporations and firms. The site holds financial statements for all registered Swedish firms, and was available to us through Umeå University. This database presented us with a list of the corporations that filled our requirements in order to answer our research question. From this list we selected fifteen firms from which we collected data.

4.2 Data Collection

The data in this research was collected by thoroughly examining the corporations published information related to environmental risks and stakeholders. In this case, mainly the corporations’ annual reports and other published information on their web pages were used, such as their sustainability report for instance. We obtained the information primarily from their most recent annual reports and latest publications from 2015 and 2014. Moreover, Deegan and Rankin (1996, p. 51) acknowledge annual reports as a good tool to in order to extract environmental information, which legitimise the use of this type of information as a source of knowledge. In line with this, Deegan (2002, p. 282) states that there consists evidence of the fact that reporting of social and environmental concern is driven by an aspiration from management to legitimise different conditions of their operations. Also, like mentioned there is a high requirement of transparency of corporate operations to the public in forms of annual reports and other published information, one can argue that the information they publish are a good way of understanding certain aspects of the business, and in this case a good way of understanding their environmental risks. This can be seen as a motivation for why it is suitable using annual reports as an information source when exploring subject of corporate environmental initiatives. Furthermore, in this deductive research we constructed a theoretical framework based on previous literature related to the subject of environmental risks with a funnel towards environmental risks within the pulp and paper industry. This was in some sense used as a template of the construct of the followed data
gathering and subsequent analysis. Thus, we collected the data based on the premises of: identification, mitigation, salient risks and stakeholder initiative.

When collecting data by using annual reports and other published information one has to be aware of the limitations that comes with it. Even though Deegan and Rankin (1996, p. 51) acknowledge the use of annual reports as a good tool for extracting this environmental information, sometimes this information is used by firms to pose as favourable in terms of reputation. Though, it was not possible for us in this research to know what information that was published for the sole reputational purpose, but we argue that the information published is according to what they do in their operations and is transparent for their stakeholders. Thus, exaggerated information not according to what the corporations actually do is one of the risks of using this type of data. Another risk can be found within the potential lack of existing information among these sources. For example, when exploring a subject like environmental risks, which is a subject with a relative lack of previous literature, one has to be aware that the corporations might not place as much focus on these risks, hence do not publish extensive literature about it. If the data collection would have been done by interviews with managers of employees responsible for this type of business are one would have been able to extract different knowledge, and would thus not have been dependent on what they publish. However, these limitations are important to be aware of, but we still argue that the information extracted by collecting data from annual reports and other published documentations are suitable for this particular thesis and contains the managers most emphasised risks and their subsequent management, together with their claimed important stakeholders and why they are initiated towards taking environmental actions in relation to risks.

4.3 Analysis
When conducting research, the analytical part of the process is seen as very important. This is the part when you are supposed to connect what you have found in the data collection with what exists in the previous literature on the subject. It allows for a deeper understanding about the explored subject and attempts to explain why the results are similar or different by any means. In this part of our research we analysed what environmental risks that were defined by the firms, together with what type or risks that have been detected within industry standards. Furthermore, we analysed how the corporations managed these risks and related this to the process of how firms in general manage risks, with the intention to gain a deeper understanding about how the process looks in practise.

4.3.1 Analytical Approach
Saunders et al. (2012, p. 580) describes that the deductive approach can impact the analytical process in several ways, for instance by following key themes or subjects when creating questions when conducting interviews, or in general by using categories developed from the theory when structuring the analysis. They also emphasise that when using a deductive approach, you can use the key patterns and themes from theory when knowing what to search for in your data (Saunders et al., 2012, pp. 580-581).

Like mentioned in the scientific methodology, the research approach in this study was deductive, which means that we began by establishing a sound theoretical framework, and from this found an unexplored knowledge gap which we intended to fill, and this formed the conduct of the research. This was also the case for our analytical approach, where we used the main topics presented in our theoretical framework as guidelines to how we structured our presentation of empirical data and the subsequent analysis of this
data. Furthermore, the research question leads a great way regarding the structure of our analysis, in which we aim to find out what environmental risks the corporations identify and how these are managed, together with what drives the corporation towards environmental initiatives. Therefore, the presentation of data was influenced by these themes.

4.3.2 The Analytic Process
According to Miles and Huberman (1994, p. 10) qualitative analysis can be composed by three components of activity flows: data reduction, data display and conclusion drawing and verification. They describe the activity of data reduction as the process of simplifying the collected data by focusing and organising the data, and this can be done by selection, through summaries of transcripts, and by finding larger patterns (Miles & Huberman, 1994, p. 11). Since we did not conduct interviews, thus had no transcripts to simplify, this process in our study related to the focusing of our collected data from the different corporations, by recognising key risks, mitigation techniques and stakeholder drivers and reducing the data to be focused towards environmental risks.

The second activity, data display, relates to the process of organising the data in a way to make it easier for the researcher to grasp the data, this can be done by constructing visual displays or summarising tablet (Miles & Huberman, 1994, p. 11). This was done in this research by summarising our collected data by making tables in order to get a broader understanding of our findings, and also in order to more easily compare the findings from our different corporations. A general summary of the explored corporations risk identification and potential impacts are presented in Appendix 1, and tables over the most emphasised risks can be seen in the chapter of empirical data. Furthermore, this was also the case for the presentation of data in relation to drivers of environmental initiatives and the use of sustainability reporting and EMS.

The last component of conclusion drawing and verification that Miles and Huberman (1994, p. 11) describe relates the process of using the data reduction and data display to conclude what the collected data showed. As they emphasise, this process also related to the verification of prefigured conclusions that has been based on previous literature (Miles & Huberman, 1994, p. 11). This was the stage in our analytical process when we already had summarised the data and focused our findings by what was found, and by that could draw conclusions and verify this against previous literature.

4.3.3 Codes and Coding
In this research we used a coding technique which consisted of finding key risks emphasised by our participants and transforming these into codes. These were to represent the most important risks in relation to the natural environment, and could be seen as the most emphasised risks made by managers’ in the pulp and paper industry. When collecting the data, it was clear that the corporations used different vocabulary for similar matters, which forced us to sometimes use our subjective judgements to collectivise these into key meanings. For example, when analysing the data, we could see patterns and key meanings of the corporations, which were transformed into summaries and tables. By viewing all identified risks and their respective mitigation techniques we could find similarities among many corporations, from which we could make conclusions about the industry of pulp and paper. Related to the drivers of environmental initiatives we collectivised the data into a table in order to easily analyse and compare the corporations with each other to gain understanding on what stakeholders that could be connected to their environmental engagement, and whether the natural environment is
seen as a stakeholder or not by these corporations. We searched for motivations and drivers in relation to their environmental work by looking for key words used as motivation for the management of the natural environment, and from that derived what common stakeholder drivers existed. The same method was used in terms of examining the corporations’ sustainability reporting and use of EMS.

To obtain high quality in research, objectivity from us as research is important. Therefore, in this study we also had the ambition to be as objective as possible as researchers, we argue that this is important when collecting and using data from annual reports and other published information. Since we want the data to represent the sample of corporations’ in a way that is fair and representable for this particular industry, we saw it of importance to be as free of judgements as possible when collecting the data as well as when analysing the data. Though, one can argue that it is hard to completely be objective when conducting research. For example, when collecting data related to what stakeholder drivers that influenced the corporations towards considering the natural environment in terms of managing environmental risk, one always had to interpret the data since the formulation could differ between firms. Therefore, we aimed to be objective, but we realised that it was necessary to use our subjective judgement when analysing certain data. When using our subjective judgement one always has to be aware of the risk of incorporating our values and judgements into the data collection and analysis, and this could have implications on the study if for example we valued different information between the two of us, and also if we interpret the data wrongly due to different usage of words. Though, to avoid this we collected the data together and could by this technique be sure of what we aimed to extract from the published information. Also we aimed to make as little own interpretation of the words used as possible, even though we sometimes were forced into collectivising different words to common codes in order to understand the subject as clearly as possible.
Empirical Data
In this chapter one can read about what was found during the data collection. Firstly, the environmental risk analysis will be presented, and it contains the most emphasised risks stated by the sample of corporations within the pulp and paper industry. One can further gain insight into these risks potential impact and the mitigations techniques that are used. Moreover, the detected stakeholders for each corporation are presented as well as for their drivers towards environmental initiatives. Lastly the findings related to sustainability reporting will be revealed and the corporations’ usage of management systems.

5.1 Environmental Risk Analysis
In this research one of the aims was to explore and gain knowledge on what environmental risks large corporations in the pulp and paper industry in Sweden identify as important, and also these risks potential impact on the corporation and its operations. We thereafter wanted to see how these risks identified by the corporations are related to the most salient environmental risks in media. Furthermore, we intended to see what techniques these corporations use in order to mitigate the claimed environmental risks to gain more understandings on the subject of environmental risks within this specific industry. When collecting data from the selected sample by using their annual reports and other published information one could notice that most corporations were clear and transparent with their general risk management, and also that many had stated risks coming from the environment as either a part of their annual report or their sustainability reporting.

5.1.1 Identification of Environmental Risks and Their Potential Impact
In terms of exploring what types of environmental risks corporations in the pulp and paper industry in Sweden state as important we found that the risks that were emphasised the most are: raw material risks, production risk, climate change, facility risk, forest risk, restoration cost risk and insect/animal pest risk (see Table 2). These were the risks mentioned by more than two corporations. As can be noted in Table 2, raw material risk was emphasised by ten of the fifteen corporations that the data was collected from, and can thus be regarded as the risk that is most prominent within this industry based on the information the corporations have published. These corporations either mentioned this risk directly or indirectly by, for instance, writing about risks of increased raw material price or risk of limited supply. The corporations who mentioned this risk claimed that the potential impact could result in an increased raw material price, which could affect earnings due to higher costs and insufficient supply of raw material. An example of this is the corporation BillerudKorsnäs, who regard wood and pulp price as risks present for their corporation and that this could cause problems with derivatives related to purchase agreements. Related to the wood price risk they stated “Prices are influenced by demand from the pulp industry, indicating that changes in the output for the pulp industry as a whole in the Nordic countries may lead to long-term changes in the cost of wood raw materials”. Smurfit Kappa AB in line with this write “The Group is exposed to risks arising from market fluctuations in the price and sales volumes of similar wood”. Most corporations who mentioned raw material risks also emphasised that it could cause higher costs for the firm. Another environmental risk that was mentioned by ten corporations was the production risk. This was mainly connected to the risk of disruption in production due to unforeseen events of extreme weather conditions and limitations in supply of raw material. Also financial losses due to production risk could be seen as a potential impact.
Nine corporations stated that climate change risk is present as an environmental risk, and that this could potentially lead to disruptions due to extreme weather, increased amount of natural disasters such as: floods, forest fires, typhoons, frost periods and earthquakes. To exemplify, Södra Cell AB considered climate change as a risk and highlights “Climate change may bring more and worse storms, increased problems with pests, increased risk of fires and changing vegetation boundaries”. They further state “Growing forests and the use of wood play a major role in combating climate change”. Continuing, facility risk and forest risk was also emphasised by many corporations, and six out of fifteen mentioned these as risks that were considered within their corporate operations. An example related to facility risks could be found in Domsjö Fabrikers AB web page, where they stated that this risk could potentially harm facilities and products. A general description of potential impact of facility risks extracted from the data was that it could lead to higher costs, disruptions in production and a decreased production capacity. Moreover, since all firms are dependent on wood and pulp the forest risk was also emphasised. This risk is related to damages on forestry due to climate change and extreme weather. Increased number of floods, storms, insect pest, fires, frost periods, earthquakes and rainfall was further described as potential impact due to forest risk.

Related to forest risks one could also find insect/animal pest risk, which three corporations out of fifteen in the pulp and paper industry in Sweden emphasised. This was related to increased amount of insect pest due to increased mean temperatures, and Södra Cell specifically pointed out elks as a risk to the forest, when they could cause damage to the wood. They specifically write that “One consequence of wild animals grazing after planting is that the proportion of young pine forest declines”. The last risk we found that was mentioned by at least two corporations was the risk of restoration costs. Basically, this can be related to increased costs due to restoration of the environment in the event of the corporation affecting the environment in a harmful way. Though, since this was more closely related to how the firm affects the environment and the negative aspects of behaving in a way that is not regarded as green, and we aim to place our focus on how the environment can affect the corporations, this is not regarded as an environmental risk in this study. Hence, even though this is an actual risk, we do not regard it as important for this particular research.

In general, we found some risks that were only emphasised by single corporations, and could therefore not be seen as risks that is frequently addressed for the specific industry. Examples of these are: increased global demand for water, legionnaires disease and Pontiac fever, inability to meet sustainability standards, disruption in transportation and customer requirements and changes in environmental regulations. The previously mentioned risks and their potential impacts are presented in Table 2 below. In this table one can also find the risks ranked by the number of corporations that mentioned them, thus an indication of which risks that are most prominent and salient in present times.
Table 2. Risks emphasised by the selected corporations and their potential impact

<table>
<thead>
<tr>
<th>Detected risks</th>
<th>Potential impact*</th>
<th>Emphasised by number of corporations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Raw material risk</strong></td>
<td>Increased wood or pulp price → impact on earnings/higher costs</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Problems with derivatives due to price risk</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Insufficient supply of raw material</td>
<td></td>
</tr>
<tr>
<td><strong>Production risk</strong></td>
<td>Disruptions in production due to unforeseen events of extreme weather conditions</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Limitations of raw material</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Financial losses due to disruptions</td>
<td></td>
</tr>
<tr>
<td><strong>Climate change</strong></td>
<td>Disruptions due to extreme weather conditions</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Reduced access to raw material and water</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Negative effect on the environment</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Disruptions in distribution chain</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Increased risk of: floods, forest fires, typhoons, frost periods and earthquakes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Increased mean temperature</td>
<td></td>
</tr>
<tr>
<td><strong>Facility risk</strong></td>
<td>Higher costs</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Disruptions in production</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Decreased capacity to produce</td>
<td></td>
</tr>
<tr>
<td><strong>Forest risks</strong></td>
<td>Damage on forestry due to extreme weather conditions and unforeseen events</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Damage due to storms, floods, insect pets, fires, typhoons, frost periods, earthquakes and rainfall</td>
<td></td>
</tr>
<tr>
<td><strong>Insect/animal pest</strong></td>
<td>Increased mean temperature → increased amount of insect pest</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Elks damaging the wood → decreased quality of the material</td>
<td></td>
</tr>
</tbody>
</table>

* Potential impact according to the corporations mentioning the risk

5.1.2 Mitigation Techniques Used by the Corporations

When it came to what type of mitigation techniques our sample of corporations in the pulp and paper industry used in order to reduce and smooth the environmental risks, the most apparent techniques were: adapt to changed conditions, insurance, derivatives, improve facilities and crisis management (see Table 3). When viewing the data one could see that eight out of our fifteen corporations mentioned that they try to adapt to the changed environmental conditions. This can be done by for example holding buffer zones of wood, planning of logging and thinning of forest to prevent storm damages, responsible management of forest and ecosystem and comply with environmental requirements. Further, sustainable initiatives towards the environment and environmentally friendly actions that can stimulate the ongoing climate change and hopefully reduce the magnitude of natural disasters that can imply costs. Related to this, Stora Enso Skoghall AB wrote that they adapt to climate change by purchasing forest in safer locations with less environmental risk and by that they can in that way diversify the risk when they state that “most assets are located in areas where the probability of flooding, earthquakes and volcanic activity are low”. They also claim to use R&D to increase the tolerance for extreme temperatures, as well as having a diligent plantation planning to avoid frost sensitive areas.

Two other ways of mitigating environmental risks are insurance and derivatives, and both of these risks were mentioned by five corporations. Insurance can for instance be used on
facilities or raw materials to reduce the risk of unforeseen environmental damages. Two examples of this could be found in the published information from BillerudKorsnäs and Södra Cell. BillerudKorsnäs stated that they use insurance companies and insure facilities with regard to property and business interruption. Furthermore, Södra Cell utilises insurances on facilities, and also use insurance to cover contracted forests. Another example is Holmen, who does not insure the forest but diversifies the risk by spreading the areas of forest supply over the whole country, which in turn reduces the risk for extensive damage. Related to the use of derivatives, the corporations that mention this technique used different types of derivatives, such as: hedging, forward and future contracts and supply agreements. Related to this, Smurfit Kappa claimed to maintain a strong supply agreement of what they write as “approximately 75% of its covered fibre requirements each year” as a way to mitigate risks such as price of raw material and water. Moreover, four corporations wrote that they use the technique of improving facilities to mitigate environmental risks related to the facilities. Both Domsjö Fabriker AB and Holmen uses fire as an example of an environmental risk that their facilities are exposed to. An example of how this was stated among the corporations, BillerudKorsnäs wrote “Investments are constantly being made to improve the status of the facilities”. The last technique that was mentioned by four corporations was crisis management, and was related to preparing ways to deal with crises. An example of this can be found by Södra Cell, which use refined ways to deal with wind-thrown forests in order to gain control rapidly. To be precise, they write “Proven methods are applied to promote rapid clearing up in wind-thrown areas” In Table 3 below one can find the mitigation techniques used by corporations in our sample and see how many corporations that emphasised these.

Table 3. Environmental risk mitigation techniques used by selected corporations

<table>
<thead>
<tr>
<th>Mitigation* technique</th>
<th>Emphasised by number of corporations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adapt to changed conditions</td>
<td>8</td>
</tr>
<tr>
<td>Insurance</td>
<td>5</td>
</tr>
<tr>
<td>Derivatives**</td>
<td>5</td>
</tr>
<tr>
<td>Improve facilities</td>
<td>4</td>
</tr>
<tr>
<td>Crisis management</td>
<td>4</td>
</tr>
</tbody>
</table>

* Mitigation refers to the methods used to reduce or minimise risks and the likelihood of its occurrence  
** Includes hedging, forward and future contracts, supply agreements

5.2 Corporate Stakeholders

When accumulating the data of necessity to compute our study, we found it of essence to observe which stakeholders that the largest Swedish companies within the pulp and papermaking industry see themselves to have. This in light of our chosen theory, the stakeholder theory. In that sense, we found this of interest when we were eager to explore if the corporations state and include the natural environment as a stakeholder, hence oblige to their interests and perceptions.
<table>
<thead>
<tr>
<th>Corporation</th>
<th>Main Stakeholders</th>
<th>Drivers for environmental initiatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCA</td>
<td>Suppliers, employees, customers, consumers, owners and society</td>
<td>Internal and external stakeholders through sustainability analysis</td>
</tr>
<tr>
<td>Sandvik</td>
<td>Owners, employees, customers, suppliers and society</td>
<td>Involved corporate members and input from their stakeholders through</td>
</tr>
<tr>
<td></td>
<td></td>
<td>sustainability analysis</td>
</tr>
<tr>
<td>CellMark Holding</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Holmen AB</td>
<td>Employees, customers, business partners, suppliers, government, stockholders/investors and local community</td>
<td>Laws and regulations combined with their market share and subsequent responsibility</td>
</tr>
<tr>
<td>Ekman Invest Holding AB</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>BillerudKorsnäs Skog och Industri AB</td>
<td>Investors, customers, employees, business partners and society</td>
<td>Environmental regulations and follow big global trends</td>
</tr>
<tr>
<td>Södra Cell</td>
<td>Customers, owners/members, employees, business partners, different actors in society (capital market, communities, politicians, media, societal organisations, environmental organisations)</td>
<td>Stakeholder dialogue. View sustainability as a corporate advantage and is a vital part of their business strategy</td>
</tr>
<tr>
<td>Metsä Board Sverige AB</td>
<td>Customer/consumers, authorities/legislators, political decision makers, research organisations, trade associations, local communities, cooperative, NGO’s, other forest owners, corporate networks, media, own personnel, shareholders, suppliers and investors/analysts</td>
<td>Customers interest in sustainability topics, and its responsibility as global forest industry</td>
</tr>
<tr>
<td>Stora Enso Skoghall AB</td>
<td>Consumers, customers, employees, forest owners, governments, investors, local communities, media, NGO’s, partners and suppliers</td>
<td>Stakeholder feedback related to expectations regarding their operations</td>
</tr>
<tr>
<td>Smurfit Kappa Kraftliner Piteå AB</td>
<td>Customers, employees, municipalities, investors and suppliers</td>
<td>Input from stakeholder groups that emphasise need for sustainability, and guidelines from global reporting initiative. Trends, laws and regulations and code of conduct</td>
</tr>
<tr>
<td>Tetrapak Packaging AB</td>
<td>NGO’s, government organisations, industry organisations and consumers</td>
<td>Trend spotting and customer input and expectations</td>
</tr>
<tr>
<td>Domsjö Fabriker AB</td>
<td>-</td>
<td>Media, reputation and pressure from consumers and employees</td>
</tr>
<tr>
<td>DS Smith Packaging AB</td>
<td>Customers, employees, shareholders and the natural environment</td>
<td>Legal requirements, key suppliers, environmental policies and credentials</td>
</tr>
<tr>
<td>Mondie Dynäss AB</td>
<td>Employees, customers, suppliers and managers and others that can raise concerns about conduct that is contrary to Mondi’s values</td>
<td>National and local environmental laws and regulations along with requirements from customers and expectations of our broad stakeholders</td>
</tr>
<tr>
<td>Rottneros AB</td>
<td>Customers, suppliers, owners, employees, families, unions, mass media, society, Politian’s and environmental organisations</td>
<td>Environmental requirements and dialogue with stakeholders about the corporations environmental impact</td>
</tr>
</tbody>
</table>
5.2.1 Stakeholders and Main Drivers
As our table reveals, we were able to extract and find that the majority of all corporations specifically stated their stakeholders with the use of their annual reports and other relevant publications. Suppliers, employees, customers, consumers where stakeholders that arose frequently across our sample when extracting the corporation’s main stakeholders. Further, additional stakeholders were also viewed and the corporations conveyed a vast dispersion of actors and they varied in detail. Other stakeholders that also arose regularly were owners, society in general, municipalities, investors and other societal organisations. In many of the corporations’ published information these stakeholders were stated directly and very clearly, which made it easy for us to extract this information.
When observing if the corporations specifically stated the environment as a stakeholder we found, to our surprise, that only DS Smith Packaging AB explicitly stated the natural environment as a main stakeholder. However, Rottneros AB and Södra Cell incorporate the environment as a stakeholder to a certain extent when they take environmental organisations into consideration within their operations even though they do not explicitly state the natural environment per se as a main stakeholder.

Another interesting factor that we perceived when overlooking our accumulated data was the fact that three corporations state the media as a direct stakeholder to adhere to. This is stunningly interesting within our study when we utilise the agenda-setting theory to partly extract the environmental risks that are most prominent and frequently apparent within the media nowadays and further to promote our choice of corporations. This can eminently be linked to the agenda-setting theory when our choice of large corporations within the pulp and paper industry in Sweden can be seen to attain a vast amount of media attention when they inevitably withhold a large market share and in that sense receive a great deal of media attention when they are prominent within their market sector. Besides from the media, other apparent stakeholders consist of different governments, authorities and political decision makers that are seen to impose regulations and guidelines that the corporations are enquired to follow (see Table 4). An example of this is when Mondi Dynäss AB write that they are “Subject to national and local environmental laws and regulations along with requirements from customers and expectations of our broader stakeholders”.

To further investigate which factors that are seen to drive the corporations towards considering environmental risks within the operations, we had to explore and extract information to a greater extent. This to generate a precise picture and elucidate which factors that they state influences them to adhere to the natural environment. When addressing the results, one can see that the majority of the corporations place a great amount of attention towards complying to their stakeholder interests. Ten out of fifteen corporations state that they value and take stakeholder expectations and interests into account, this in terms of addressing environmental concerns. Mainly, the corporations utilise a substantiality analysis and ask their stakeholders for inputs in terms of matters that they wish the corporation to address. All of the corporations that compute this strategy state that their stakeholders regard the natural environment as a vital component to adhere to, which eminently drives the corporations to satisfy their stakeholders interests and expectations and consider environmental matters. For instance, Sandvik AB write that they “conduct substantiality reports, which gives us a clear guideline towards sustainability and shows which areas that are of great importance nowadays”. Further, SCA states that “substantiality reports show which questions are of importance for SCA and their stakeholders”. Another factor that is apparent within our included sample of
corporations is the ability to address current trends and the process of trendspotting. Trendspotting complies in an increased amount of attention towards the state of the natural environment, not least when the corporations entail the importance of the ongoing situation surrounding matters aligned with the prominent climate change that permeates our surroundings. This can result in more extreme weather conditions and accelerated natural disasters, thus environmental risks. More specifically, the corporations that utilise trendspotting to determine which matters to address state the urge and importance with the stricter and enforced corporate requirements that are seen to promote environmental attention, not least with the recent climate conference in Paris and carbon dioxide and emission initiatives.

Other drivers towards adhering to the environment that was found concerns the corporations’ perceived responsibility when they see themselves as prime actors that should pave the way in terms of operating in a responsible manner. Not least when they are fully aware of the fact that their operations are seen to affect the environmental state and possess a large market share. The corporations see this of importance not least when they imply that the greater amount of attention they place on considering environmental initiatives and their adaption to changed climate conditions can result in fewer environmental risks that can inevitably benefit the corporation's finances. Not least the magnitude and frequency of extreme weather conditions. Also, some corporations highlight that different laws, regulations and legal requirements influence them to adhere to the natural environment, not least when penalties and other sanctions can arise if they are not fulfilled. Domsjö Fabriker AB also emphasises that a damaged reputation can arise if they do not consider the environment and that they achieve a lot of pressure from consumers and employees in terms of operating towards the environment and a more sustainable business climate.

5.3 Sustainability Reporting and EMS
In terms of accumulating data from our included corporations, we found it of interest to see if they place effort on developing sustainability reports and moreover if they adopt EMS strategies and certifications. Not least when this may prevail their interest towards adhering to the environment and generating a sustainable business climate and also present their strategy in terms of being environmentally friendly. This is of issue to our study when we have seen that the main mitigation technique used to decrease the frequency of environmental risks is to adapt to the environment. In that sense, the more sustainable initiatives and actions taken could reduce the chance of suffering salient environmental risks that consequently affects finances when the natural environment would diminish as an environmental threat.
Table 5. Sustainability reporting and environmental certifications

<table>
<thead>
<tr>
<th>Corporation</th>
<th>Sustainability Report</th>
<th>Environmental Certifications</th>
<th>EMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCA</td>
<td>Yes</td>
<td>ISO 14001, ISO 9000, FSC, PEFC</td>
<td>Yes</td>
</tr>
<tr>
<td>Sandvik</td>
<td>Yes</td>
<td>ISO 14001</td>
<td>Yes</td>
</tr>
<tr>
<td>CellMark Holding</td>
<td>No</td>
<td>ISO 9001, FSC, PEFC</td>
<td>No</td>
</tr>
<tr>
<td>Holmen AB</td>
<td>Yes</td>
<td>ISO 14001, ISO 9001</td>
<td>Yes</td>
</tr>
<tr>
<td>Ekman Invest Holding AB</td>
<td>No</td>
<td>-</td>
<td>No</td>
</tr>
<tr>
<td>BillerudKorsnäs Skog och Industri AB</td>
<td>Yes</td>
<td>ISO 14001, ISO 9000</td>
<td>Yes</td>
</tr>
<tr>
<td>Södra Cell</td>
<td>Yes</td>
<td>FSC, PEFC, ISO 14001</td>
<td>Yes</td>
</tr>
<tr>
<td>Metsä Board Sverige AB</td>
<td>Yes</td>
<td>PEFC, FSC, ISO 14001, ISO 9001</td>
<td>Yes</td>
</tr>
<tr>
<td>Stora Enso Skoghall AB</td>
<td>Yes</td>
<td>ISO 14001, ISO 9001</td>
<td>Yes</td>
</tr>
<tr>
<td>Smurfit Kappa Kraftliner Piteå AB</td>
<td>Yes</td>
<td>FSC, ISO 14001, ISO 9001, PEFC</td>
<td>Yes</td>
</tr>
<tr>
<td>Tetrapak Packaging AB</td>
<td>Yes</td>
<td>Principals UN global compact, ISO 12001, report greenhouse emissions according to GHG, ISO 14001, ISO 9001</td>
<td>Yes</td>
</tr>
<tr>
<td>Domsjö Fabriker AB</td>
<td>Yes</td>
<td>ISO 9001</td>
<td>No</td>
</tr>
<tr>
<td>DS Smith Packaging AB</td>
<td>Yes</td>
<td>ISO 14001, ISO 9001, Forest certification-chain of custody, safety OHSAS 18001</td>
<td>Yes</td>
</tr>
<tr>
<td>Mondie Dynärs AB</td>
<td>Yes</td>
<td>ISO 14001, PEFC, FSC</td>
<td>Yes</td>
</tr>
<tr>
<td>Rottneros AB</td>
<td>No</td>
<td>FSC, PEFC, ISO 14001</td>
<td>Yes</td>
</tr>
</tbody>
</table>

5.3.1 Corporate Engagement in Sustainability Reporting and EMS

Our data collection through the observations of the largest Swedish corporations within the pulp and paper industries annual reports and other publications presented us with clear findings encircling this topic. Twelve out of fifteen corporations had extensive sustainability reports that were either incorporated within their annual reports or presented separately. This showed a seriousness in line with their sustainable operations, and their reports revealed how their corporate actions affect the state of the environment and further how they intend to comply with the present urge to safeguard the environment to prevent environmental risks. This partly due to the fact that the corporations take responsibility when they are aware that their operations consequently result in a disruptive environmental state and also when present climate changes can imply more frequent and elevated weather conditions, increased amount of floods, forest fires and changed temperatures. All of these factors can eminently affect their production and operations, which implies a decreased financial state, hence indicates the essence to adhere to the natural environment.

However, Cellmark Holding, Ekman Invest Holding AB and Rottneros AB did not present sustainability reports and did not reveal any detailed information towards sustainability matters in line with their operations. As Table 5 shows, there is an apparent correlation between the corporations that have sustainability reports and the corporations that make use of environmental management systems. With that said, it is evident that all corporations that have sustainability report implements EMS and withhold different internal certifications, there among ISO 14001, FSC and PEFC. An example of this is Stora Enso Skogshall AB who state that a mitigation technique towards assessing
environmental risks is to apply and utilise EMS and state that risks can be "[...] minimised through EMS and environmental due diligence for acquisitions and divestments and indemnification agreements where effective and appropriate remediation projects are required". Rottneros AB on the other hand poses as an exception when they do not present a sustainability report but do on the other hand implement EMS and withhold internal certifications. Also, Rottneros AB touches upon sustainable matters within their annual report but do not separately present a sustainability report. When it comes to overlooking Cellmark Holding and Ekman Invest Holding AB one can clearly observe the absence of environmental concerns when they do not report on these matters and also do not, to our findings, implement EMS and withhold the environmental certification ISO 14001 which is often apparent. Cellmark Holding briefly speak of sustainable matters on their website whilst Ekman Invest Holding AB have a clear absence to our findings on all matters in relation to environmental concern and sustainable initiatives.
6 Analysis
In this analysis chapter one can read about the findings of this study and its relation to previous literature on environmental risks. The identified environmental risks are analysed and argued for, as well as for the mitigation techniques used. After this, these risks will be compared and analysed with the salient environmental risks that are placed 'on the agenda' for the specific industry in Sweden, in light of the agenda-setting theory. Moreover, in this section of the thesis the stakeholders of the corporations are elucidated and the drivers for addressing environmental initiatives will be analysed together with an analysis of the corporations’ use of sustainability reporting.

6.1 Risk Analysis
6.1.1 Identification of Environmental Risks and Their Potential Impact
When investigating what environmental risks the corporations claim to be of importance it was found that the most emphasised risks were: raw material risks, production risk, climate change, facility risk, forest risk, restoration cost risk and insect/animal pest risk (see Table 2). Thus, these sum up what types of environmental risks that these corporations within the pulp and paper industry find important enough to state and stress in their published information. However, it was somewhat hard to categorise the described risks since the corporations utilise different words for the same matter so a thorough examination was of essence.

The most highlighted risk connected with the natural environment was the risk related to raw material. Since corporations in the pulp and paper industry all have wood as their prime raw material, which is a material highly exposed to changes in the environment, this was not a surprise. One could by this finding argue that firms highly dependent on a specific type, or different types of raw material are highly affected by climate change and are by that exposed to crucial risks related to the natural environment. Even though the selected industry of pulp and paper is not the same as the industry of forestry, one could argue that since they both are dependent on the raw material of wood they are connected in terms of environmental risks that stand as important. SMHI (2014b) and SMHI (2014a) highlight the industry of forestry as an industry decidedly affected by climate change, and this was also supported by Klimatguiden (2010), who claims that forestry is vulnerable to climate change due to the natural resources it extracts. Therefore, one can conclude that both the pulp and paper industry and forestry are highly affected by climate change due to their dependency on wood and forest. Continuing, the emphasised risk of raw material was mostly mentioned in terms of raw material price risk or risk of limited supply of the raw material. Thus, one can argue that these types of corporations are seen to be affected to a great extent if changes in wood supply arises and if the price of wood or pulp increases. Like mentioned, most firms that state the risk of raw material saw a potential impact of increased costs, which could be an indication of how the firms are affected if the price on wood increased or if some sort of limitation in supply occurs. VTT (2016) supports this raw material risk and acknowledges raw material as a risk that is important for corporations to manage in order to reduce financial losses.

The second most common risk that was mentioned by our sample of corporations was production risk, which could be related to the risk of unforeseen events of extreme weather causing disruptions in production, and also the ability to cause limitations of supply of raw material. These factors were described by our sample to potentially impact the financial state for their operations, which is in line with Davidsson et al. (2003, p. 39), who found out that disruptions in corporate operations can result in losses due to
diminished production. Moreover, Porter and Reinhardt (2007, p. 22) acknowledge climate change and state that it is a growing part of corporate competition. Related to this, nine out of fifteen corporations perceived climate change as a risk for their business. This in terms of disruptions and diminished operations due to increased mean temperatures and extreme weather conditions such as: floods, forest fires, typhoons, frost periods, and earthquakes. Also disruptions in the production chain was seen as a potential impact, which is connected to the production risk. As can be noted here, many of the risks we have found correlated with each other, and some were followed by others. For example, changes in the climate, hence climate risk, might cause risks in the production when extreme weather conditions and natural disasters could cause havoc within the facilities and impact the supply of raw material. In the same way, raw material risk can be the factor that also causes trouble with the production, and this is noted as production risk, this eminently when a decreased amount of raw material diminishes production, which can lead to financial losses. Even though these risks might be connected and intertwined, we present the risks that the firms themselves have posted as important for their operations.

Our findings related to raw material risk, production risk and climate change risk are in line with Heil’s (2016) argument, that increased climate change and natural disasters can impact different areas of the business, and that the corporations may be inclined to handle disruptions in production due to damage or limitations of raw material. Heil (2016) further mentioned that natural disasters can cause loss of human capital due to injuries and death of employees, however, this was nothing that was clearly stated by the corporations we examined. One cannot by this claim that the managers did not see this as a risk, but rather that they might cover this type of risk in another way, which is not connected to their environmental risk management. The findings most closely connected to injuries and deaths of employees was found at Domsjö Fabriker AB, where they have suffered legionnaire disease and Pontiac Fever throughout the past. These epidemics can cause fatal injuries to those exposed to the fearsome bacteria that can result in severe illness and also death as a worst case scenario. Also, Domsjö Fabriker AB suffered two deaths at their working sites in the near past so they enhanced the value they place on employee safety and that they aim towards a zero tolerance in light of deaths at work. Their embedded notion of zero tolerance implies, among other actions, improved facilities and continuous inspections of the working environment.

Moving forward, as mentioned, the facility risk and forest risks was something we found was emphasised by several firms, this indicates their importance for this industry. Since facility risks are connected to the corporation's facilities and production, and forest risks related to the raw material of wood and production, one could also here see that there is a clear connection between these risks and the previously mentioned risks of production and raw material. One can by this argue that corporations with a clear production function using a raw material as a base for their production are sensitive to risks related to everything surrounding their production and its facility and raw material. Since we did not examine any other industrial production industries we cannot make any conclusions about these, but as our findings show, the pulp and paper industry are sensitive to risks related to wood and their production.

The last two risks we found to be of importance for some of our examined corporations was insect/animal pest risk and restoration cost risk. When analysing these risks one can again see a clear connection to the raw material of wood and production of these
corporations. Insect/animal pest risks are risks for forest and wood, causing implications on the quality of the material used in the production. If for example the wood is of poor quality or is destroyed by animals, this affects the corporation's ability to produce. Moreover, the fearsome bacteria and insects that Domsjö Fabriker AB entail has seen to affect human capital and can cause severe threat. As Heil (2016) states, the loss of human capital can be cost some for corporations when the employer is obliged to cover benefits if they are absent from their jobs, thus a financial liability. Looking specifically at the restoration cost risk, this is related to increased costs due to climate change and extreme weather conditions, which also can be connected to limitations in production.

The previous risks presented were the ones that were emphasised by many corporations, hence the risks that can be regarded as most important for firms in this industry. However, the risks only mentioned by single firms cannot be ignored, since they apparently are important for the firms who mentioned them. Thus, one can argue that corporations will always have risks that are specific for their operations or production, and these have to be managed as well, though one may not be inclined to view these risks as important for the industry as such when they did not arise frequently and this is the reason for why we did not place a vast amount of focus on these risks. Further, the degree of details can vary substantially between the different corporations when some corporations may reveal more extensive and detailed explanations and argumentations surrounding the risks of exposure to them.

Weinhofer and Busch (2012, p. 124) conducted a research on electricity-production organisations, in which they found out that the negative impacts of climate change on corporate business activities can be related to; resource supply, production and product distribution. From our findings one can see that this was also the case for companies within the pulp and paper industry. The resource supply can in this case be related to the the raw material risk, the production is related to production risk, and product distribution could be similar to our found risk of facilities. As can be noted from this is that climate change and environmental risks affects corporations in the selected industry in several parts of the value chain, which indicates the need for firms to properly manage these risks in order to reduce the risk of unwanted or unexpected costs or losses. This work of Weinhofer and Busch (2012. p. 124) inspired us to create a model. In the model you can see a model derived from our findings showing how environmental risks and primarily climate change affect corporations in the pulp and paper industry (see Model 1). As was noticed from our findings the majority of the risks can be seen to steam from changes in the climate and extreme weather conditions. To specify, the most emphasised risks found in our sample were as mentioned: raw material risks, production risk, climate change, facility risk, forest risk, restoration cost risk and insect/animal pest risk. This model shows the relationship between all risks and how it ultimately affects the corporation. As can be noted, the climate change causes risks related to raw material, which in turn contains risks of forests and is affected by insect/animal pest risk. The risk of raw material can impact the production of the corporation, due to for example increased price or limited supply, hence disruptions in production. The facility risk is directly linked with climate change, and contains the risk of restoration costs. Problems or damage with facilities due to climate change or extreme weather conditions affects the corporation’s ability to produce, hence production risk.
Model 1. Emphasised environmental risks detected from findings

During the data collection it was clear that environmental risks are considered by all firms, and some firms had very well elaborated sections related to these types of risks whilst Smurfit Kappa AB and Ekman Invest AB had a clear absence of well-developed information though some information was present. This gives a picture that corporations in this industry perceive it to be of importance to consider the natural environment, which is according to Arnell and Delaney’s (2006, p. 227) who argue that it is important for corporations to be aware of environmental risks, and also to understand the impact and defining response for these to avoid financial disruptions. This could further be connected to SMHI (2014 a), SMHI (2014 b) and Klimatguiden (2010), who all claimed that forestry is highly exposed to climate change, and our argument that the pulp and paper industry also in that sense are exposed to these types of risks, either in a direct or indirect way. For this specific industry, we therefore argue that climate change has a growing part and that it has impacted many aspects of corporate performance, which is in line with Porter and Reinhardt's (2007, p. 22) belief about climate changes’ growing part in corporate competition, and Heil’s (2016) argument that the rise in climate change and natural disasters can cause losses in different business areas. Thus, one can view the environmental risks that are being assessed as risks that firms need to manage in order to reduce potential negative outcomes for corporations’ operations and finances.

This apparent management of environmental risks within the pulp and paper industry can have its origins from many sources, and in this research we argue that environmental issues and climate change are and have been on the ‘agenda’ for a time now, which might have caused an upraise in understanding and knowledge from the general public, hence impacted corporations need for dealing with this type of issue. This is connected to the agenda-setting theory, which was elaborated in the theoretical framework. Due to the increased public knowledge, corporations might feel a need to address topics of high salience to consider the interest of their stakeholders. The subject of these corporations’ stakeholders and initiatives towards managing environmental risks will be analysed in a section 6.1.3 below.

6.1.2 Mitigation Techniques Used by the Corporations
The most apparent mitigation techniques used by the managers at the corporations were; adapt to changed conditions, insurance, derivatives, improve facilities and crisis management (see Table 3). Worth to note here is that the word mitigation refers to the...
methods used to reduce or minimise risks and the likelihood of its occurrence. From these stated techniques the most emphasised one used by the corporations was to adapt to changed conditions. Like mentioned, this was done by holding buffer zones of wood, planning of logging and thinning of forest to prevent storm damages, responsible management of forest and ecosystem and comply with environmental requirements. Storbjörk (2007, p. 457) claims that adaptation to changes in climate conditions is important and has become a vital element of governing climate change. Thus one can conclude that the majority of the corporations agrees with Storbjörk (2007, p. 457) that it is favourable for their operations to adapt to changes conditions and changes in the natural environment. Moreover, this adaptation can also be connected to the corporations’ general adaption towards more sustainable operations, and is therefore in a longer perspective seen as a mitigation technique of environmental risks. Thus, if firms become more environmentally friendly and sustainable they could work towards preventing emissions and dangerous waste, which could reduce the risk of natural disasters and such in the long-run. This will be elaborated further in section 6.3.

Insurance was described by five corporations as a technique used to mitigate environmental risks. This was related to insurance of facilities or forest, and used to reduce the risk of unforeseen environmental damages. As Chichilnisky and Heal (1993, p. 23) emphasise, the use of insurance does not reduce the possibility of an event occurring, but rather concerns compensation if the event unfortunately occurs. One thing that can be hard related to environmental risks is to quantify the risks, and estimate what effect these risks could have (Chichilnisky & Heal, 1993, p. 23). Thus, one can argue that the use of insurance is good, but since it is a hard task to estimate potential impact and effect of some risks it can also be costly. Though, it is important to note here that even the corporations that did not write insurance as a direct way of mitigating certain risks could in fact use insurance for several parts of their operations anyway. They might not use it solely in order to prevent environmental risks, but primarily due to other reasons, which is the reason for why they did not mention it in relation to these types of risks. Heil (2016) further supports that insurance is a vital risk managerial strategy in order to mitigate risks related to facilities, such as fires and natural disasters. From this one can conclude that insurance is a good technique to mitigate some environmental risks, and our sample shows indications that it is a common method for corporations within the pulp and paper industry in Sweden.

Five corporations claimed to use derivatives, such as hedging, forward and future contracts and supply agreements in order to mitigate environmental and climate risks. Froot et al. (1993, p. 1629) acknowledge the possibility of using hedging and other derivatives in order to mitigate some risks, and this could for instance be used when hedging against price fluctuations on raw material. Since the corporations were all dependent on wood or pulp it was not surprising that some of the firms used these types of techniques in order to secure their price or supply of raw material, however, one could argue that it was strange that only five out of fifteen claimed to use it. Though, one could see that some corporations diversified some risks related to the wood and forest by like mentioned purchasing forest from safer locations, and also to purchase small amounts from many different suppliers or owning diversified areas of forest to reduce the risk. This could in some way be a way to deal with risks related to raw material without using derivatives.
Continuing, another mitigation technique found within four corporations were improvements of facilities. This was used as a way of protecting the facilities to environmental risk, such as fire improvements. We were not able to find detailed descriptions over what improvements that were conducted, but rather that the corporations believe it to be of importance to constantly improve and develop their facilities towards climate threats. The last technique that four corporations used was crisis management, which is related to developing ways to deal with a crisis. Anderson (2002, p. 158) describes crisis management as a technique when risk managers develop plans in order handle crises such as: tornados, floods, hurricanes, fires et cetera. Since only four out of fifteen wrote about matters in line with crisis management, one can from these findings view it as a relatively common way of mitigating environmental risks, even though it is hard to draw any conclusions from it. The usage of crisis management may come apparent when it is essentially hard to avoid natural disasters and the damage that may arise from natural disasters, more specifically extreme weather conditions. So in order to safeguard their operations to a greater extent they may feel it of value to establish good routines and techniques to quickly handle the event of a disaster, thus become better equipped in case of a disaster, all to reduce the chance of holding up production that can result in financial losses.

As we assumed before collecting the data, when exploring the corporations’ ways of mitigating environmental risks, it was noted that the corporations did not specify the ways of how they quantified the risks, and as Chichilnisky and Heal (1993, p. 23) acknowledged, this is very hard to do. Maylor (2010, pp. 223-225) states that techniques that can be used range from obtained perceptions and in-house brainstorming to distinguish an approximate perception of impact and severity to the use of mathematical methods such as sensitivity analysis and expected value. To explore this type of mitigation and quantification methods it would have been more favourable to use an interview technique, in order to gain deep knowledge from the right source. This was not information clearly published by our corporations in annual reports or their other published information. However, our aim of this study was not to gain knowledge on quantification methods for environmental risks, and this could be a potential gap for future research.

6.1.3 Risks Emphasised by Corporations in Relation to Risk Salient in Media

In this research we aimed to observe environmental risks within corporations in the pulp and paper industry in Sweden, and this with a focus on what environmental risks that are salient in media, hence what environmental risks that are on the agenda for Swedish firms in the given industry. In this section we will analyse what environmental risks were emphasised by our corporations together with what risks that are seen to be on the agenda within the pulp and paper industry. In that way, we will be able to see if the corporations adhere to the risks that are present for the industry and that different media channels perceive to be ‘on the agenda’ and can help influence the corporations in terms of identifying certain risks to reduce the chance of financial loss. We retrieved the environmental risks from media with the use of agenda-setting theory, thus risks that permeate the media in present times and are seen to be the ones most frequently spoken of in connection to the pulp and paper industry. With this said, we through the use of the agenda-setting theory perceive the risks as placed on the agenda and in that sense we have grounds to believe that they are the ones that the corporation also detect as relevant and adhere to. The risks we elucidated from media that are seen to be on the agenda for the forest industry, hence the pulp and paper industry are: increased rainfall, changing
ground conditions, decreased quality of the wood, animal diseases, insect pests, storm damages, fires and also increased temperatures on earth (Klimatanpassning 2016; Skogsstyrelsen, 2016; SMHI, 2014 a; SMHI, 2014 b). These are therefore the risks that we intend to see if our accumulated data set from the largest Swedish corporations in the pulp and paper industry adhere to and also see if they detect any additional risks worth elucidating in line with environmental risks.

When connecting these risks to our findings one can see similarities, which are presented in Table 6. For instance, nine out of fifteen corporations emphasised some examples of extreme weather conditions such as storms, fires and increased rainfall. Thus, due to the different usage of words by different corporations we chose to collectivise this to one single category. In the salient risks in media one could find increased rainfall, storms and fires, hence we argue that this can be seen as examples of extreme weather conditions. Furthermore, three corporations mentioned something in line with decreased quality of the wood, and this could to some extent be connected to the detected forest and raw material risks. The reason for why only three out of fifteen corporations emphasised decreased quality of the wood as a problem could be that the firms in our selected industry do not see the same need to manage these risks and assume that this will be handled by the suppliers of wood, unless they own forests themselves, which sometimes was stated in the reports. This could also be the case for the risk related to animal diseases. When outbreaks of newly developed infectious animal diseases can cause problems related to woods in terms of decreased quality (Klimatanpassning, 2016; Skogsstyrelsen, SMHI b). Three corporations indicated that invasion of insects and pests can imply damage, thus a decreased quality of wood, which is a risk prominent for the pulp and paper industry (SMHI, 2014 b). Moving on, the risk related to increased mean temperature was directly mentioned by two corporations, and this could therefore be a risk that is not perceived to be of importance for corporations in this industry. However, one could further argue that this might be included in the risk of climate change or extreme weather conditions, and this is the reason for why firms did not emphasis the risk in itself. Looking more closely to the environmental risk of changing ground conditions, only one corporation mentioned that this was a risk. Once again one could argue that this is included for some firms in forest risk, due to its direct impact on the forest, or it could be more relevant for companies directly owning the forest

<table>
<thead>
<tr>
<th>Risk salient in media</th>
<th>Emphasised by number of corporations</th>
</tr>
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<tbody>
<tr>
<td>Extreme weather conditions*</td>
<td>9</td>
</tr>
<tr>
<td>Decreased quality of wood</td>
<td>3</td>
</tr>
<tr>
<td>Animal diseases</td>
<td>3</td>
</tr>
<tr>
<td>Increased mean temperature</td>
<td>2</td>
</tr>
<tr>
<td>Changing ground conditions</td>
<td>1</td>
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* Extreme weather conditions include storms, fires and rainfall

As one can see, the most frequently spoken of environmental risks within the pulp and paper industry in Sweden can be linked to extreme weather conditions in terms of our study, we can connect extreme weather conditions to the risk of climate change when extreme weather conditions are seen to arise due to the ongoing transformation of the natural environment. This can be backed up by SMHI (2014 a), Klimatanpassning (2016) and Skogsindustrin (2016) who clearly state that apparent risks associated with forestry, hence the paper industry are increased rainfall, decreased ground frost and quality of wood and animal diseases due to increased mean temperatures. Further, another SMHI
source elevates storm damages, increased temperatures, insect pests and fires as risks that also face this industry. With this said, it is further prone to conclude that climate change, thus extreme weather conditions, can be seen as an overarching risk which can consequently result in fires, high temperatures, changed ground conditions, storms and differentiated levels of rainfall. This intuition is also considered by Södra Cell AB who perceived climate change as a risk and that consequently could cause potential impacts of increased storms, floods, fires and insect pest. So, when overlooking our accumulated data, one can clearly see that the risks elucidated from media are apparent with our sample.

Conclusively one can argue, based on the presented literature sources, that the risks of elevated rainfall, higher temperatures, storms and fires can be seen as a consequence of climate change and can therefore be incorporated within the category of extreme weather conditions. With that said, we see ourselves to have grounds to entail that the environmental risks presented and observed by the corporations are highly in line with the elucidated risks retrieved from media for the pulp and paper industry. Our findings did not come as a surprise in that sense when prior advocates and authors have intentionally highlighted the importance for corporations to be aware of the risks associated with the climate change and not least to regard what impact these risks can bear with them (Arnell & Delaney, 2006, p. 227). Another motivation and incentive for our given corporations to adhere to the climate change, thus extreme weather conditions, is due to the fact that it is stated that specific industries dependent on raw material is seen to be greatly affected by climate change, hence risks related to the natural environment (Klimatguiden, 2010). From our findings it was clear that raw material risk was a main issue related to corporations in the pulp and paper industry in Sweden, and as can be seen in Model 1 this risk is directly connected to climate change. Hence, one can argue that this can be connected to the salient risk of extreme weather conditions and seen through the perspective of agenda-setting, the reason for this emphasis on raw material risks could be derived from increased attention of climate change in the media. This is also in line with Klimatguiden (2010) statement of that climate change impacts raw material and miscellaneous industrial processes, and this with focus on the forestry industry, which we argue are highly connected with the pulp and paper industry.

When it comes to the agenda-setting theory and matters that are placed ‘on the agenda’ by different sources of media, one has to analyse what actually influences people or corporations, which sometimes can be a hard task. There has been some critique towards this theory related to unclarity in which way media influences the relationship between management and shareholders (Hunter et al., 2013, p. 27). Related to the subject on climate change and environmental issues there is no doubt that it has been emphasised in media as an issue that needs human attention and behavioural changes. One can argue that the wider dispersion of technological channels to distribute news coverage could have an impact in order to spread topics such as environmental issues. Though, it is hard to say if this is what affects corporate managers in a direct way or by the stakeholders who are concerned with the corporation’s operations. In this study we specifically focused on the environmental risks that were placed on the agenda in Sweden as a way of exploring the corporations’ management of environmental risks. From our findings one can argue that our corporations have placed focus on the salient risks emphasised in media, which indicates that corporations actually place attention towards matters that have high salience in media.
Another issue worth addressing is the influence that the stakeholder theory can have on the direction of corporate operations. Linked with Hunter et al. (2013, p. 27), there has been critique regarding the clarity in what way media affects the shareholders. With that said, we have seen through our collection of data that internal and external members of the corporations are highly influential in terms of portraying what they believe the corporation should place their main attention towards, and this directly poses as a barrier for considering the environmental, hence environmental risks that are placed on the agenda. So, notions confine with the belief that media influences their audience on what matters to acknowledge which can further be detected through their pressure placed on corporations to adhere to their concerns of interest. This will be further elaborated on in upcoming sections.

6.2 Corporate Stakeholders
An issue that frequently arose when accumulating and analysing the data was that the vast majority of all corporations placed a great amount of attention towards the present relevance of addressing environmental concerns, and not least the ongoing climate change that permeates our planet. Conserve Energy Future (2016) pinpoints this by enhancing the importance for people to generate an increased awareness towards environmental concerns, and one major issue towards this is eminently the incursion of natural disasters that are thought to increase in frequency and magnitude in the near future. Natural disasters that are believed to result in diverged weather patterns, changes in mean temperature and other extreme weather conditions (Conserve Energy Future, 2016).

When thoroughly overlooking the stated stakeholder of our included sample, we saw from our findings that the main stakeholders that arose frequently were customers, employees, suppliers and consumers. This is profoundly in line with notions from Donaldson and Preston (1995, p. 68) who derived a stakeholder model specifically consistent of these mentioned parties, thus actors who primarily act as a sound basis when addressing corporate stakeholders. Further, we also detected other stakeholders within our sample, and there among society, governments, the local community and environmental organisations. This is ultimately also in line with prior stakeholder advocates such as Rowley and Moldovenanu (2003, p. 204) who additionally speak of actors apparent within our data, hence environmentalists, employees, communities, human rights organisations etc. With that said, our accumulated data incorporates stakeholders that are frequently apparent within media, and when applying an environmental perspective one can thus see that environmental organisations is considered as a separate stakeholder in essence to the environment per se. Södra Cell and Rottneros AB state environmental organisations as a stakeholder, and in that way we believe that they indirectly adhere to environmental concerns when the environmental organisations have the interest of the natural environment as a prime agenda. Though with this said, we cannot imply that Södra Cell and Rottneros AB explicitly state the natural environment as a stakeholder but confines with incorporating interests of environmental organisations that adhere to the environment.

When addressing this issue in light of our collected data from the pulp and paper industry in Sweden, we could see that the vast majority of the corporations speak of the growing concern regarding sustainable matters and are very transparent in terms of elucidating the impact their operations has on the natural environment when phrases such as “environment before production” were apparent. However, with this said we had limited
information regarding the corporations’ operations that can be seen to harm the natural environment, since this might naturally be excluded from their published documents. Therefore, we can argue that the majority of the corporation place focus on environmental concerns, though only based on what they chose to speak out to the public. Moreover, the identification of the environmental risks apparent within our corporations merely concerned the climate change when nine out of fifteen denoted the climate risk as a risk worth attending to, this to decrease the possible impact of extreme weather conditions and changes in temperature. One can also draw parallels to our chosen theory regarding agenda-setting and the corporations responsible operations. An example surrounding this matter can be taken from Rottneros AB, Stora Enso Skoghall AB and Domsjö Fabriker AB who state the mass media as a stakeholder. This primarily based on the intuition that they see themselves as great corporate actors that receive a vast amount of media attention. In that sense it is of importance for them to convey a strong position regarding certain standpoints and to show that their operations are of importance towards the industry as well as the environment. This notion can be backed up by Schmidt et al. (2013, p. 1233) who state that the media coverage does play a prominent role when they are seen to act as central agents when distributing information and further to accelerate the awareness surrounding certain salient topics, in this case the natural environment. This can eminently result in the fact that the corporations see it of importance to address matters of vital concern for our surroundings when the media can help influence the audience on what matters that are to be highlighted. Not least when the media also can act as a central forum for knowledge generation (Anderson, 2011, p. 535). In that case, the salience of environmental risks in media can promote an increased awareness and a stronger driving force to adhere to the ongoing climate change.

6.2.1 Stakeholders and Main Drivers
A valuable insight we gained when analysing our found data was the fact that ten out of fifteen corporations chose to directly incorporate inputs from their stakeholders when choosing which matters to address when facing their corporate strategy. This was clear when the corporations explicitly stated that they adhere to stakeholder interest and their inputs. Carroll (2009, p. 60) speaks of the importance of adhering to the interests of the individuals and groups who are a part of the corporation. This point is something that the majority of all corporations comply with, not least when they make use of a substantiality analysis to help them determine and detect which topics that their internal and external stakeholders perceive to be of importance and wish the corporations to attend to. In terms of our study, we found that the corporations that utilised this strategy identified an interest from the stakeholders to address environmental concerns. Thus, the stakeholders are seen to be the main driver towards considering the environment. We believe that it is of importance to adhere to stakeholder interests when trying to develop a prospering business environment. This can further be backed up by Freeman et al. (2004, p. 364) who state that the stakeholder theory encircles the assumption that stakeholder values is seen to act as a sound basis in terms of doing business, this when corporations should adhere to the values of the actors that can affect and be affected by their operations. Further, the distinction of their main values and confining with what brings the stakeholders together is valuable in terms of driving the business forward which can result in an increased economic performance (Freeman et al., 2004, p. 364). With that said, we can through our findings state that the stakeholders’ interests and inputs is what mainly makes the corporations within the pulp and paper industry strive to operating towards environmental concerns. Other parties that appear and are seen to affect corporate actions towards operating environmentally are the mass media, regulations and their perceived
responsibility. Subsequently, Hunter et al. (2013, p. 27) speaks of stakeholders and that corporate leaders should comply with the increasing influence stakeholder media has over the corporate strategies and the ability they have in terms of convincing others of the importance of certain topics and how to respond. In terms of our data, it seems that our corporations value the inputs and inquiries of their stakeholders to a high degree which ultimately helps them towards influencing the corporate strategy.

Continuously when touching upon the topic of media, Domsjö Fabriker AB was the only corporation that distinctly mentioned the mass media as a driver towards engaging in environmental matters. Seeming that environmental issues have been seen to be ‘on the agenda’, corporations may feel the pressure towards addressing environmental risks merely based on the salience and knowledge generated by media. This notion is also spoken of by Anderson (2009, p. 25) who states that matters associated with environmental risks have become increasingly apparent and the fact that corporations are seen to be pushed towards being environmentally considerable. However, most interest was seen to be placed roundabout 2009 due to the increased frequency of natural disasters, though it is considered to still be of value today. The magnitude of the environmental topic may also result in a sense that corporations are obliged to address topics of high salience to fulfill the interests of their stakeholders. McCombs and Shaw (1972, p. 185) note that media can be seen as highly successful in telling the audience what to think about. And to relate this to our study, it was interesting to see that the vast majority of the corporations spoke of the current climate situation that permeates our earth and the risks it bears with it, also the corporations enlightened us readers with present inputs from the global climate conference in Paris and other salient topics. So to conclude, the audience may indirectly, through the strength of media, oblige corporations to adhere to salient subjects not least when the media is seen to be successful in knowledge generation and telling people what to think about. Further, our sample are seen to be highly influential in media when they are the largest corporations in Sweden within their industry. Domsjö Fabriker AB enhance this by stating that they appear frequently in media and it is therefore important for them to show that their business is of importance for the industry and the natural environment, not least in a reputational manner. This is of importance when a diminished reputation can affect a corporation’s finances through decreased demand of products et cetera (Brown & Deegan, 1998, p. 22). Holmen AB also elevates their responsibility as a large corporation in terms of addressing environmental concerns.

When extracting other factors that drives the corporations to adhere to environmental concerns, a third of the corporations speak of the different laws and regulations that encircle the environment. In present times, it is known that we have seen a vast increase in environmental regulations (Rugman & Verberke, 1998, p. 363) and this itself may stem as a key driver for corporations to fulfill these requirements, hence a driver towards considering environmental risks and concerns. Fines and penalties can occur if corporations do not apply to the environmental laws and requirements which can ultimately affect the reputation in a poor way, thus affect the corporation’s finances (Kleindorfer, 2006, p. 196). With this said, the urge to comply with the laws and legislations does indeed seem to be of essence in terms of boosting the corporations to adhere to the environment.

Conclusively, another factor that we stumbled across that is prone to also act as a driver to address the environment is global trends and the process of trend spotting. BillerudKorsnäs and Tetra Pak packaging AB place attention towards investigating and
spotting current global trends, which nowadays is seen to encircle environmental concerns. This can be analysed in terms of the agenda-setting theory which apprehends the fact that there exists a correlation between the emphasise media covers on certain issues and the importance associated with them (McCombs & Shaw, 1972, p. 185). Anderson (2009, p. 6) implies that issues related to global warming and climate change are some of the most significantly spoken of risks in literature and business nowadays and not least the magnitude that is placed on discussing the earth's atmosphere and the increasing mean temperature. Also factors that reveals that the increasing temperature will continue this way and that human-activity is seen to be the main driver (Anderson, 2009, p. 30). With this said, literature elevates that the current climate change that permeates our planet is a global trend, hence is something that corporations must attend to.

In that way, it is evident that we have managed to find several different drivers that the corporations see as factors towards addressing environmental concerns. The most frequently spoken of was the process of identifying different inquires and inputs from the stakeholders, however, these stakeholders were not fully specified other than the fact that they used inputs from internal and external stakeholders. Further, one stakeholder that was apparent was the government who implement different environmental laws and regulations that corporations must fulfil. Further, the process of trendspotting arose from a few corporations along with the pressure from media and internal codes of conduct. Initially, it is hard to detect one main key driver towards handling environmental interests but we can confine in presenting a dispersed number of drivers that corporations utilised. One issue that we found of interest when analysing the found drivers was the fact that some drivers stemmed from internal initiatives such as trend spotting and the investigation of stakeholder preferences and also drivers that can be seen as obligatory to attend to, for instance the environmental laws and regulations that permeate the business environment.

In this research it is important to note that media can both be seen as an agenda-setter and also a specific stakeholder, that can impact the corporations’ and their other stakeholders. For instance, Metsä Board Sverige AB, Stora Enso Skoghall AB, and Rottneros AB state the mass media as a stakeholder for their operations. Thus, one can argue that media can play two roles in terms of considering environmental risks, they can for instance help the corporations detect risks of interest and also stem as a stakeholder when the media is thought to impact corporations and their direct stakeholders. To exemplify, the media is seen to be able to influence and affect its audience and this is a factor that Domsjö Fabriker AB enhances when they imply that they often appear within media and in that sense it is of essence for them to entail their operations are of importance for both their industry and for the environment.

6.2.2 The Environment as a Stakeholder
When accumulating our data and thoroughly analysing our results, we found it interesting to see that it was only DS Smith packaging AB who explicitly detected and stated the natural environment as a stakeholder. This can be denoted when they specifically highlighted the natural environment as a stakeholder. Moreover, Södra Cell and Rottneros AB incorporated environmental organisations into their discussion surrounding their perceived stakeholders and in that sense the environmental organisations are seen to be the stakeholder and not the natural environment per se. This was of interest to us when we inevitably thought that more corporations would enlighten the value they place on environment and present them as a main stakeholder. Not least when prior advocates
highlighted that the natural environment should be seen as one, also due to the easiness to identify the environment and also when the climate change is seen to be highly on the agenda (Haigh & Griffiths, 2009, p. 347; Driscoll & Stark, 2004, p. 56; Mitchell et al., 1997, p. 878; Phillips, 2003, p. 137). Haigh and Griffiths (2009, p. 348) contemplate that the essence of considering the natural environment as a stakeholder can have grounds due to the present knowledge regarding the negative financial impact that can encircle the corporation and the unpredictability of increased numbers of natural disasters and extreme weather conditions. Seeming that the category of extreme weather conditions was the environmental risk most apparent within our data, we therefore believed that the identification of the natural environment as a main stakeholder should have appeared more greatly in magnitude.

Further, Mitchell et al. (1997, p. 878) speak of the fact that the natural environment can also be seen as an indirect stakeholder when it is seen to attain legitimate claims though it has a decreased amount of power. With this said, we argue that the corporations may not directly choose to identify the natural environment as a main stakeholder but still oblige to their interests indirectly. This when the environment can be seen to have legitimate claims worthy of addressing for the safeguarding of the corporation's finances due to a more sustainable climate. To exemplify, the corporations’ mitigation strategy towards adapting to the ever evolving climate is seen to imply an effort towards reducing the frequency and magnitude of climate risks that can be seen to safeguard finances when the risk of havoc diminishes. We believe that this is the case when the overall discussion and identification of the wellbeing of the environment is very present within their publications, not least when the vast majority enlighten the urgency to comply with the natural environment through their sustainability reports. With this said, an explanation towards the absence of stipulating the natural environment as a stakeholder may only lie in the fact that they may see the natural environment as an indirect stakeholder and may solely choose to present dependent stakeholders that both acquire power and legitimate claims, thus human actors such as the actors most apparent as suppliers, customers, employees and consumers. To further analyse our found results, one can also discuss if the majority of the corporations solely choose to incorporate human actors. This point is discussed by Phillips (2003, p. 143) among others who elevate the fact that only human actors should qualify as stakeholders when they are the only ones who can establish and create moral obligations, thus possess legitimate claims and power. We cannot fully imply that this is the case though it can be in line with our found results as well when Södra Cell and Rottneros choose to highlight environmental organisations as a stakeholder, thus more based on human activity than the natural environment on the whole. Moreover, Phillips (2003, p. 146) implies that seeming that the natural environment is seen to be a solid foundation to the wellbeing of society, corporations can be seen to have an obligation to see to their interests, hence acknowledge the natural environment as a stakeholder in one way or the other. Worth mentioning is that the standpoint that Phillips (2003, p. 143) takes in terms of the stakeholder theory, may not always be the case when moral obligations is not in general included within the framework of the stakeholder theory.

Even with these stated arguments, one cannot know the reasoning behind the corporations’ choices to include the natural environment or not. Moreover, one can also suggest that the vast majority of the corporations in this study do indeed see the natural environment as a vital component to adhere to, even though they do not explicitly state them as a direct stakeholder. We argue that this can be stated when all corporations that
prevail extensive information take the natural environment into consideration. Exceptions that appeared within our sample consisted of Ekman Invest Holding AB and CellMark Holding who did not reveal any substantial information at all. Further, all included corporations besides from Ekman Holding Invest AB wright extensively about the environment and matters in line with their exposure to the natural environment, yet alone the consequences and damage that the natural environment and not least the climate change can result in for earth and its operations. Our perception is further that the corporations may be indirectly inclined to adhere to the wellbeing of our environment and as a stakeholder not least when observing the benefits of elucidating different risk elements that can result in a diminished financial state while simultaneously preserving and safeguarding the environment. This does, in our meaning, entail the profound interest and value that the majority of the corporations dedicate towards addressing these matters, despite them stating the natural environment as a stakeholder. Conclusively, we therefore have grounds to say that all corporations apart from Ekman Holding Invest AB place a considerable amount of attention towards the environment and their stakeholders’ interests, hence actors that can be affected or affect the success of the business (Jensen, 2001, p. 9).

Another interesting implication that arose when discussing this prevalent topic is also due to the notions of Haigh and Griffiths (2009, p. 357). This when they argue to include the natural environment as a stakeholder when it can enable corporations to be aware of the services that can be gained and can help encourage mutual benefits when operating towards the environment (Haigh & Griffiths, 2009, p. 357). So, when overlooking our findings, we could see that the adaption to the ongoing climate change was one of the more apparent risk mitigation strategies. This to reduce the chance of disrupting the environment and decrease the frequency of natural disasters and extreme weather conditions to reduce financial losses. In that way, the corporations may feel inclined to adhere to the natural environment when mutual benefits can be created, thus a more sustainable and pleasant environment along with a decreased amount of havoc that can consequently cause environmental risks and damaged finances.

To summarise, we imply that the corporations may very well adhere to the interests and values of the natural environment though there is an absence of them in their list of direct stakeholders. In that sense, the environment can stem as an indirect stakeholder, not least when other human actors can become strained by the environment and influence the corporations to see to their interests. This particular thought can also be backed up by our accumulated data when we, as previously seen, found that a prime strategy towards distinguishing what values to address are made from considerations and interests of a range of other stakeholders that imply that an interest of them is to adhere to the environment. Initially, the distinguishing of environmental risks that can harm the corporation's economic performance could result in a greater risk assessment that eminently will benefit the natural environment through enhanced actions, implemented risk strategies and systems along with a narrower contact with the environment to reduce economic impact. Worth stating is that the majority of all corporations see to their negative impact on the natural environment through their operations and uses this as a standpoint and driver towards engaging in environmentally friendly initiatives. With that said, the corporations affect the environment in a negative way but enlightens us readers with information regarding their impact and strives towards a reduction. This information can be retrieved through the corporations’ sustainability reports when they highlight that the pulp and paper industry, thus their operations, are inclined to affect the state of their
surroundings. Therefore, even though they engage to protect the environment, it is of essence to understand that their operations are seen to result in implications that can fuel the climate issues that permeates our environment.

6.3 Sustainability Reporting and EMS

6.3.1 Corporate Engagement in Sustainability Reporting and EMS

One can wonder why it is of essence to examine if our corporations compute sustainability reporting and engage in environmental management systems when this primarily attends to the health of the natural environment per se, and not directly any environmental risks that can pose as a threat financially. Though, as previously mentioned, nine out of our fifteenth corporations address the climate change as an environmental risk when this eminently can increase the magnitude and the frequency of natural disasters, hence storms, fires, rainfall, increased mean temperatures and other extreme weather conditions. These can be seen as threats that can disrupt corporate finances. With that said, it is seen, as previously stated, that the corporations that distinguish the climate change as an environmental risk mention the importance of adaptation as a possible mitigation strategy. Hence, the greater chance of them adapting to the ongoing climate change, the greater chance of them preserving the planet which can consequently result in decreased environmental threats such as extreme weather conditions, floods and other mentioned risks. In that case, it seemed of value for us to overlook the corporation's annual reporting and other relevant publications to see if they place attention on this subject to reduce the chance of financial losses. And to our findings, we saw that thirteen out of fifteen presented extensive sustainability reporting which entails their interest in working to adapt to the ongoing climate change and towards a sustainable working environment. The two absent corporations are also worth placing attention to when Rottneros AB does not explicitly present a sustainability report but does speak extensively about the environment and their sustainable initiatives whilst we found a clear absence relating any matters of the environment and sustainability on the whole from Ekman Holding Invest AB. When continuously addressing this topic, SearchCIO (2015) backs up our notion by highlighting that the objective with sustainability management and the preparation of sustainability reports is to make the alignment as efficient as possible in terms of growing a business and simultaneously safeguard the environment. In that sense, this is the intuition we see among our sample apart from Ekman Holding Invest AB. Hence, corporate initiatives towards working in an environmental and sustainable manner can help the corporation grow and also see to the environment. The act of preparing sustainability reports most often involves the corporation's initiatives in line with waste reduction, greenhouse gases, the usage of efficient energy systems, the anticipation of changes in regulations and also considering the environment in terms of production (Anderson, 2009, p. 31). Moreover, EMS is also a often spoken of topic in line with sustainable operations and an approach that stems around the corporation’s actions towards overseeing their impact on the environment and can make use of to gain control over their environmental impact and help fulfil environmental goals (Daily & Huang, 2001, p. 1540; Darnall et al., 2007, p. 30). Seemingly that we identified different laws and regulations as a driver towards addressing the environment, EMS may be of essence to enforce within corporations’ operations to avoid penalties and fines if one does not gain compliance with different environmental standards. Also, it is seen that the implementation of sustainable operations can enhance economic performance (Stefan & Paul, 2008, p. 57). Though, the implementation of EMS is also a discussed topic when some authors question the validity when one can claim to adopt EMS but do not actively operate to reduce environmental harm and instead state the usage of EMS to gain trust.
and reputation, hence the “right thing to do” (Darnall et al., 2008, p. 30). In our case, we do not have grounds to know how the corporations make use of EMS though we can with certainty reveal that twelve out of fifteen corporations say themselves to implement EMS. In relation to risk management, EMS is as previously denoted a tool to be able to identify any impacts towards the environment that arises from corporate operations (NASA, 2014). Further, the EMS system is also seen to support risk management when it includes measures to help detect and mitigate environmental risks that can encircle corporations (NASA, 2014). Conclusively, seeming that thirteen out of our entire sample utilise EMS we argue that they most probably make use of the incorporated tools to help detect and handle risks that can directly pose as a threat towards corporate finances.

To further speak of the usage of environmental management system, we could see that all of corporations that operates under EMS attain the ISO 14001 certification. This certification is a standard that frequently arises when addressing management systems and is issued by the international organisation for standardisation (ISO) (Kleindorfer, 1997, p. 194). Further, articles show that the use of these systems are of importance for corporations when they are seen to affect the performance in a positive way (Schoenherr, 2012, p. 125; Melnyk et al., 2003, p. 344; Pagell & Gobeli, 2009, pp. 290-291). This indefinitely can be seen as an incitement to implement environmental management systems.
7. Conclusion
In this section of the thesis the conclusion derived from the findings is presented, and the research question is answered by presenting the identification of environmental risks and potential mitigation strategies towards reductions of financial losses, and if there exist prevalent stakeholders within our chosen sample. Furthermore, the theoretical contributions of this study is presented along with recommendations for future research within this empirical field.

7.1 Research Question
Within this study, our aim was to examine environmental risks for large corporations within the pulp and paper industry and detect risks that can consequently impact the corporations in a negative state. Continuously to observe potential mitigation strategies. Further, we aimed to see through the accumulated data if the corporations adhere to the natural environment and not least if they perceive the natural environment as a stakeholder or what drivers influence the corporations to attain to the interests of the natural environment.

To be able to delve into and fulfil our purpose, we established the research question: What environmental risks do large corporations within the Swedish pulp and paper industry identify and how are these managed, and what stakeholders influence the corporations to adhere to the natural environment?

In attempt to answer this research question, the findings in this research showed that the most emphasised and apparent environmental risks corporations in the pulp and paper industry identify are: raw material risks, production risk, climate change, facility risk, forest risk, restoration cost risk and insect/animal pest risk. It was apparent that raw material risks and production risks were the risks acknowledged by most corporations, and one can thus conclude that these pose as the risks that are most likely to impact the corporations’ in a negative way. This was derived from the corporations’ dependency on the raw material of wood, which in turn was exposed to forest risks and insect and animal pest risk. From this one could also conclude that their dependency on wood and risks related to this raw material can cause indirect risks in production. Having limited supply in wood as a result of extreme weather conditions or decreased quality of the wood due to animal pest could are direct risks that have implications on the corporation’s ability to produce, hence can be seen as risks of financial losses. In the same fashion, many corporations saw that environmental risks sprung from climate change could lead to facility risks, thus risks related to destruction in production facilities, which also resulted in reduced ability to produce. This could further lead to cost of restoration of the facilities. Taken all of this together, the main risks coming from the environment was related to climate change and extreme weather conditions, which in turn resulted in risks in raw material, facilities and finally risks in loss of production, hence financial losses.

When addressing the agenda-setting theory, we can through our study conclude that the most apparent and salient risks found in research do in fact stem as a good reference point in terms of acquiring knowledge regarding what risks to attend to. This due to the fact that our findings are in line with the elucidated risks highlighted in media in the pulp and paper industry in Sweden. With this stated, we further believe that we can convey the intuition that we have been able to increase the understanding surrounding what environmental risks that corporations within the pulp and paper industry in Sweden
highlight as important. Moreover, to seek any differences between the extracted risks placed on the agenda within the given industry.

Related to the part of the question of how these identified risks are mitigated, we have found that the main mitigation techniques used are: *adapt to changed conditions, insurance, derivatives, improve facilities and crisis management*. From these mentioned techniques, most firms worked towards adapting to changed conditions, and these firms indicated a belief that it was favourable for their operations to make these adaptions. Insurance and derivatives was also emphasised by some corporations, but this was not as common as we believed related to environmental risks. Another way of mitigating environmental risks was related to improving facilities, which could be connected to reducing facility risk. Lastly we found that crisis management was used as a technique for mitigating environmental risks.

In terms of environmental drivers, our findings showed that there was a diversified amount of factors that drove corporations towards adhering to the natural environment. With this stated, we saw that the corporations did not solely present specific stakeholders that influenced an engagement towards environmental concerns but also other drivers. In that sense, the stakeholders elucidated that influenced the corporations are *governments, the media* and unspecified *internal and external stakeholders* whilst other drivers concerned *trend spotting and their own degree of perceived social responsibility*. Due to our findings, we can bravely state that we have successfully contributed to our gap when we on beforehand detected an absence of research related to the financial implications of environmental risks that permeate the natural environment in Sweden. Seeming that prior research has stipulated their approach primarily around a green and environmentally friendly perspective in terms of preserving the planet, we can contribute to our gap when we have detected environmental risks that can decrease the economic state our our chosen sample, hence affect their operations. Further, another evident gap in literature encircled the absence of knowledge in line with how corporations address environmental risks to prevent financial havoc.

### 7.2 Theoretical Contribution

In this research we have increased the knowledge and understanding concerning how environmental risks are assessed within the industry of pulp and paper, this in terms of the identification of risks and how these subsequently are managed. This study has therefore contributed with scientific knowledge to the research area of environmental risk management within the specific industry. One could also argue that we have contributed with knowledge to the general field of risk management, this when an increased amount of knowledge regarding managerial strategies could imply better modified and customised systems towards managing risks that can stem from climate changes and environmental threats. Consequently, this could both help safeguard the natural environment by operating in a more environmentally friendly state and simultaneously acquire corporations with an increased knowledge based and implemented risk managerial systems to reduce the chance of financial loss. Furthermore, with the findings from this research we have increased insight into what stakeholder drivers that influence corporations towards considering the environment. Thus, this can be seen as a contribution to the stakeholder theory. By stipulating and elucidating key drivers towards driving corporate managers to attend to the natural environment, corporations can gain insight into what stakeholders perceive environmental concerns of relevance and which
demands and interests to adhere to. This when it is thought that a collaboration of stakeholder interests can help drive corporate performance.

A theoretical contribution related to the agenda-setting theory would be to conclude that the media generates a fundamental basis regarding prevalent risks though it is of essence for corporations to customise and identify risks relevant to their operations. This is something that we extracted from our study when other risks appeared, risks a side from the prominent ones found in media.

7.3 Future Research
Our study leaves room and paves the way for future research within our given field of environmental risks and risk management. In that way, one can say that our research can act as a sound foundation for future studies, not least in terms of generating greater depth and breadth. One suggestion to future research can eminently be to direct the attention towards a wider range of industries, this to further detect other environmental risks that can affect the corporation's finances in a negative way and compare other industries within the geographical sphere of Sweden. For example, the agricultural sector and the pharmaceutical industry could be suitable industries to examine due to their environmental impact. Another view one could take is to conduct a study that consists of more in depth data generated from interviews. Within our study, we primarily accumulate our data from annual reports and other relevant publications to establish a sound dataset with information regarding the corporation’s identification of environmental risks and their mitigation strategies. With interviews, one could most probably attain more depth and a greater amount of information from highly involved corporate actors. This to create a more extensive perception encircling their risk managerial strategies and further, how they perceive the state of the environment and the role of their stakeholders. Further, another suggestion would be to extensively address corporations risk mitigation strategies. When studying this topic narrower and with more depth, one could attain a better picture of how corporations go about mitigating any perceived environmental risks, this to greater diminish the chance of financial losses.
8 Quality Criteria

In this section, we intend to address the quality of our study along with matters concerning the reliability, generalisability and validity. This to ensure that our study is trustworthy and constitutes of high quality.

Is is of essence to consider data quality issues when conducting qualitative research, all to present and pursue research of a trustworthy and high quality nature and further to assure that our study prevails the highest possible quality. Saunders et al., (2012, p. 381) emphasises the value of quality criterion and presents different elements that constitutes a sound basis in terms of evaluating the criteria, these are reliability, forms of bias, generalisability and validity.

Bryman and Bell (2008, p. 262) also highlights that the past 25-30 years have encircled an increased attention and focus on qualitative research when it has become more common, this inevitably has implied an increased focus on the handling of quality issues in relation to qualitative studies. When taking different evaluation criteria into consideration throughout the research process, this can result in an increased amount of transparency and yet alone helps aid us researchers to consider our perceived strengths and limitations within our field of research (Eriksson & Kovalainen, 2003, p. 290). Authors see it of value to continuously assess the quality of the evaluation criterion throughout the entire research process to establish a high quality study.

8.1 Validity

Bryman and Bell (2012, p. 42) speaks of validity and that it merely is considered to be the criterion of most importance which addresses the integrity gained from the conducted research. Svensson and Starrin, (1996, p. 210) additionally states that validity is seen as the ability to measure how applicable and suitable the chosen methods and structure of the research is. Moreover, Eriksson & Kovalainen (2012, p. 395) concludes that validity surrounds the extent to which findings can apply a precise description or explanation to the happening. With these stated explanations, Bryman and Bell. (2011, p. 395) further breaks the concept down and enhances that the term validity can take alternative forms such as internal validity and external validity. Internal validity addresses causality and whether the foundations based on theory correlate to the researcher’s’ observations and intention (Bryman & Bell, 2012, p. 395). It is also thought that internal validity if most regularly seen to be the strength and backbone of qualitative research. Moreover, external validity addresses which degree the findings of the research can be generalised into alternative settings (Bryman & Bell, 2012, p. 395). Lecompte and Goetz (1982, p. 44) highlights though that the issue to generalise into different social settings can often be a problem in qualitative research, this mainly due to decreased samples and the different contextual settings.

So, when addressing internal validity and factors concerning whether our chosen approach measures and observes what we intend it to do, we can with clarity say that our approach in terms of extracting information regarding environmental risks for larger corporations in Sweden is in line with our intention. Further, the information we can extract from annual reports and other publications has a clear relationship with our perceived information regarding industry standards, hence not altered and influenced by an external event other than our chosen sources of publications. Regarding external validity, it is prone to say that the results in our study can be generalisable to a certain extent and can be applicable to other social settings when one can attain the same data at
another point in time. Though with that said, one would have to achieve a substantial amount of data regarding other industries and industry standards in accordance to environmental risk exposure to be able to apply the findings to a greater setting which is not our intention within our field of research.

8.2 Reliability
Issues in relation to the reliability criterion helps evaluate whether we researchers are dependable in terms of producing reliable data and assesses the trustworthiness and consistency of the findings. (Kvale & Brinkmann, 2009, p. 245). Subsequently, Saunders et al. (2012, p. 192) state other issues of relevance in line with reliability and considers consistency as a prominent factor concerning if the empirical study can be replicated at another point in time. LeCompte and Goetz (1982, p. 32) denote that qualitative research in general can be seen to inquire issues associated with the ability to replicate the study when different circumstantial and social settings cannot be reproduced. In terms of our study, we have grounds to set aside these issues when our qualitative approach merely concerns accumulating data from annual reports and webpages. This implies the use of publically available data which establishes the ability to reproduce our findings at a different time using the same framework. We argue that extracting information from annual reports and other published information was a good and appropriate way of examining the subject of environmental risks. One can also speak of internal reliability which regards the ability to agree to what we researchers perceive and how we interpret our findings (Bryman and Bell, 2011, p. 395). In line with our previous argumentation, the same can be applied in this case when we do not utilise the use of interviews where one can apply a more subjective intuition. Instead, our qualitative approach to extract data from annual reports and webpages minimises this issue when there is a decreased chance of applying a sole subjective opinion on published texts. Though, it is of essence for us to highlight that it is hard to completely eliminate all subjective perceptions.

When evaluating these factors of reliability, we can bravely conclude that our research can be seen as reliable. Not least when we utilise the enterprise database Retriever Business to acquire our data, a data source which is frequently and abundantly used and is seen to possess trustworthy and reliable attributes in terms of content. This further proclaims the ability for any other individual at another point in time to be able to replicate this study, which enhances the transparency and trustworthiness encircling our field of research.

8.3 Research Bias
Saunders et al. (2012, p. 381) state that there exist three different types of potential bias which should be considered when conducting research. The first is referred to as interviewer bias where comments, tone or issues with non-verbal behaviour can influence the way the interviewees respond, hence create bias. This issue may arise when one tries to impose beliefs of one owns and angle the way of interpreting responses (Saunders et al., 2012, p. 381). Further, response bias is also highlighted and explained as a bias that can arise based on perceptions about the included interviewees and also participation bias which can be a reaction from the nature of the participants who are involved in the study and result in falsely stated answers.

Within our study, the issue regarding biases that can arise from the use of interviewees is excluded when our qualitative approach stems around the interpretation and extraction of qualitative data from annual reports and webpages. This cannot fully eliminate our
subjective judgements related to our field of research but we can diminish any bias related to interviewees when our accumulation of data is the main source that our research is stipulated around.

When collecting the data in the way as in this research, one can argue that the corporations publish certain information due to the general requirements, and thus may not represent the exact state of reality. For example, the corporations might imply that they operate in a fully environmentally friendly way but may not entirely devote the amount of attention that one would assume from the stated information. This could lead to bias in terms of conveying slightly angled information, the information that stems as a sound foundation to our research.

8.4 Generalisability
Within our study, we empt to address large corporations within the pulp and paper industry in Sweden and in that sense we know on beforehand that it is hard for us to generalise our results to an extensive degree. This mainly when industries within the same geographical sphere can possess different attributes and are exposed to different environmental risks and thus it would be hard to draw any further conclusions. Thus it was never our intention to generalise the results on the entire population of corporations within the pulp and paper industry in the whole world. Saunders et al. (2012, p. 382) enhances the importance of generalisability and implies that it generally concerns the ability to apply the findings to other settings, hence utilise the attained research to other real world situations. Lukka and Kasanen (1995, p. 72) amplifies this and corresponds to the idea that generalisation infers that the argumentation and conclusions made can cover a wider dispersion of cases that stems from one or more measures from the real world. Further, generalised conclusions can consist of conceptual frameworks that gives us the possibility to discuss the highlighted subject more in general, explanatory models that can help generate general relationships, prescriptive models that can result in solutions and guidelines to practical problems (Lukka & Kasanen, 1995, p. 72). Moreover, Saunders et al. (2012, p. 383) states that the criterion of generalisability is often of an issue in relation to qualitative research, this based on an often smaller sample set that can be unrepresentative. Eriksson and Kovalainen (2011, p. 293) also emphasises that the discussion encircling generalisability in light of qualitative studies may concern well-argued and grounded selection of participants or other research events.

With this said, we believe ourselves to obtain a sample of a generalisable nature when it can represent and be of value to corporations within the pulp and paper industry in Sweden. Our main aim is to solely direct attention towards large corporations in Sweden within the pulp and paper industry, though this primarily based on the more extensive risk management that larger corporations possess to be able to assure that we can accumulate data of relevance (Frank, 2008, p. 7). In that sense, larger corporations are more inclined to denominate their environmental risk identification and risk managerial strategies through annual reports and publications. Even though we intend to primarily use this information to compare their intuitions surrounding environmental risks against an industry standard, we therefore believe that all corporations in Sweden within the pulp and paper industry, independent of size can utilise our research to their advantage. This primarily in terms of an identification of environmental risks and how corporations apply risk managerial strategies to decrease the risk of obtaining financial costs. Further, different industries and the diverged geographical locations inquire an exposure to different risks (Weinhofer & Busch, 2012, p. 121). In that case, we cannot imply that our
sample can be representative and generalisable to other geographical locations and industries and to be able to establish this would inquire further research towards corporations in other locations and industries.
9 Reference List


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**Personal Communication**

### Appendix 1
Environmental risk identification, potential impact and mitigation

Table 7. Presentation of risk, potential impact and mitigation

<table>
<thead>
<tr>
<th>Corporation</th>
<th>Risk Identification</th>
<th>Potential Impact</th>
<th>Mitigation*</th>
</tr>
</thead>
</table>
| SCA                          | - Costs for restoration of the environment  
- Climate change  
- Facility risks (fires, production disruptions) | - Higher costs  
- Uncertain economic effect due to climate change  
- Disruptions in distribution chain | - EMS  
- Environmental analysis  
- Risk management system (strict guidelines) |
| Sandvik                      | - Financial Raw Material  
- Environmental Pollution  
- Increased Public focus on Climate Change and Water Consumption | - Higher costs  
- Negative effects on the environment  
- Tarnished reputation  
- Decreased demand  
- Reduced access to raw material  
- Reduced access to water  
- Disruptions in supply chain  
- Disruptions due to extreme weather conditions | - ISO 14001  
- ISO 50001  
- Life cycle analysis  
- Environmental reporting  
- Environmental and climate change strategy development |
| CellMark Holding             | - Price risk  
- Disruption in supply chain | - Disruption in production  
- Higher costs | - ISO 9001  
- Forest stewardship council (FSC)  
- Program for the endorsement of forest certification (PEFC)  
- “back-to-back” with suppliers and customers |
| Holmen AB                    | - Facility risks (forest fires)  
- Damage to forestry  
- Disruption in production  
- Higher costs | - Loss prevention program  
- Improvement of facilities  
- Diversify risk through dispersed forestry  
- Insurance for unforeseen environmental damages | |
| Ekman Invest Holding AB      | - Raw material risks  
- Higher costs | - Hedging Offset fluctuations |
| BillerudKorsnäs Skog och Industri AB | - Facility risks  
- Raw material risks  
- Wood price risk  
- Pulp price risk | - Unforeseen disruptions  
- Affect capacity to produce  
- Affect customer relationship | - Preventive work to avoid disruptions  
- Internal environmental planning/inspection  
- Insurance |
Price risks can cause problems with derivatives. Fluctuation in pulp price affects earnings.

Södra Cell
- Climate and environmental risks
- Raw material risks
- Facility risk
- Forest risks (due to elks)
- Increased extreme weather conditions
- Floods
- Insect pest
- Increased risk for fire
- Changed vegetation limits
- Damage on forestry
- Higher costs
- Communication and planning with forest owners
- Education
- Crisis management
- Improvement of facilities

Metsä Board Sverige AB
- Forest risks
- Insects
- Natural disaster and environmental damage
- Supply of raw material
- Large financial losses
- Damage of forest disruption of production
- Insurance programs
- Buffer zones of wood
- PEFC
- FSC
- Careful planning of loggings and thinning prevent/minimise storm damages
- Recovery plans for extreme weather

Stora Enso Skoghall AB
- Raw material risks
- Climate change
- Natural catastrophe risk
- Increased global demand for water
- Higher costs
- Increased typhoons and frost periods
- Increase in temperature milder winter and shorter periods of frozen soils
- Increased risks for storms, floods and earthquakes
- Affect supply chain and operations
- Insect outbreaks
- Certifications
- Purchase forest in safer locations risk diversification
- Adapt to climate change and actively seek opportunities to reduce environmental impact
- R&D to increase tolerance for extreme temperatures
- Diligent plantation planning avoid frost sensitive areas
- EMS

Smurfit Kappa Kraftliner Piteå AB
- Raw material risks
- Climate change
- Higher costs
- Forward pricing
- Dedicated purchasing function
- Supply agreements

Tetrapak Packaging AB
- Raw material risks
- Forest risks
- Climate change
- Reduced production
- Financial losses/higher costs
- Reduced amount of material
- Certifications
- Consolidate shipments (rail rather air)
- Climate change adaption
<table>
<thead>
<tr>
<th>Company</th>
<th>Risks</th>
<th>Precautionary measures</th>
</tr>
</thead>
</table>
| **Domsjö Fabriker AB** | - Forest risks  
- Extreme weather changes  
- Legionnaires disease and Pontiac fever  
- Facility risks | - Increased frequency of storms and floods  
- Changed rainfall patterns  
- Milder winters  
- Dryer and warmer summer  
- Damage to production  
- Economic losses/higher costs  
- Injury to human capital (due to disease) | - Precautionary principles to reduce risks  
- Precautionary measures and insurance  
- Adapt to environmental changes  
- Improvement of facilities |
| **DS Smith Packaging AB** | - Production risks  
- Inability to meet sustainability standard and customer requirements | - Higher costs  
- Reduced supply of raw material  
- Penalties (due to inability to meet sustainability standards) | - Hedging (hold short term position)  
- Disclosure of sustainability data  
- EMS  
- Monitor progress |
| **Mondie Dynäs AB** | - Climate change  
- Physical and regulatory risks related to climate change  
- Facility risks  
- Forest risk | - Disruption in demand  
- Affected production in case of environmental happenings  
- Reputational damage  
- Affect financial performance and position | - Adaption to climate change/anticipate changes  
- Detailed risk assessment through monitoring  
- Responsible management of forest and ecosystems to prevent disruption  
- Comply with environmental requirements |
| **Rottneros AB** | - Raw material risks  
- Changes in environmental regulations  
- Climate change | Restoration costs  
Higher costs  
Affected production  
Decreased customer relation/reputational risk | - Secure customer relations  
- Long-term supply agreements  
- ISO 14001 |

* Mitigation refers to the methods used to reduce or minimise risks and the likelihood of its occurrence