

Department of thematic studies,
Campus Norrköping

The Swedish Insurance Sector's View on Climate Risks

Adaptation Strategies to the Consequences of Current Weather Variations and Expected Climate Change

Karin André and Johanna Brunge

Bachelor of Science Thesis, Environmental Science Program 2005



LINKÖPINGS UNIVERSITET

Linköpings universitet, Campus Norrköping, SE-601 74 Norrköping Sweden

**Institution, Avdelning**

Department, Division
Institutionen för tematisk utbildning och forskning,
Miljövetarprogrammet
Department of thematic studies,
Environmental Science Programme

Datum

Date
2005-06-15

Språk

Language

- Svenska/Swedish
 Engelska/English

Rapporttyp

Report category

- Licentiatavhandling
 Examensarbete
 AB-uppsats
 C-uppsats
 D-uppsats
 Övrig rapport

ISBN

ISBN LIU-ITUF/MV-C--05/06--SE

ISSN**Serietitel och serienummer**

Title of series, numbering

Handledare

Tutor
Sofie Storbjörk

URL för elektronisk version

<http://www.ep.liu.se/exjobb/ituf/>

Titel

Den svenska försäkringsbranschens förhållningssätt till klimatrisker
- Anpassningsstrategier till konsekvenserna av dagens vädervariationer och en förväntad klimatförändring

Title

The Swedish Insurance Sector's View on Climate Risks
- Adaptation Strategies to the consequences of current weather variations and expected climate change

Författare

Author
Karin André and Johanna Brunge

Sammanfattning

Abstract

In recent years Sweden has been struck by several cases of weather related property damage resulting from the severe flooding in 2000, 2002 and the storm Gudrun at the beginning of 2005. The importance of strategies enabling society to adapt to coming changes in weather patterns has been confirmed by the Intergovernmental Panel on Climate Change (IPCC) as well within the international and national policy arena. It is reasonable to believe that the insurance sector would be among the first within the financial realm to feel the effects of expected climate change. This qualitative study aims to investigate how the Swedish insurance sector relates and deals with the consequences of current weather variations and expected climate change. Research areas of importance concern *1. The role of the insurance sector. 2. Knowledge and other actors* and *3. Adaptation strategies, current and future.*

Comprehensive theories regarding adaptive strategies have been applied to the insurance company's operations. The empirical material is based on interviews with relevant employees at the four largest insurance companies in Sweden as well with the Swedish Meteorological and Hydrological Institute (SMHI) and the Swedish Insurance Federation. The overall results show that the insurance sector considers the climate issue to be important to future operations; however, since Sweden has not yet been affected by climate change, they prefer, at this time at least, to monitor developments and gather knowledge. Due to their position on this matter, the insurance sector's role in the climate debate is, generally speaking, considered to be minor whereas the more important actors are authorities, municipalities and the government. Reinsurance companies are seen as a significant player in the market due to many factors; most notably that they indirectly have the capacity to affect the entire Swedish insurance sector by raising the costs for reinsurance premiums. However, the climate change issue is of importance yet, of higher relevance is adaptation to present weather variations.

Nyckelord

Keywords: adaptation, climate change, risk and the Swedish insurance sector

Acknowledgement

We would like to acknowledge the spokespersons at Trygg Hansa, Folksam, Länsförsäkringar, If, SMHI and the Swedish Insurance Federation who have contributed information to this study. We are grateful for letting us share your experiences and knowledge which have made this study possible.

We would also like to thank our supervisor Sofie Storbjörk for all the valuable support and information as well as constructive critique we have been provided with during this Bachelor of Science thesis. It has been appreciated and advisable for our study.

Finally, we are grateful to Sean Grant and Gustav Pettersson for taking the time reviewing the manuscript and giving technical support.

Karin André and Johanna Brunge

Norrköping, 2 June 2005

Preface

A project was recently undertaken at Linköping University under the heading *Climate Science and Policy beyond 2012*. The project aims to develop action alternatives to support international climate change decision making with an explicit focus on the period beyond 2012. The program is further divided into several sub-programs including *WP C: Agendas and strategies for adaptive action*, which is concerned with examining strategies on how to adapt to climate change.¹ The purpose of the program is to analyse the decision-making and management processes at the national, regional, and local levels and consequently prompted the completion of this subsequent study concerning the response by the insurance sector to climate change.

¹ Storbjörk 2004 p.1 pp

Abstract

In recent years Sweden has been struck by several cases of weather related property damage resulting from the severe flooding in 2000, 2002 and the storm Gudrun at the beginning of 2005. The importance of strategies enabling society to adapt to coming changes in weather patterns has been confirmed by the Intergovernmental Panel on Climate Change (IPCC) as well within the international and national policy arena. It is reasonable to believe that the insurance sector would be among the first within the financial realm to feel the effects of expected climate change. This qualitative study aims to investigate how the Swedish insurance sector relates and deals with the consequences of current weather variations and expected climate change. Research areas of importance concern *1. The role of the insurance sector. 2. Knowledge and other actors and 3. Adaptation strategies, current and future.*

Comprehensive theories regarding adaptive strategies have been applied to the insurance company's operations. The empirical material is based on interviews with relevant employees at the four largest insurance companies in Sweden as well with the Swedish Meteorological and Hydrological Institute (SMHI) and the Swedish Insurance Federation. The overall results show that the insurance sector considers the climate issue to be important to future operations; however, since Sweden has not yet been affected by climate change, they prefer, at this time at least, to monitor developments and gather knowledge. Due to their position on this matter, the insurance sector's role in the climate debate is, generally speaking, considered to be minor whereas the more important actors are authorities, municipalities and the government. Re-insurance companies are seen as a significant player in the market due to many factors; most notably that they indirectly have the capacity to affect the entire Swedish insurance sector by raising the costs for reinsurance premiums. However, the climate change issue is of importance yet, of higher relevance is adaptation to present weather variations.

Keywords: adaptation, climate change, risk and the Swedish insurance sector

Content

1 INTRODUCTION	7
1.2 AIM	8
1.3 DELIMITATIONS.....	9
2 METHOD	9
2.1 SELECTION OF EMPIRICAL MATERIAL	9
2.2 PLANNING THE INTERVIEWS	10
2.2.1 <i>Interview guide</i>	11
2.2.2 <i>Ethical considerations</i>	11
2.3 CONDUCTING THE INTERVIEWS	12
2.4 ANALYSING THE INTERVIEWS.....	12
2.4.1 <i>Reliability</i>	13
3 INSURANCE SECTOR, CLIMATE RISKS AND ADAPTATION STRATEGIES	14
3.1 CLIMATE RISKS AND ADAPTATION STRATEGIES.....	14
3.2 ROLE OF THE INSURANCE SECTOR	15
3.2.1 <i>Adaptation strategies to handle climate risks in the insurance sector</i>	16
4 RESULTS AND DISCUSSION	17
4.1 ADAPTATION TO CLIMATE CHANGE IN SWEDEN	17
4.1.1 <i>The impact of climate change, direct and indirect effects.</i>	17
4.2 HOW THE INSURANCE SECTOR RELATES TO CLIMATE CHANGE	19
4.2.1 <i>Attitudes towards adaptation to climate change</i>	19
4.2.2 <i>“Time for adaptation”</i>	20
4.2.3 <i>Drivers for climate change considerations</i>	21
4.3 ROLE OF THE INSURANCE SECTOR, AUTHORITIES AND KNOWLEDGE.....	22
4.3.1 <i>Role of the insurance sector</i>	22
4.3.2 <i>Responsibility and role of authorities</i>	23
4.3.3 <i>Role of knowledge</i>	24
4.4 ADAPTATION STRATEGIES, CURRENT AND FUTURE.....	26
4.4.1 <i>Current strategies of adaptation</i>	26
4.4.2 <i>Thoughts of the future</i>	28
5 CONCLUSIONS	30
5.1 POTENTIAL FURTHER RESEARCH AREAS	31
6 REFERENCES	32
APPENDIX 1	34
INTERVIEW GUIDE, ENGLISH	34
APPENDIX 2	36
INTERVIEW GUIDE, SWEDISH.....	36
APPENDIX 3	38
QUOTATIONS IN SWEDISH	38

1 Introduction

On the 9th of Januarys this year, a storm called Gudrun struck the southern Sweden and resulted bankruptcy for many Swedish forest owners and moreover resulted in vast financial losses for the Swedish insurance sector. This marked the largest ever-extreme weather related cost within the Swedish insurance sector and has therefore enlarged the debate concerning today's extreme weather variations as well as the issue of future climate change and the impact on society.

According to the Intergovernmental Panel on Climate Change (IPCC) the costs associated with extreme weather haven increased dramatically from a global perspective during recent decades. Global losses have increased an annual from US\$4 billion in 1950 to an annual US\$40 billion in 1990. These augmented costs have resulted in stronger efforts to strengthen infrastructure and enhance preparation for future disasters.²

Both scientists and politicians alike agree that climate change politics need strategies to help society adapt to coming changes in weather patterns. Most natural systems, artificial or man-made processes are likely to be affected by climate-change. To what degree these systems will be affected depends on the extent of the change as well as the systems capacity to adapt.³ Climate change is by the majority of researchers believed to result in more occurrences of extreme weather combined with more frequent natural disasters, which in turn will result in dire consequences for the large numbers of people currently living in high-risks areas. These impacts are likely to have both ecological and socio-economic consequences and the responses to the problem must operate on two levels; mitigation of greenhouse gases to lower the rate of impact and adaptation to the changes resulting from climate impacts.⁴ Yet, in comparison with mitigation, adaptation is an area far less developed regarding policy management.⁵ Information and knowledge concerning adaptation strategies is currently required from decision makers and planners in order to evaluate the future climate change and prepare for its impacts.⁶

Demographic and socio-economic trends, like increased population, enhance wealth and urbanisation in high-risk areas; have contributed to society's increasing vulnerability to weather related events.⁷ As things stand today, in comparison with other sectors, the insurance industry is most affected of extreme weather events, although, vulnerability varies by region. In several countries with high risk-exposure, the insurance sector employs strategies where the cover for insurance in vulnerable areas are either limited or the price for certain premiums are higher. In Sweden however, there are no limits in the premiums, yet the deductibles are in comparison high. Moreover, Sweden is traditionally characterised by a strong insurance sector, which can afford to hold a broad insurance cover due to a high purchase of insurance premiums among households.⁸

² IPCC 2001 p. 419

³ Kerr and McLeod 2001, p.1

⁴ Smithers and Smith 1997 p.131

⁵ Ibid p. 129, Burton 2000 p.1

⁶ Smithers and Smith 1997 p. 129 p

⁷ IPCC 2001 p.419 pp

⁸ PSI report 2002 p.47

This qualitative study focuses on the Swedish insurance sector in order to investigate the sectors responses and standpoint regarding expected climate change. The reasoning behind a focus on the insurance sector is twofold. Firstly, the insurance sector is the first to be affected by climate change within the financial market. Secondly, insurance companies play a key role in defining and managing “risk” in society. The sector also spreads risks, which means that costs for extreme weather events are disseminated to other sectors in society. From an international perspective the insurance companies possess a third of the global financial market and therefore play an important role in creating incentives to prevent greenhouse gas emissions⁹. Moreover, the insurance sector plays a central role when it comes to adaptation and mitigation since the insurance companies pose a great source of global and regional data including eventual costs.¹⁰ Therefore it is relevant to see how the insurance sector relates to expected climate changes.

1.2 Aim

The overall aim of this study is to investigate how the Swedish insurance sector relates to and deals with the consequences of current weather variations¹¹ and expected climate change¹². One task is concerned with what current as well as future climate adaptation strategies can be discerned within the sector.

The following research questions are defined:

- How does the Swedish insurance sector relate to expected climate change and current weather variations?
- If expected climate change is considered to affect the companies, what initiated the issue?
- How does the Swedish insurance sector apprehend their role in the climate debate?
- What players in the market are important to interact with?
- What knowledge is used in the Swedish insurance sector to manage risks and uncertainty?
- How can insurance companies manage and equalize insurance risks with respect to climate change impacts?

⁹ Kerr and McLeod, 2001 p.26

¹⁰ IPCC 2001 p.421

¹¹ Climate variations: the normal variation in weather

¹² Climate change: future changes in weather patterns

1.3 Delimitations

Other important actors within the insurance sector are the international reinsurance companies whose business concept is to cover larger risks, for instance extreme weather events from insurance companies all over the world. The practise of covering many insurance companies is designed to diversify the risks and in general render the possibility of insuring society. The reinsurance sector is an important actor within the field since they are financing many climate-related research projects and constitutes a large source of knowledge.¹³ In addition they partly motivated this study since they are frequently mentioned in the empirical literature. However, since this study sets its focus at the national level in Sweden, the reinsurance sector will not be more than mentioned as an important actor in the results. Nor will EU's work concerning the insurance sectors relation to current weather patterns and expected future climate change be investigated, yet the issue is a present topic in several circumstances within EU and several reports on the matter have been released. Finally, there are several regions in Sweden, who are more vulnerable for extreme weather events, as for instance floods. Yet, this study do not enters deeply into regional differences concerning adaptation strategies between regional insurers.

2 Method

For this study, a qualitative interview was selected as method considering the aim to describe how the Swedish insurance sector relates to expected climate change. The qualitative interviews are essential in order to obtain viable empirical material since the interviewed spokespersons attitudes and answers are not to be found documented. An opposite method concerns the usage of a quantitative method; however the quantitative approach aims to create broad results, which is not relevant for the purposes as in this study where viewpoints and attitudes are in focus. Case studies and group interviews as method were also discussed; however, since there is a factor of competition within the insurance sector it is reasonable to believe that group interviews would have constrained the answers, as the spokespersons are rivals in the matter. Case studies did therefore not correspond with the aim of this study.¹⁴

To obtain an overall picture of the research area, the study begun by reading articles about adaptive theories and elements of the insurance sector related to climate change. That provided us with a theoretic framework to commence from when the research and interview questions were formulated. Crucial literature for this study is comprised of two different areas: climatic adaptive strategies and the importance of the insurance sector.

2.1 Selection of empirical material

In order to acquire a comprehensive insight into the Swedish insurance sector, twelve insurance companies were investigated by studying their environmental policies as found on the Internet. In keeping with the aim of this study, we decided to focus our qualitative study on four companies, Länsförsäkringar, Trygg Hansa, Folksam and If, which together constitute

¹³ Ingelgård and Olsson 1999 p. 5

¹⁴ Kvale 1997 p. 25 pp

approximately 90 % of the Swedish general insurance market¹⁵ and are powerful companies within the sector. Furthermore, they can be expected to have the most resources to act with as well as they cover the largest areas of risk exposure. To amalgamate the smaller insurance companies' point of view we also contacted the Swedish Insurance Federation, which is a trade association for the insurance companies in Sweden. The Swedish Insurance Federation has 35 insurance companies as members, which represent 95 % of insurance interests in Sweden.¹⁶ To this end, by performing the qualitative interviews on these companies and the Swedish Insurance Federation, an overall national perspective could be achieved.

Before contacting these companies a background interview was conducted with a research director at the Swedish Meteorological and Hydrological institute (SMHI), an important source of knowledge in the field. Moreover, SMHI recently published a study requested by the Swedish Environmental Protection Agency titled "Anpassning till klimatförändringar"¹⁷ in which the insurance sector played a role. All the four largest insurance companies in Sweden that were interviewed in this study, were mentioned in the interview at SMHI and it was presumed that they all shared a common interest in the future risk exposure. In addition, by interviewing the representative from SMHI we were also provided with the names of relevant persons at the insurance companies to be contacted. A recent seminar put on by the Swedish Environmental Protection Agency provided us with an additional two contacts representing an insurance company and the Swedish Insurance Federation and they, along with the contacts provided by SMHI were contacted for interviews.

Each spokesperson was in some way suggested or recommended before the interviews. In addition, they were believed to possess most knowledge concerning climate issues within the organisations. Later while accomplishing the interviews, several of the spokespersons mentioned each other's names again. It is important to be aware that the results of the interviews are not representative of the entire company's outlook. Yet, they can still provide us with relevant viewpoints that mirror the Swedish insurance sector's attitudes towards present weather variation and future the climate change.

2.2 Planning the interviews

The research interview is a specific form of a dialogue, which by structure can be recognized as a conversation around specific themes introduced by the interviewer but where there is a considerable openness to the perspectives of the spokespersons. The professional interview utilizes a particular approach and technique, which in practice can be recognized as an open dialogue, a concrete structured questionnaire or a "semi structured" method.¹⁸ The interviews conducted for this study were performed in a semi-structured manner which entailed a combination of both an open dialogue and a structured questionnaire. The interviews were based on an interview guide; in correspond with Kvale, where certain themes covering the field of the research area were created¹⁹. However, before the interview guide was definitive arranged, the background interview was performed where the proposed questions and our roles as researchers were tested. According to Kvale, by performing a background interview

¹⁵ The Swedish Federation annual report 2004 p. 4

¹⁶ The Swedish Federation, www.forsakringsforbundet.se, access 2005-04-22

¹⁷ Here translated to "Adaptation to Climate Change".

¹⁸ Kvale 1997 p. 117 p

¹⁹ Ibid. p. 121 p

the interviewer is likely to achieve experience of the interview situation and hence feel more confident during the "real" interviews²⁰.

The background interview was conducted by both of the authors at SMHI and held in an explorative manner, although there were prepared questions to focus on. The spokesperson provided a broad perspective on the meaning of adaptation and the role of the insurance sector. In addition the spokesperson also answered to our questions in a way that raised new perspectives on the aim, as well as improved the awareness of which questions we could distinguish as important for the study. The interview was recorded, transcribed and summarised before the interview guide for upcoming interviews was formed.

2.2.1 Interview guide

The interview guide (see appendix 1 and appendix 2 for a Swedish version), included a thematic division followed by dynamic questions²¹. The guide was slightly modified before the interview at the Swedish Insurance Federation as this trade organisation possesses other functions than the insurance companies. However, the overall themes were retained. These three themes together with a short description of our study were handed out to the spokespersons before the interviews²². The purpose was to prepare the spokespersons yet not impinge them with the concrete questions. These three themes together with the aim and the research questions constitute the central focus in this study, which has been carefully analyzed in order to contribute with a profound description of the Swedish insurance sector standpoint in the climate issue. The themes were formulated as following:

- A: The relevance of climate change and the significance of adaptation.
- B: Risks and the insurance companies' activities
- C: Knowledge and the insurance companies' role and responsibility in society

2.2.2 Ethical considerations

In the beginning of each interview, the spokespersons were asked whether they wanted to appear with names or remain confidential. It was also explained in what context the results from the interviews were intended to be applied. Additionally, in order to avoid misunderstandings while analysing the interviews, the spokespersons were also given the option to permit the usage of a tape recorder. They all agreed upon being recorded, however desires diverged in one case considering the usage of names in the study. For that reason, none of the spokespersons are named in the study and the insurance companies are consequently identified as Company A, B, C, and D. In addition, revealing the names are insignificant for the study as the focus is on insurance sector in its entirety and not any specific company. Since SMHI as well as the Swedish Insurance Federation agreed to participate with names there are no reasons to conceal these two important actors. Moreover it would be difficult to describe their role in the climate change issue and the insurance sector, without revealing their names.²³

²⁰ Kvale 1997 p. 137

²¹ Ibid. p. 122

²² Company B were informed over telephone and had therefore not seen the formulated three themes. However, since the spokesperson had broad insight in the study, it is reasonable to believe that the interview was not affected.

²³ Kvale 1997 p. 105 pp

2.3 Conducting the interviews

The first “real” interview was conducted by both of the authors, at an insurance company located in Stockholm. This interview differed a great deal from the background interview and was conducted according to Kvale’s semi-structured approach with general themes and prepared questions to focus on. Before the interview, two different responsibility areas were taken by the authors, one with the purpose to lead the interview, and the other in responsible to observe and take notes. The reason for conducting the interview as a pair was to be provided with an equal base in order to achieve reliability in further interviews.

The third interview was conducted at Linköping University; campus Norrköping by both of the authors, yet the responsibility was reversed in order to receive equal experience. The fourth and fifth interviews were conducted separately at one insurance company and at the Swedish Insurance Federation, both located in Stockholm. An overall apprehension was that the previously interviews in addition with the interview guide had been of great assistance when conducting the interviews separately. Moreover, the experiences were considered to be rewarding since each of the transcriptions afterwards could be scrutinized of the absent hence impartial author, which would result in deeper discussions while analyzing the material. Finally, the last interview was however conducted together in Stockholm, in the same manner as the three first ones.

One observed phenomenon related to the interviewing phase concerns the pre-knowledge, which of natural reasons increased with every conducted interview. This in turn might have affected the conduction of the later interviews as the studied area by time became more clear and comprehensible. This reasonable resulted in more specific questions in the later interviews in order to grasp and compare relevant information from the spokesperson. However, the increased knowledge is merely seen as a beneficial factor for the results, as it make deeper interpretations possible in the analysing phase. Leading questions might, according to Kvale, for instance steer the spokesperson’s answers and thus diminish the reliability. However more specific questions are not always negative for the results since they can verify the reliability in the answers and confirm different interpretations made by the interviewer.²⁴

2.4 Analysing the interviews

After the interviews were transcribed, a great effort was put into the analysis phase. The method was discussed and compared to relevant literature. In this study the interviews were analysed independently by both of the authors. Furthermore, the individual interpretations were carefully compared and discussed to improve the reliability of the results.

The analysis phase was divided into three different stages where Seidman presented a foundation to start out from. In the first stage, the texts were read and re-read in order to acquire an overall apprehension of the material. In order to let the material speak for itself, the material was read with an inductive approach as well as open minds. Certain sections, which for some reason draw extra attention, were spontaneously marked. The opposite approach would be to test pre-made hypothesis, yet since this study is signified of an explorative analysing method, it was relevant to describe the different aspects in concert with

²⁴ Kvale 1997 p. 145 p

the spokespersons view. Furthermore, the purpose behind employing a qualitative interview as method was to learn of the spokespersons' experiences as well as their view on the matter.²⁵ In the second stage the sections were categorised into different broad themes. In this stage a large part of the material was reduced in order to seize relevant aspects. In the third stage, the independent results were compared and discussed between the authors, moreover the categories were weighed against each other. New themes were constructed which included the independent results.

When all the interviews were analysed, the next step was to compare the results from the different interviews in order to find meanings and reveal patterns in the complete material. What similarities and differences could be defined? What conclusions could be drawn? The results were examined by both authors and summarized in a matrix where similarities were marked in green, differences in red and single statements marked in yellow. In this way we received an overall picture of the results to commence from during the writing process. In order to maintain the context in the case of the simplified quotations, an additional summary of each interview was put together.

2.4.1 Reliability

Kvale states that interviews conducted by different researchers may present different results, even when utilizing the same guide as a base for the interviews. There are many causes to explain the differences, for instance the researchers' different characters and variations in perceptiveness will likely give rise to different answers from the interviewed person. However, a qualitative interview seeks methods to take advantage of the researchers' different abilities with the aim to capturing the shifting dimensions in the interviews.²⁶ The same occurrence arose in this study, yet, since every independent transcription was analysed, discussed and compared by the authors, this can be seen as an advantage instead of a disadvantage. Furthermore, in every stage the material was carefully worked through, compared and discussed by both of the authors. The matrix along with the summarized interviews constituted the foundation during the writing and has therefore been worked through several times during the process. When interpretations have been made, they have been compared with other perspectives and sources of knowledge, as well as discussed between the authors.

An overall reflection concerning the field of this study is that the empirical material, as well as the literature in general, has been coherent and clear. In the comparison stage the authors had made similar reflections, therefore, a general opinion concerning the results of this study is that they possess a high degree of reliability. Since the interviews have been conducted, transcribed and analysed in Swedish to later be translated into English, it is reasonable to believe that the translation has affected the material as well as the presentation of the results. For instance, certain quotations have been difficult to translate carefully, even after best ability. The original quotations are to be found in appendix 3.

²⁵ Seidman 1998 p. 100

²⁶ Kvale 1997 p.38

3 Insurance sector, climate risks and adaptation strategies

3.1 Climate risks and adaptation strategies

Adaptation, according to IPCC, is defined as: “adjustment in natural or human systems in response to actual or expected climate stimuli or their effects, which moderates harm or exploits beneficial opportunities”.²⁷ Kerr and McLeod recognise adaptation as a form of risk management, which is easiest to put into practice when incorporated in an already existing system²⁸. Another insight into the meaning of adaptation is adaptation as a process of learning in organizations²⁹.

Whether society plans for future climate change or not, society, like all other natural systems, will adapt automatically in the same way as society adapt to social, economical and environmental conditions in general. However, the costs and damages will unquestionably be bigger if adequately planning and decision actions are not taken in the form of preventing measures.³⁰

According to Smithers and Smith, examples of adaptation to climate change can be found all around us in daily life. It can be embedded in physical planning, for instance constructions and transport systems, in agriculture or any activities that in some way are formed to respond to climatic impact. For this reason, the concept of adaptation is associated with present climate variation as well as future climate change and. Future climate change will likely have ecological and socio-economic consequences, which have given rise to two broad responses; mitigation³¹ of greenhouse gases to prevent rates of change and impact, and second; adaptation³² to the changes and its impacts. The extent of change and impact is relevant for all possible adaptive strategies. Smithers and Smith have framed the possible impacts-attributes from climate change, which makes it possible to classify and describe different adaptive strategies. Here follows seven broad adaptation occurrences that comprise different possible human responses to climate change:³³

- 1: *Intent*; whether the response is based on conscious decisions or an unintentional occurrence.
- 2: *Role of government*; the adaptive strategies can be discerned depending on which sector they are carried out; the public-, private sector, public organizations or a combination there of. The role of government can be indirect or direct.
- 3: *Scale*; in what spatial level in society is the adaptation response undertaken, local, regional, or national level? In what social dimension does the respond arise from? Depending on individual initiatives or on common decisions?
- 4: *Timing of response*; when is the adaptive response taken? Before, during the climate impact or after the occurrence has happened?
- 5: *Duration*; is it a matter of long-term or short-term response? Some adaptive strategies can last for years after the climate impact and gradually become a part of a society's system.
- 6: *Form*: Adaptive responses can be discerned depending on the wished-for effect. Some adjustment can be made in form of technological modifications or in changes in attitudes.

²⁷ Burton et al 2001 p. 146

²⁸ Kerr and McLeod 1 2001 p .9

²⁹ Berkhout et al 2004 p. 3

³⁰ Kerr and McLeod, 2001 p. 9

³¹ Mitigation: prevention of discharge of greenhouse gases

³² Adaptation: society's adaptation to climate change

³³ Smithers and Smith 1997 p.127 pp

7: *Effect*: There is a difference between responses whose aim is to buffer an impact and in responses who is trying to facilitate a new state of affairs.³⁴

Adaptation to climate is not isolated from the effect of other forces. Instead, the context is a complex integration where economic, social and institutional factors are being combined. Kerr and McLeod argue that it is necessary to assess a system's vulnerability and sensitiveness to climate impact in order to take adaptation strategies into practice. This requires a comprehension for both future climate changes as well for the socio-economic development. The latter sets the opportunities and limits for adaptation.³⁵

3.2 Role of the insurance sector

Ulrich Beck is a professor in sociology, active in Munich, Germany, and known for developing the term "Risk society". Beck's theory is relevant to this study due to the insurance sectors' routine of dealing with risks. The concept of "risk" is frequent used in this study and a definition is relevant since risks can be of many varieties and cover a broad spectrum. Here, a general definition of risk is "risk" as *a potential negative occurrence*.³⁶ In this context risks are often related to both the business of insurance as well as capital administration.³⁷

According to Beck, the insurance sector plays an important role due to their ability to determine the limits of the risk society when putting up restrictions in the insurance coverage. The theory is based on the premise that risks in large-scale business, like nuclear-power accidents are in all practically considered to never occur, however, the consequences would in spite be devastating. In a future scenario this could lead to a society where the risks are too large to insure and larger industries will precede business with a limited insurance coverage. Hence, the risk society represents an uninsured social order where the insurance cover will decline depending on the extent of the risks.³⁸ In this society, the politicians are responsible for decision-making; yet, they are dependant on experts who indirectly will lead the development further. Moreover, this will not only facilitate new future issues but also create conflicts between different interest groups.³⁹

In order to fully understand the importance of the insurance sector in developing adaptive strategies, it is necessary to further explain the fundamentals of insurance company's operations. The core business of the insurance sector is to manage and estimate risks⁴⁰. Besides, an insurance company can be divided into two different sections, one being actual insurance revenues where the profit represents the price for signed premiums, and the other being capital administration where profits are invested in stocks, bonds, and properties. These assets shall cover forthcoming indemnities. Their activities consist of signing legal contracts between the insurer and the insured, which are either private persons or enterprises. The insured pays a premium that shall cover both the expected financial losses an eventual

³⁴ Smithers and Smith 1997 p.139

³⁵ Kerr and McLeod 2001 p.8 pp

³⁶ Lidskog et al 1997 p. 11

³⁷ Minoli and Bell, 2003 p. 108

³⁸ Beck 1993 p. 30 pp

³⁹ Ibid.

⁴⁰ Salt 2000 p. 154

damage can bring and the administrative costs for the insurance company.⁴¹ There are two different types of insurance: life assurance and general insurance. The first includes death, accidents and diseases and the latter cover for property- and liability insurance. The investigated companies A and B concern themselves with both, while company C and D are leading companies concerning the general insurance business.

To manage different risks in society- severity, frequency, economic and political factors are of great importance. For example, events that occur frequently but are less severe, such as car accidents are ideal for insurance. On the contrary, events with less frequency and high severity, such as nuclear power incidents are not suitable to be insured. The competition between the companies is evident and puts pressures on premium prices, which affects whether consumers are willing to pay or not. If the price is too high the consumers will consequently not pay, yet a too low price will limit the companies' abilities to fulfil the insurance agreements. Moreover, the political factors are important since the government for example can provide supplement contributions in non-insurable cases. In contrast with an insurance company, they have a much longer temporal scale and can achieve the interests of a broader public.⁴²

3.2.1 Adaptation strategies to handle climate risks in the insurance sector

There are three important keywords, hazard, vulnerability and exposure to take into consideration when the insurance sector defines climate change risks. If the hazards become more common the insurance sector needs to take action to reduce their exposure to the current hazard. Moreover they also need to reduce their vulnerability by improving their adaptive capacity.⁴³

According to Kerr and McLeod, with respect to conditions within the insurance sector, there are four different approaches to apply in which insurance companies can reduce their exposure to climate change risk. Firstly, the insurance companies can *raise the costs of policies*. Secondly they can *transfer risks* into other financial markets. The third option concerns *limitation*, which means that they can cap insurance premiums. Finally, in order to *control eventual losses* they can engage other stakeholders such as the government.⁴⁴

IPCC illustrates different aspects on vulnerability in an insurance perspective. First, vulnerability can be characterised by an uncertainty among the insurers concerning the extent, area and the time of the extreme weather impact. Second, in a broader meaning vulnerability can also concern the insurers possibilities to cater for the losses of extreme weather impacts.⁴⁵

With closely related climate change in sight, a suitable strategy to reduce vulnerability to the insurance companies would be to look into risk areas and subsequently take actions. Furthermore, one specific strategy is to help customers through education and information. In addition objectives concerning carbon dioxide reductions could be included in their annual reports. Finally, insurance companies could voluntarily sign contracts with each government to reduce carbon dioxide emissions.⁴⁶

⁴¹ Ingelgård and Olsson 1999 p. 5

⁴² PSI report 2002 p. 5 pp

⁴³ Kerr and McLeod 2001 p.27

⁴⁴ Ibid.

⁴⁵ IPCC 2001 p.431

⁴⁶ Salt 2000 p.154

With respect to the different approaches the insurance companies could apply to reduce their exposure to climate change risk, they also have a dual role in the adaptation process. First, they need to act in order to defend themselves against changed conditions for underwrite of climate risk. The second role concerns their possibilities that arise when individuals and business tries to insure themselves against climate risks. This might lead to the foundation of new insurances in the market.⁴⁷

4 Results and discussion

4.1 Adaptation to climate change in Sweden

Adaptation to climate change in Sweden has recently been given noticeable attention. SMHI has, as mentioned, been commissioned by the Swedish Environmental Protection Agency to investigate the national need for adaptation to climate change. There are several regions in Sweden who in the last few years have had great problems with flooding, extreme precipitations and storms. Many sources claim that this depends on climate changes, however according to the research director at SMHI; it has not been possible to statistically prove that the recent high impact events in Sweden are related to climate change. Of greater importance is the socio-economic change in society where certain circumstances might appear as climate change where there in fact is a matter of how society is planned.⁴⁸ According to the research director at SMHI, with respect to flooding in Sweden climate change is a relatively small problem, yet of great importance, in comparison to today's vulnerability. We have already now big problems related to natural climate variability and physical planning. The combination of these two problem areas is intriguing.⁴⁹

4.1.1 The impact of climate change, direct and indirect effects.

Our results show that the companies examined have identified similar expected impacts and consequences as flooding, extreme precipitations and storms. One spokesperson divides the expected impacts into two groups, namely indirect and direct effects⁵⁰ of climate change and this division is suitable for all spokespersons identified climate change impacts. Expected direct effects are related to extreme weather events and also smaller events due to higher temperature. Indirect effects concerns economic consequences for instance on a global scale.⁵¹ The Swedish insurance sector preferably focuses on an increased flood risk⁵². Floods are easier to predict and manage than for instance storms.⁵³

An EU project prepared jointly by Policy Studies Institute (PSI), examines the insurance sector's role concerning sustainable development. According to PSI, extreme precipitation has occurred rarely in Sweden with exception of certain severe cases in recent years. Particularly in 2002 certain areas in Sweden were struck by extreme precipitation which led to extensive floods. However, PSI claims that the Swedish insurance sector does not regard floods as an acute natural disaster since in relation to other events the amounts covering such damages are

⁴⁷ Kerr and McLeod 2001 p.28

⁴⁸ Interview with SMHI

⁴⁹ Ibid.

⁵⁰ Company A

⁵¹ Ibid.

⁵² Company A, B, C and D

⁵³ Company A and B

not especially high.⁵⁴ The Swedish companies interviewed support this view,⁵⁵ where the spokesperson at company A clarifies that costs related to floods are so far not involving important sums for the Swedish insurance sector:

/---/this does not concern a big amount of money in comparison with the premium incomes we receive. And therefore, the insurance sector has so far taken all these damage related costs as a lump sum.⁵⁶ [1]

Moreover the spokesperson at company A explains that, damages related to floods are about 100 millions Swedish kronor per year while damages caused by, for example careless dishwasher installations is about 2.5 to 3 billions Swedish kronor per year. Flood risk is therefore, so far, included in the Swedish household premiums.⁵⁷ This strategy is similar to the British insurance tradition but the difference is that the Swedish deductibles are significant higher.⁵⁸

The spokespersons also expect increased storms occurrences⁵⁹. For instance, the research director at SMHI claims that it is easy to consider injuries caused by storms as a result of extremer weather, seeing that the damages in recent years have taken larger economic proportions. However, the Swedish forest industry at present is less flexible today due to a monoculture farming system. Consequently, the forests today are a lot more vulnerable to storms than in the past.⁶⁰ Another example of this is the structure of the Swedish electricity network, which in the recent vast storm caused great problems for private persons when trees fell on the cables.⁶¹

The storm Gudrun is a current example of what vast storms can lead to in Sweden. The storm cost approximately 4 billion Swedish kronor for the insurance sector⁶². This concerns large amounts, yet storms represent an example of events, which are ideal for reinsurance, and hence the insurance companies could manage the costs. Moreover the spokesperson at company C compares the costs caused by Gudrun to costs related to traffic damages. They are about 10 billion Swedish crones per year while Gudrun cost about 4 billion Swedish crones, in addition Gudrun does not occur every year.⁶³

Moreover, there are also risks in form of increased number of noxious insects, power cut et cetera.⁶⁴ IPCC declares that almost every weather extreme is relevant for the insurance sector. A series of event less severe can be more expensive for the insurance companies than a single more severe event since individual losses are often limited irrespective of the size of event.⁶⁵ However, managing risks is one of the insurances business core activities, therefore none of the companies sees climate change as an immediate threat⁶⁶. On the other hand, climate

⁵⁴ PSI report, 2002 p. 47 p

⁵⁵ Company A, B, C and D

⁵⁶ Company A

⁵⁷ Ibid.

⁵⁸ PSI report 2002 p.47 p

⁵⁹ Company A, B, C and D

⁶⁰ Interview with SMHI

⁶¹ Ibid.

⁶² Company A and C, the same comment were also made by the Swedish Insurance Federation

⁶³ Company C

⁶⁴ Company A

⁶⁵ IPCC 2001 p. 423 p

⁶⁶ Company A, B, C and D

change can also lead to opportunities for the Swedish insurance sector if the companies are able to discern the risks in order to fend them off. Consequently the companies are able, for instance, to generate new insurances⁶⁷. One spokesperson mentions the possibilities as following:

Above all there is immense focus on the difficulties, yet there will likely be opportunities too. The winters will be warmer; the electric heating bills will be cheaper, less traffic accidents, perhaps even more water in the hydroelectric power magazines, and an increased growth in the forest /.../ Therefore, it is a vast balance in it [climate change] yet the development is slow, which we lately have begun to take into consideration.⁶⁸ [2]

Indirect effects concerns economic consequences for the insurance companies and are believed to affect the insurance companies equally as direct effects. The spokesperson at company A considers that climate change will be grasped in the global economy gradually, not unexpectedly. The reason is that more extreme weather events due to climate change will affect the global economy, and hence the insurance companies assets.⁶⁹ Moreover according to the SMHI report concerning adaptation, the financial sector will be influenced by for instance, changed property prices and renewed energy consumption⁷⁰.

Connected to this is also how the global reinsurance companies will react. If there will be an increased number of extreme weather events in a global perspective, the reinsurance companies will be the first within the sector to feel the effects. Hence they will put pressure on the Swedish insurance companies even if Sweden in itself is not affected. Therefore conditions for insurance coverage might change in Sweden due to changed reinsurance costs, not due to an increased number of floods in Sweden.⁷¹

4.2 How the insurance sector relates to climate change

4.2.1 Attitudes towards adaptation to climate change

The overall results from the interviews show that the climate change issue today is not among the major questions in the insurance sector. More important factors on the agenda are for instance traffic safety and whiplash injuries.⁷² In general, there is a common awareness that the question is of importance since the spokespersons believe that climate change will affect the insurance sector in the future.⁷³ Above all, they are afraid of the risk to receive numerous damages liabilities which may possibly result in large expenses⁷⁴. Even though the risk is not evident today, there exist an inherent potential in the climate change issue which will only increase with time⁷⁵. Considering this, one spokesperson explains that an insurance company is affected by many different elements where the climate issue is relative new. In short term it is not among the most important concerns in the business.⁷⁶

⁶⁷ Kerr and McLeod 2001 p. 28, Rummukainen et al 2005 p.18

⁶⁸ Company A

⁶⁹ Ibid.

⁷⁰ Rummukainen et al 2005 p. 30

⁷¹ Company C

⁷² Ibid.

⁷³ Ibid.

⁷⁴ Company A, B, C and D in agreement with SMHI

⁷⁵ Company A, B, C and D

⁷⁶ Company C

4.2.2 “Time for adaptation”

Company A, slightly differs in their attitude towards climate change. The spokesperson at this company argues that the expected temperature change is sufficient enough to pay attention to at present⁷⁷. This view is similar to IPCC who also argues that foresight is a keyword concerning risk reduction⁷⁸. Considering this, the spokesperson at company C affirms that limited awareness could be a misfortune since it requires knowledge to understand climatic developments.⁷⁹

The interviewed spokesperson at company A implies that their company is the only one considering taking initiatives related to adaptation today while the other spokespersons at the companies do not see climate change as a pressing issue. One possible interpretation concerning the company’s more proactive approach is probable due to the fact they were the company most affected by the violent advance of the storm Gudrun. Furthermore, they also insure many buildings in flood risk areas. This view is partly supported by the spokespersons at company C and D who during the interviews confirm that company A has more customers in these regions mentioned⁸⁰. However there are more possible interpretations, for instance company A’s position depends on enthusiast individuals within the company, which will be explained further on. Yet a combination of different factors is likely to be the explanation. In addition, the climate issue is considered to be of strategically importance in order to be prepared in the future. In the majority of the companies⁸¹, the information is kept on a managerial level within the organisations as is illustrated in the following quotation:

/.../ I can add this [the climate change issue] is not managed down on the “floor” without being connected to strategically thoughts instead our managerial are keeping themselves well-informed and are being engaged.⁸² [3]

All spokespersons consider the insurance companies to have time for adaptation and that it is a matter of a gradually process. Moreover they all agree that it will be relative easy to change their approach to business when it is necessary. The spokesperson at the Swedish Insurance Federation declares that it is a long process and more extreme weather events must occur to get a reaction from the insurance companies as is illustrated in the following quotation.⁸³

At present I don’t think they [the insurance sector] are dealing with this seen from a Swedish [perspective,] there is an interest [in the climate issue] and some companies are looking into these questions more than before. I think this is a long-term process, I mean it requires more extremer weather events to receive a reaction.⁸⁴ [4]

One spokesperson stated during the interview that even though adaptation has to occur gradually, what they do wrong today will not affect them in 20 years but tomorrow. Therefore they have got time to adapt to changes in weather patterns.⁸⁵ This has been coined a “wait-

⁷⁷ Company A

⁷⁸ IPCC 2001 p.437

⁷⁹ Company C

⁸⁰ Company C and D

⁸¹ Company A, B, C and D

⁸² Company C

⁸³ Interview with the Swedish Insurance Federation. Similar comments were also made by Company B

⁸⁴ Interview with the Swedish Insurance Federation

⁸⁵ Company C

and-see” stance by the IPCC, which can be seen as a significant viewpoint in the Swedish insurance business in the matter of climate change. This position is also common in an international perspective, even though the issue has been devoted great attention in Europe and Asia.⁸⁶ The spokesperson at SMHI, however, argues that there is a need for adaptation today, yet, the adaptation concerns the present climate variation and is not a matter of future climate change⁸⁷.

4.2.3 Drivers for climate change considerations

There exists a mutual understanding that mitigation and the Kyoto-protocol are not sufficient enough and hence, there is a need to prepare for changes. For this reason, the common attitude towards adaptation has been altered in the past year. From having been associated with an unwillingness to act, it has, in recent times, become an accepted reality. The fact that Sweden has several high-risk areas sensitive to flooding also constitutes a reason to act.⁸⁸ However, another perspective related to this is the way the media has reported the global warming issue and how this has changed during the last years. One spokesperson declares that in 2002 the focus of the media was on whether global warming exists or not, and moreover in what form it will affect society. The news about climate issues could be found only in science and technology pages. It was not until 2003 when the heat wave stroke France that the news about global warming moved to the first pages. Today these questions are common topics on the editorial pages and it is not a question, whether “if” global warming will occur but “when”.⁸⁹

The spokesperson at the Swedish Insurance Federation states that the pressures on the insurance companies to begin taking climate change into consideration are not necessarily due to political initiatives. Rather, it is the global reinsurance companies who have carried these questions onto the agenda.⁹⁰ All the spokespersons support this view and one even claims that the reinsurance companies have consequently discussed the increased exposure to extreme weather events in a global and local scale since the hurricane Andrew hit Florida in 1992.⁹¹ This is also confirmed by IPCC who further acknowledged that Andrew has been a trigger point for many of the international insurance companies concerning their relation to climatic circumstances.⁹² In Sweden, for instance, this initiated a climate-related response in one of the insurance companies who, the year after Andrew, took the initiative to call to a meeting with the reinsurance company Swiss Re in order to discuss these issues.⁹³

A general result shown by the interviews is that enthusiast individuals and driving forces at the companies are relevant for the initiating of adaptation to climate change.⁹⁴ The spokesperson at Company B argues that apart from the company’s own interest and structure in organization it has also been driven due to individual interests.⁹⁵ This can be seen as an important factor in the Swedish insurance sector, since the pressure on the companies is still far from perceptible. However, the reasoning behind the decisions to initiate the climate change issues differ amongst the insurance companies. The spokesperson at company A can

⁸⁶ IPCC 2001, p. 429

⁸⁷ Interview with SMHI

⁸⁸ Ibid.

⁸⁹ Company A

⁹⁰ Swedish Insurance Federation

⁹¹ Interview with Company C

⁹² IPCC 02001, p.435

⁹³ Company C

⁹⁴ Interview with SMHI, Company B and C

⁹⁵ Company B

surely discern at what point these issues were initially raised and refers to an initiative two years ago when it came to the attention of the spokesperson internal via chairperson at a local office.⁹⁶ For the other companies it is more diffuse and different time perspectives and reasons are being mentioned.⁹⁷ These view the different dimensions in how the sectors are concerned of climate related occurrences.

4.3 Role of the insurance sector, authorities and knowledge

4.3.1 Role of the insurance sector

All four companies and the Swedish Insurance Federation see the insurance sector as a minor actor in the climate debate. The potential contribution among other things is the statistical knowledge the companies possess. Otherwise the responsibility according to all the spokespersons relies first of all on other actors, for example certain authorities and municipalities. The following quotation demonstrates one spokespersons opinion concerning the role of the insurance sector in the climate debate.

I don't know if the insurance sector in its whole ever has had an inherent tendency to act as a barricade champion, yet, we're capable of being a small part of it⁹⁸. [5]

Even if the result shows that the companies see them selves as minor actors in the climate change issue, it is reasonable to assume that they have different views on their potential to influence society. Hence, their different apprehension concerning the climate issue does not only reveal their attitude towards climate impacts, but also demonstrates their outlook on their potential to act on the matter. For instance the spokesperson at company B has an inherent environmental profile where they involve environmental consciousness in the majority of their business. In addition they distinguished themselves concerning how they relate to climate change. On the questions concerning adaptation, the spokesperson talked to a higher extent about their possibilities to mitigate.⁹⁹ This depends assumable on the company's minor risk exposure as they are not concerned with insurances in vulnerable areas to the same extent, as for instance, company A. Therefore, this company concerns itself with more discussion about mitigation than adaptation when talking about their role in society. However, an additional perspective on the insurance sectors possibilities to act in the climate issue concerns the fact that the greenhouse gas emissions is of minor interest in an insurance point of view. The companies are only supposed to charge a price for what they are obligated to compensate. According the spokesperson at company B:

For instance, car insurance, the amount of carbon dioxide discharged is nothing we have the authority to include in the premium price. We charge premiums for occurrences where the car has been stolen, broken or for instance if people have been hurt in [traffic related] accidents. /---/ It has to be the authorities [responsibility] to decide this state of affairs. Cars who discharge large amounts of carbon dioxide can receive another tax for instance. We are only supposed to charge for what [the losses] we are obligated to compensate.¹⁰⁰ [6]

⁹⁶ Company A

⁹⁷ Company B, D. Similar comments were also made by the Swedish Insurance Federation

⁹⁸ Company D

⁹⁹ Company B

¹⁰⁰ Ibid.

Considering these reasons, the insurance sector itself can be seen as obstructing due to its core business in itself. In other words, the sector is restricted to fully act in the climate issue due to their role as insurers.

Salt argues that the insurance sector, in contrast, possess an important role in the climate debate as they possible can invest long-term and strategically in, for instance, non-fossil industries. In that manner, they will send out important indications to the market and facilitate new processes.¹⁰¹ Minoli and Bell bring up two examples of how an insurance company can positively affect society's adaptation to climate change. First of all they can provide information and support to reduce the risks. Secondly, they have the possibility to create economical incentives by putting demands on the companies where capital is invested.¹⁰² However, these possible strategies have hitherto not been relevant among the examined Swedish insurance companies. The strategies regarding investments was frequent mentioned in all of the interviews. However, the answers presented different attitudes towards their potential to put pressure on the market. Above all, the prior reason to change capital investments strategies depends rather on economical reasons than the aim to mitigating. The spokesperson at the Swedish Insurance Federation maintains a sceptical position regarding the insurance companies' role in the matter, due to their function of making a profit out of customer investments:

These funds must be placed safe in one hand but also in a profitable manner/.../
There are rules; we can't randomly place them wherever.¹⁰³ [7]

4.3.2 Responsibility and role of authorities

The more important actors are the municipalities who, as authorities, possess the utmost responsibility of planning permission.¹⁰⁴ The spokesperson at company A means that company A has a role to put pressure on the municipalities, since it is them who will be held responsible in the future due to their role as authorities.¹⁰⁵ Yet, even if the spokespersons share this view concerning the municipalities' role in the matter, the majority of the companies are not in a dialogue with any municipalities¹⁰⁶. The same observable fact concerns the insurance sector's relationship with the Swedish government. Traditionally, Sweden's system is characterized by the idea that the state holds the utmost responsibility for larger losses or accidents caused by natural hazards such as flooding, and constitute a key actor in the climate issue. However, the Swedish private insurance sector is traditionally strong.¹⁰⁷ A possible interpretation concerns the impact of the Swedish culture which may probably affect the insurance sector standpoint regarding the distribution of responsibility between the government and the sector itself. According to the spokesperson at the Swedish Insurance Federation, which represents a link between the government and the insurance companies, there is as mentioned no existing dialogue between them concerning the distribution of responsibility. On the subject of governmental responsibility the spokesperson utters:

¹⁰¹ Salt 2000 p. 149

¹⁰² Minoli and Bell, 2003 p. 108

¹⁰³ Interview with the Swedish Insurance Federation

¹⁰⁴ Company A, B, C and D

¹⁰⁵ Company A

¹⁰⁶ Company B, C, and D. Similar comments were also made by the Swedish Insurance Federation

¹⁰⁷ PSI report 2002 p. 47

No decisions have been taken considering the distribution of responsibility for climate related problems. That could be one of the problems since the issue is distributed between several different authorities, for instance, The Swedish Environmental Protection Agency, Swedish Rescue Services Agency, SMHI, The Surveying Office and the Swedish Geotechnical Institute.¹⁰⁸ [8]

It is illustrated in the literature as well as in the empirical material that the poor dialogue between the insurance sector and the government may cause confusion in situations where weather related losses are being compensated.¹⁰⁹ The spokesperson at the Swedish Insurance Federation believes that the situation where losses are compensated by the government instead of by insurance companies is unfair since those who are exposed to risks have chosen not to purchase insurances and therefore forfeited the possibility to be compensated. In occurrences where the government cater for the losses the whole idea of insurance is questioned.¹¹⁰ Another view on the government's role is described in the PSI report which illustrates the importance of the government. Hence, it is explained that the government is able to achieve the interest of a broader public since they have a much longer temporal scale to operate on.¹¹¹

However, there are certain cases where the government, on the other hand, plays a much greater role than the insurance sector. One such case could be terrorism or war where the government has better preventative capabilities to manage these risks.¹¹² In Sweden the insurance companies have, for example, clarified in front of the Ministry of Finance that they will reject insuring terrorist attacks to a certain degree, and that is up to the Swedish government to address the consequences. This resulted in better distribution of responsibility as well as facilitated awareness within the government concerning how to compensate a possible terrorist attack.¹¹³ IPCC also verifies that the relationship between governments and insurers differs in different countries. In the, US for instance, weather related losses, such as the hurricanes in Florida, are too vast for the government to compensate. In those cases, the American government has chosen to restrict their subsidies in order to limit their exposure to financial costs.¹¹⁴

The previous example concerning the government's role in occurrences of terror attacks illustrates the insurance sectors abilities to act if the reasons are big enough. If they feel threatened, they are in the position to use their role as an important sector in order to put pressure on society.

4.3.3 Role of knowledge

The spokesperson at the Swedish Insurance Federation argues that knowledge is a fundamental factor in order to participate in preventive activities. In a study by Kerr and McLeod, regarding adaptation to climate change in Scotland it is clarified that the rate and degree of climate change is yet unknown and it is reasonable to believe that the insurance companies in most cases are underestimating the future consequences. Moreover, insurers

¹⁰⁸ Interview with the Swedish Insurance Federation

¹⁰⁹ Company D, Swedish Insurance Federation, PSI report 2002 p.45

¹¹⁰ Interview with the Swedish Insurance Federation

¹¹¹ PSI report 2002 p. 7 pp

¹¹² Ibid. p. 15

¹¹³ Company D

¹¹⁴ IPCC 2001 p. 435

must improve their ability to identify and cost climate change risk. In Great Britain, for instance, one insurance company has amalgamated with universities and government agencies in order to improve the costing of climate risk.¹¹⁵ In Sweden, data presenting costs associated to climate risk is a requirement among insurers and constitutes an important factor in being able to take adaptive strategies into action. The distribution of responsibilities can also be seen as a lack of knowledge as the climate change issue is not mentioned as an element in the insurance sectors business.¹¹⁶

In general, according to the interviewed spokesperson representative at SMHI, Sweden possesses a respectable knowledge concerning weather patterns in the past. SMHI possess an extensive database with climate related records dated back to 1860¹¹⁷ and is therefore an active player in the market in the matter of providing information concerning future climate.¹¹⁸ Extreme weather events in specific are very difficult to prevent, hence the companies require better knowledge as detailed mapping data in order to identify vulnerable areas in the future. This has so far been a neglected issue in the Swedish government according to the interviews.¹¹⁹

The spokesperson at the Swedish Insurance Federation declares that little research is being done within the sector.¹²⁰ Save company A, who has the largest risk exposure is sponsoring a research project commissioned to SMHI which aim is to assess future risks with respect to flooding as well as vulnerability in forests¹²¹. The results are intended to become the future basis data in order to assess vulnerability in different areas all over Sweden. This will also contribute to put adaptation strategies into action and even make it possible to price the premiums in a different way.¹²² Above all, the most significant research is being done within the international reinsurance sector that is more exposed to climate risks.¹²³ These are also mentioned in all the interviews as great sources of knowledge.¹²⁴

Another aspect of the need for knowledge is that the companies who feel they are not affected of climate related damages do not, by way of any natural reasons, feel the need to actively seek knowledge in the matter. On a question concerning what required knowledge the company found important for business, the spokesperson answered as following¹²⁵:

We are aware of the problem and watch the development in order to manage things from what we consider ourselves be able to do. Yet, proficiency knowledge is something to seek when you feel you are in a need of support. We have one person like that whom we feel we can cooperate with. However yet again, this is not a question for Swedish insurance companies.¹²⁶ [9]

¹¹⁵ Kerr and McLeod 2001 p. 27

¹¹⁶ Rummukainen et al 2005 p. 3. Similar comments were also made by the Swedish Insurance Federation

¹¹⁷ PSI report 2002 p. 47

¹¹⁸ Interview with SMHI

¹¹⁹ Company A, C, D. Similar comments were also made by the Swedish Insurance Federation

¹²⁰ Interview with the Swedish Insurance Federation

¹²¹ Company A

¹²² Rummukainen et al 2005 p.8

¹²³ Interview with the Swedish Insurance Federation

¹²⁴ Company A, C, D. Similar comments where also made by the Swedish Insurance Federation

¹²⁵ Company B

¹²⁶ Ibid.

4.4 Adaptation strategies, current and future

4.4.1 Current strategies of adaptation

Regarding the current strategies in the insurance companies all companies are at a stage where they are observing the development and available research. Moreover, they try to raise the question and create a consciousness about climate change, both within the organisation and externally towards the market. They will not act as front-runners in the matter but there is a general opinion among them that considers the possibilities to contribute by raising the question under different circumstances.¹²⁷ For instance, company A is being active by participating, as well as is in charge of different climate-related seminars¹²⁸. The spokesperson at company B explains that one perspective on their role is not about putting pressure on other actors, but rather raising questions and creating consciousness about climate change.¹²⁹ Company D took part in an international reference group among with other insurers to prove the sectors position towards the climate change issue, before the Kyoto-meeting in 1997¹³⁰. Although, the spokesperson at company C explains the current situation with reference to their possibilities as insurance company, namely, changing premiums quickly if necessary.¹³¹ The latter represent a general view among the companies.

Up to now, the main strategy is to watch the development and comply with it, be, so to speak ‘on the toes’ to use a sport term. When, where, what is going on and what is our ability to adapt gradually. This is a matter of a long-term issue and therefore, it is not like we from one day to another are forced to raise the homeowners’ insurance premiums due to a climate change.¹³² [10]

In general there is little preventive work being done in the Swedish insurance sector since the external pressure is believed to be insignificant. Company A has so far made concrete acts as mentioned; seminars on a local level in cooperation with important actors such as SMHI, municipalities and universities and where the view on climate change has been broadened. The company has also produced a brochure about how climate change can impact the insurance sector. Moreover, they do not just watch research; rather they are in financiers of two research projects concerning forest and climate change.¹³³

Company B, who in 1995 signed the UNEP-III proposal¹³⁴, diverge slightly from the other companies. This company uses their “climate index”, which has the potential to contribute to improved investment strategies related to climate change in the future. In addition it is used to create incentives in the market and to awaken the enterprises’ attention in the climate change issue. In this sense they try to put pressure on customers and other sectors in a way that mitigates climate change. Unlike the other companies, they have a more awareness concerning investments in non fossil fuel stocks.¹³⁵ This strategy correlates with Salt who argues that insurance companies who are part of UNEP-III will not be taken seriously if they

¹²⁷ Company A, B, C, and D

¹²⁸ Company A

¹²⁹ Company C

¹³⁰ Company D

¹³¹ Company C

¹³² Ibid.

¹³³ Company A

¹³⁴ According to Salt 2000 p. 152, the main purpose of UNEP-III was to gather together all like-minded insurance companies throughout the world and provide them with support concerning how to include environmental concerns and long-term sustainable actions into their operations.

¹³⁵ Company B

do not employ strategies for their investments, since these will likely be closer examined in the future.¹³⁶ Yet, the spokesperson detects some difficulties regarding the possibility of putting pressure on the market through investments due to the temporal-scale in stocks trends.

This [investments] has to be valued over a long time /.../ there has to exist a trend where this is taking a negative turn/.../ nevertheless, the long-term idea of the climate index is to use it as an instrument of dispose.¹³⁷ [11]

Furthermore, from an international perspective, it is revealed in literature and in the interviews that the contemporary Swedish insurance sector differs from other countries in their approach for the reason that the Swedish insurance companies hitherto make no exceptions in the insurance coverage.¹³⁸ This arises partly from the ground ideology of insurance, as one spokesperson cited in an interview:

We exist in order to help our customers and will not turn them down. On the contrary we will, after best ability, equalize the risks in between them with help of our insurances. It is important to remember the basic principles of insurances.¹³⁹ [12]

The costs for keeping track of the different premiums will so far probably result in more administrative costs than it will cost to cater for the few weather related occurrences in Sweden.¹⁴⁰ In addition the spokesperson at company C claims that they must inform their customers why these possible changes in premiums are necessary and why at present there is no relevant motivation. Events like Gudrun make it easier to talk about damage prevention and make space for communication since it is much more difficult to discuss hypothetical events than authentic incidences.¹⁴¹

The spokesperson at the Swedish Insurance Federation declares that the insurance companies' careful behaviour could be the result of the competitive situation between the companies. If one company decides to make exceptions towards insurance while the competitive companies do not, the insured will probably chose the company where you get more for the paid premiums.¹⁴² This occurrence is also brought up in the PSI report where it is illustrated that the competition between insurers will likely affect insurability. When several insurance companies compete, the price will be a deceiving factor for their activities.¹⁴³ The competition can also convey that certain insurers put on a larger risk to be able to offer more attractive prices and products for their customers. But this can in the long run cause weakened companies and instability.¹⁴⁴ Furthermore, attempts to create a more stable ground for flood insurance could be undermined¹⁴⁵.

From a global perspective the strategies concerning the costs and coverage of insurance vary from country to country depending on their different view on climate change. In several

¹³⁶ Salt 2000 p. 149 pp

¹³⁷ Company B

¹³⁸ Company A, Swedish Insurance Federation, PSI report 2002 p.46

¹³⁹ Company A

¹⁴⁰ Ibid.

¹⁴¹ Company C

¹⁴² Interview with the Swedish Insurance Federation

¹⁴³ PSI report 2002 p.7

¹⁴⁴ IPCC 2001 p.435

¹⁴⁵ PSI report 2002 p. 46

countries, the losses caused by flooding have led to exceptions in the insurance coverage. Therefore, adaptation to weather related losses is of high priority within the insurance sector. It has been shown in the past that financial losses caused by extreme weather events have put pressure on the insurance companies who consequently have responded by either to raising the price, differentiate the premiums, or have gone bankrupt.¹⁴⁶ For instance, countries as Germany and the Netherlands have high flood risks and are therefore vulnerable for extreme weather impacts. Hence, they have more reasons to employ strategies where they limit the coverage for some premiums.¹⁴⁷ The UK employs a similar strategy to Sweden and covers for all risks in the premiums. Furthermore as in Sweden, the British insurance sector carries the majority of flood risks.¹⁴⁸ However, the UK prices the costs differently and has raised the costs for premiums in high-risks areas. The different strategies mirror two of the mentioned adaptive options the insurers' can take, *pricing* and *limitation*. Pricing as adaptation strategy comprised a repeatedly question asked in the interviews. In general it was considered to be a possible strategy to employ, depending on surrounding factors and driving forces such as reinsurance costs.¹⁴⁹ The next quotation will sum up a moderately common perspective from the interviews, concerning pricing as a relevant strategy¹⁵⁰:

Yes, if the risk is larger, well, storms are perhaps a bit difficult since it is hard to tell where they will strike the next time /.../ However, this is all in theory and has not been on the agenda at all or simply as a suggestion, since there is not a need for it yet. We are hardly affected by these climate consequences at all, which makes the question just a ripple in the margin.¹⁵¹ [13]

4.4.2 Thoughts of the future

During the interviews the spokespersons were asked about what possible strategies related to climate adaptation they could visualize within a five years period. In general the spokespersons consider climate change as a new "planning condition". In the same way as the insurance companies calculate inflation and how often there are forest fires, they have to take climate change in to consideration. The spokespersons saw a future opportunity in investment strategies, but emphasised that is not a present topic¹⁵². One conclusion is that the Swedish insurers move towards the trend to differentiating the costs of certain premiums. One possible reason for this, as one spokesperson expresses concerns a technological innovation, which facilitates the opportunity to price the risks in a more specific manner than before. Therefore, changes in weather patterns are not the foremost reason for differentiating premiums.¹⁵³ On the other hand, it is reasonable to interpret that climate change will constitute an indirectly factor, since more extreme weather events will probably accelerate the progress of technology innovation. Of larger importance according to a generalized opinion among the insurance companies, is the possibility to alter the coverage on some premiums and thereby protect the insurance sector against increasing costs related to extremer weather patterns. One spokesperson expressed it as follows:

¹⁴⁶ IPCC 2001 p.427

¹⁴⁷ Company A

¹⁴⁸ PSI report 2002 p. 46

¹⁴⁹ Company A, B, C and D

¹⁵⁰ Company B

¹⁵¹ Ibid.

¹⁵² Company A, B, C and D

¹⁵³ Company D

Our instrument available is the premium /.../ which we can alter depending on what sort of risk we considered to cover for. /---/ A possible strategy to employ is to put a weighty price on the premium that will represent the risk.¹⁵⁴ [14]

Within five years, a common reflection in several of the interviews is the belief that the companies will possess better knowledge concerning climate change.¹⁵⁵ Moreover, in five years the insurance companies believe that society will be more aware of expected climate impacts and the discussion is intensified.¹⁵⁶ Three of the spokespersons believe that their business will have taken the climate related perspectives of interest into account and hence found new structures for work routines.¹⁵⁷ In addition with improved technology it is believed that different parts of interest, for instance premiums, knowledge of the risks and the impact of reinsurance arrangement will have been identified and taken into account.¹⁵⁸ However, all the spokespersons agree with the following and final quotation in the matter, which illustrates the general speculations concerning adaptation to weather variations and future climate change.

Well, it is hard to predict the future /.../ there are many different factors that can affect insurance companies.¹⁵⁹ [15]

The spokespersons identify similar aspects concerning how the reinsurance phenomenon will appear in the future. Due to higher costs depending on extremer weather as well as the impact of socio-economic changes will probably imply less reinsurance.¹⁶⁰ A further perspective, concerns a worst-case scenario where the economical consequences will be too vast even for the reinsurance to compensate.¹⁶¹ In correlation with Beck's theory concerning the risk society, the spokesperson forecasts a scenario where the society would be uninsurable. However, the probability for this to occur is inconsiderable according to the spokesperson that also mentioned an additional adaptive option- the possibility to transfer the risk into other financial markets.¹⁶² The reinsurance market is in fact a small part of the global financial market, which therefore constitutes an important factor due to its capacity to absorb risks.¹⁶³ One perspective on this philosophical worst-case scenario is that even where costs due to extreme weather events might become unreasonable for the reinsurance companies it is possible that alternative solutions arise. Therefore it will hopefully never be unfeasible to insure.

¹⁵⁴ Company B

¹⁵⁵ Company A, C and D. Similar comments where also made by the Swedish Insurance Federation

¹⁵⁶ Company A and D. Similar comments where also made by the Swedish Insurance Federation

¹⁵⁷ Company A, C and D

¹⁵⁸ Company C

¹⁵⁹ Ibid.

¹⁶⁰ Company C, Similar comments where also made by the Swedish Insurance Federation

¹⁶¹ Company B

¹⁶² Company D

¹⁶³ PSI report 2002 p. 15 p

5 Conclusions

To conclude, several phenomena have been discerned as climate adaptation strategies within the Swedish insurance sector. Current adaptation strategies here are identified as a viewpoint where the insurance sector is watching the general development and surrounding factors of potential impact on their business. The climate change issue is of importance since low awareness could be misfortune. This facilitates a need for knowledge in order to avoid getting locked in to a system, such as technical or computer-based systems. The insurance companies hold an awoken attitude, which foremost is to be found on the managerial level within the organisations as the climate-related issue above all is seen as an strategic issue.

All the examined insurance companies consider themselves to have time for adaptation and that it is a gradual process. Moreover they all agree that it will be easy to change their approach to business when it is necessary.¹⁶⁴ This is entitled a “wait-and-see” stance according to IPCC, which can be seen as a significant viewpoint in the Swedish insurance business as well as in the international level, above all in Europe and Asia.¹⁶⁵ It is also a competitive situation between the companies, which is likely to make the companies wait for each other’s adaptive strategies.

Concrete adaptation strategies are here being identified as the insurance companies’ possibility to change or differentiate the premiums. The premiums are the companies’ primary instrument owing to their function as an insurance company. However to differentiate premiums is a general trend within the sector due to technological innovation, which facilitates the opportunity to price risks more distinctively. Yet, more extreme weather events could speed up the technology and make it easier to target vulnerable areas. To differentiate premiums due to climate change is not a pressing issue today since it would result in more administrative costs than it will cost to cater for the few weather related occurrences in Sweden. Nonetheless, financial losses due to water damages are foremost caused by for instance careless installations of dishwashers or inaccurate dimensioned sewage pipes and not due to weather related floods. Therefore the climate occurrences are not seen as an immediate threat to business, nevertheless, managing and equalizing risks is a part of the insurance core business.

Another adaptive option for the insurance companies is to avoid signing insurances in high-risk areas. This is not seen as a primary choice since the concept of insurance is to help customers and equalise risks in between them. Foremost it is the municipalities who provide planning permissions who have the instruments to not permit constructions in these areas.

Additionally, expected climate change is not only concerning difficulties according to the interviews, it can also bring new possibilities such as the foundation of new premiums. However, the perspectives concerning the companies view on current weather variations and expected climate changes slightly differ among the companies. This depends probable on whether to what extent the companies have been affected by current extreme weather events, furthermore due to the type of insurances they hold, life assurances or general insurances, or a mix of both. It is also reasonable to assume that they have different views on their possibilities to influence society. For instance, the attitudes concerning their potential to influence society

¹⁶⁴ Company A, B, C, D

¹⁶⁵ IPCC 2001 p.429

through capital investments slightly differ between the companies, yet in general the question is of minor consideration. However, two companies see opportunities in investments premiums in the future.

General drivers for taking expected climate change issues into considerations depends above all on the global reinsurance companies since these are influencing the Swedish insurance sector indirectly by pricing the reinsurance premiums. Therefore conditions for insurance might change in Sweden due to changed reinsurance costs, not due to a higher number of floods in Sweden. The reinsurance companies also constitute a respectable source of knowledge as they finance many vast research projects concerning the impact of expected climate change. Furthermore, there has been no political pressure on the insurance sector, thus initiation factors depends rather on enthusiast individuals within the insurance companies. Regarding the need for knowledge, the overall conclusion is that the requirement depends on the extent of risk exposure the companies carry. However, knowledge is a fundamental factor in order to participate in preventing activities. An overall requirement of knowledge within the sector is the need for detailed mapping data in order to discover and recognize vulnerable flood areas.

Traditionally, the Swedish private insurance sector is strong, however the system is characterized by the idea that the state has the utmost responsibility for larger losses or accidents caused by natural hazards such as floods, and constitute a key actor in the climate issue. Nevertheless, the results show that the responsibilities have not been outspoken or declared. In addition there is no on-going dialogue between the insurance sector and the authorities, which can give arise to problems such as finical confusion where extreme weather events as Gudrun have occurred. At the moment, the insurance companies are anyhow willing to support authorities with statistical knowledge and experience if it is requested. Even if the result shows that the companies see them selves as minor actors in the climate change issue, it is reasonable to assume that the insurance sector possess large potential to put pressure on society if the reasons are big enough. For instance, the risks regarding terror attacks are one area where the sector has put pressure on the government in order to state the responsibility.

5.1 Potential further research areas

This study has examined the Swedish Insurance sector's view on adaptation to present weather variations and future climate change. There are different directions in which this research can be widened as well as deepened. In a broader perspective it is of interest to examine how the reinsurance companies further will affect the future strategies of the Swedish insurance sector. In addition, EU's work concerning the insurance sectors' relation to these climate-related issues can also be seen as a possible research area. Hence, it is of relevance to compile the results of this study with the EU's perspective in order predict the continuing development of adaptation strategies. There are several regions in Sweden who are more vulnerable for extreme weather events, as for instance floods. Since the central focus of this study was on a national level, another research area of relevance is to deeper examine regional variations in order to target differences in adaptation strategies between regional insurers.

6 References

Beck U. *Risk society and the provident state*

In the book:

Lash S. Szerszynski B. Wynne B. (2000) *Risk Environment and Modernity. Towards a New Ecology*. Sage Productions Great Britain Trowbridge, Wiltshire

Berkhout F. Julia H. David M. G. (2004). *Learning to adapt: Organisational adaptation to climate change impacts*. Tyndall Centre for Climate Change Research Working Paper 47.

Burton I (1997). "Vulnerability and adaptive response in the context of climate and climate change", *Climatic Change* 36:185-196.

Ingelgård B. Olsson H. (1999). *Modelling risks for a reinsurance company*. Linköpings Institute of technology. Reg nr: LiTH IPE Ex arb 1999:565

IPCC, McCarthy J. J. Canziani O. F. Dokken D. J. Leary N. A. White K. S. (2001) *Climate Change 2001: Impacts, Adaptation and Vulnerability*. Cambridge University Press, United States of America

Kerr A. McLeod A. (2001). *Potential adaption strategies for climate change in Scotland*. Scottish Executive Central Research Unit, Edinburgh (internetlänk)

Kvale S. (1997). *Den kvalitativa forskningsintervjun*. Studentlitteratur, Lund.

Lidskog R. Sandstedt E. Sundqvist G. (1997). *Samhälle, risk och miljö. Sociologiska perspektiv på det moderna samhällets miljöproblem*. Studentlitteratur. Lund.

Minoli D.M. Bell J.N.B. (2003). *Insurance as an alternative environmental regulator: Findings from a retrospective pollution claim survey*. Business strategy and the environment number 12, 107-117

Policy Studies Institute (PSI), EU Project Interest (2002). *Interest. Insurance, Technological Risk and Emerging Science and Technology Policies*. Policy Studies Institute, London

Rummukainen M. Bergström S. Persson G. Ressner E. (2005). *Anpassning till klimatförändringar. Kartläggning av arbete med sårbarhetsanalyser, anpassningsbehov och anpassningsåtgärder i Sverige till framtida klimatförändring*. SMHI Reports Meteorology and Climatology No. 106, SMHI, SE-601 76 Norrköping, Sweden. 44 pp.

Salt J.E. (2000). *Climate change and the insurance industry*. Corporate Environmental Strategy 7 146-155. www.coporate-env-strategy.com

Seidman I. (1998). *Interviewing as qualitative research, a guide for researcherse in education and the social sciences*. New York, London Teachers College Press

Smithers J. Smith B. (1997). "Human adaptation to climatic variability and change", *Global Environmental Change*, Vol 7, No 2, pp129-146.

Storbjörk S. (2004). WP C: *Agendas and strategies for adaptive action*. Linköping University

Personal communication

Swedish Meteorological Hydrologic Institute, SMHI, (2004-03-15). Interview performed by Karin André and Johanna Brunge.

Länsförsäkringar, (2004-04-12). Interview performed by Karin André and Johanna Brunge

Folksam, (2004-04-14). Interview performed by Karin André and Johanna Brunge.

If, (2004-04-22) Interview performed by Karin André

The Swedish Insurance Federation, (2004-04-22). Interview performed by Johanna Brunge.

Trygg Hansa, (2004-04-22). Interview performed by Karin André and Johanna Brunge.

Internet

Trygga Hansa, www.trygghansa.se (2005-01-20).

If, www.if.se (2005-01-20).

Folksam, www.folksam.se (2005-01-20).

Länsförsäkringar, www.lansforsakringar.se (2005-01-20).

The Swedish Insurance Federation Annual Report 2004, The Swedish Insurance Federation, www.forsakringsforbundet.com (2005-04-22)

Appendix 1

Interview guide, English

1. Could you in brief describe your position at this insurance company?

A: The relevance of climate change and the significance of adaptation.

2. What do the present climate variations as well as future climate change mean for the insurance company?

- Is it an issue among others?
- In relation to other issues, how important is the climate issue?
- What other issues are relevant for the business?

3. For how long have you worked with climate-related issues?

- What initiated the work (Why and by whom)?

4. In what way is your insurance company affected of present climate variations and future climate change?

- What is considered to be of most importance, the present climate variations or future climate changes?
- What type of climate variations and future changes will above all affect your company? (E.g. floods, storms, extremer weather etc.)

5. In what way is your insurance company dealing with these variations and future climate change, are there any strategies or premiums to approach? Tell us!

6. What type of difficulties is your insurance company facing when adapting to climate variations/changes?

7. What type of possibilities is your insurance company facing when adapting to climate variations/changes?

B: Risks and the insurance sector business

8. What risks do you see with climate variations and changes when decisions concerning insurance coverage are being made?

9. Are the *premium* prices affected?

- Is there anything else in your activities that can be affected, e.g. demands and conditions when underwriting insurances? (New “green” technology)

10. What is taken into consideration when *investments* are being assessed? Criteria?

- Do you consider that your company can influence external markets by investments? Tell us!

11. Do these “strategies” (premiums, investments, what is insured/not insured) differ from risk management in Sweden and between other countries?

12. Are risk analyses made? (Connected to the question mentioned above)
- What are these risk analyses based on?
 - How long-term are the analyses?

C: Knowledge and the insurance companies' role responsibility in society

13. What type of *knowledge* is of importance?
- From where is the knowledge concerning climate issue as well as possible adaptation strategies assembled?
14. What *external actors* are you collaborating with in order to assemble knowledge? (The government, authorities, SMHI)
15. Is there any specific type of knowledge required by the insurance company?
16. In what way is the insurance company dealing with the *uncertainty* concerning future climate change? (When statistics are absent)
17. How does the insurance company operate *towards* society (regarding knowledge)?
- What responsibility do you consider the insurance company has concerning allocating information about future climate change and to put pressure on society? (Do you believe the insurance company has a responsibility to allocate knowledge?)

D: Future

18. Where will the company be in five years? (Regarding their view and strategies to climate variations and future climate change)
19. What requirements and strategies must be taken in order to get there?
20. Is there anything else you want to add that has not been mentioned?

Appendix 2

Interview guide, Swedish

1. Berätta kort om din roll här på Försäkringsbolag X.

A: Klimatfrågans betydelse och vad är anpassning

2. Vilken *betydelse* spelar dagens klimatvariationer och kommande förändringar för ert försäkringsbolag? (attityder)

- Är det en fråga bland andra?
- Hur stor betydelse har den i förhållande till andra frågor?
- Vilka andra frågor är relevanta för er verksamhet?

3. Hur *länge* har ni arbetat med frågor som rör klimatiförändringar?

- Vad satte igång arbetet (varför och vem)?

4. Hur *påverkar* klimatvariationer och förändringar ert försäkringsbolag?

- Vad är viktigast, variationer eller förändringar?
- Vilka klimatvariationer och förändringar påverkar mest ert försäkringsbolag, t.ex. översvämningar, stormar, extremare väder m.m.

5. Hur *hanterar* ert försäkringsbolag dessa variationer och förändringar det vill säga har man strategier och policys? Berätta!

6. Vilka *svårigheter* möter ert försäkringsbolag i ert arbete med anpassning till klimatiförändringar?

7. Vilka *möjligheter* möter ert försäkringsbolag i ert arbete med anpassning till klimatiförändringar?

B: Risker och försäkringsbolagens verksamhet

8. Vilka *risker* ser ni med klimatvariationer och förändringar när ni avgör vad som ska försäkras?

9. Påverkas priset på *premier*?

- Finns det något annat i er verksamhet som kan påverkas, t.ex. krav och villkor vid tecknandet av försäkringar? (ny ”miljövänlig” teknik)

10. Vad finns i åtanke när *investeringar* görs? Kriterier?

- Anser ni att ni kan påverka genom investeringarna? Berätta!

11. Skiljer sig dessa ”strategier” (premier, investeringar, vad som försäkras/ej försäkras) för riskhantering mellan Sverige och andra länder?

- Kan man säga att det finns en ”svensk strategi”, varför?

12. Görs det *riskanalyser*? (Knyter an till ovanstående fråga)

- Vad baseras riskanalyserna på?

- Hur långsiktiga är riskanalyserna?

-

C: Kunskap och försäkringsbolagens roll i samhället

13. Vilken *kunskap* är viktig?

- Var kommer kunskap ifrån gällande klimatförändringar och eventuella anpassningsstrategier?

14. Vilka *aktörer* samverkar ni med för att få kunskap? (Regeringen, olika myndigheter, SMHI)

15. Finns det *kunskapsluckor*, i så fall vilka?

16. Hur hanteras *osäkerheten* med att klimatet kan komma att förändras i framtiden? (Statistik saknas)

17. Hur agerar ni *utåt* i samhället? (knyter an till kunskap)

- Vilken roll anser ni att försäkringsbolag har i samhället att påverka och informera om klimatförändringar? (Anser ni att ni som försäkringsbolag har en roll att sprida vidare kunskap?)

D: Framtid o.s.v.

18. Var står ni om fem år?

19. Hur kommer ni dit och vad krävs?

20. Något du vill tillägga kring det vi pratat om som vi inte varit inne på?

Appendix 3

Quotations in Swedish

Adaptation to climate change in Sweden

/.../ det här är inte så himla mycket pengar, sett i relation till alla försäkringspremier som kommer in. Och därför har försäkringsbranschen tagit alla skador hittills, som en klumpsumma. [1]

Man fokuserar mycket på svårigheterna men det kommer att finnas möjligheter också. Vi kommer att få varmare vintrar, billigare uppvärmningsnotor, färre bilolyckor, kanske mera vatten i kraftmagasinen, snabbare tillväxt i skogen /.../ Så att det är en väldig balans i det där [klimatförändringar] men som kommer väldigt sakta och det är väl det som vi har börjat fundera kring. [2]

How the insurance sector relates to climate change

/.../ det jag kan tillägga är att det här är inte nånting som sköts nere i någon verkstad utan koppling till strategiska tankegångar, det är vår bolagsledning som håller sig informerad, är engagerad och det ligger på den nivån. [3]

I dagsläget tror jag inte att man [försäkringssektorn] hanterat så väldigt mycket ur svenskt [perspektiv], man har börjat att intressera sig [i klimatfrågan] och det är några bolag som har börjat tittat på de här frågorna mer än vad man gjort tidigare. Jag tror att det är en lång process, jag menar det krävs ju att det händer fler naturkatastrofer egentligen för att man ska börja reagera mer. [4]

Role of the insurance sector, authorities and knowledge

Jag vet inte om försäkringsbranschen i sig är den där barrikadkämparen, det tror jag inte, utan däremot är det någon som kan ge support. [5]

Ta till exempel en bilförsäkring, vad som kommer ut ur avgasröret alltså hur mycket koldioxid som kommer ut, det är ingenting som vi överhuvudet taget försäkringsmässigt är intresserade av. För vad vi tar betalt för det är ju om bilen går sönder om den krockar så att den måste repareras, om den blir stulen, om personer som färdas i den skadas i en trafikolycka. /---/ Det måste ju vara myndigheterna som ställer upp dom villkoren. Att bilar som släpper ut mycket koldioxid får en annan skatt till exempel. För att vi ska ju egentligen bara ta betalt för det vi blir skyldiga att ersätta. [6]

Bolagen tar in pengar som man ska placera och förvalta på ett sånt sätt att det finns kapital kvar /.../ så ska man placera medlen dels säkert /.../ Det finns ju en massa regler om hur det här ska fördelas /.../ man kan inte bara sätta [placeringarna] hur som helst. [7]

Man har inte avgjort idag vem som ska ha ansvar för det här med klimatförändringar. Det är väl ett av problemen. Idag ligger hela frågan delad

mellan väldigt många myndigheter, Naturvårdsverk, Räddningsverk, SMHI, Lantmäteriet, Statens geologiska institut. [8]

Adaptation strategies, current and future

Vi är mer medvetna om att det är ett problem och vi har det under bevakning och vi gör sådana saker utifrån det vi själva kan göra. Men expertiskunskap, det får man söka på annat håll när man känner att man behöver ha den supporten. [9]

Därför att mycket har handlat om att bevaka utvecklingen, att följa utvecklingen, vara 'på tårna' som man säger i idrotten. /.../ verkligen känna av, vad pågår och /.../ måste vi anpassa oss successivt? För att det här är så pass långsiktiga skeenden så det är inte så att vi från en dag behöver höja villaförsäkringspremierna med si och så många procent därför att klimatet har förändrats. [10]

Man måste värdera det här [investeringar] över tid /.../ det måste ju vara en trend då så att man ser att det här går åt fel håll /.../ Men tanken är ju att klimatindex på sikt ska vara ett utav dom instrument som man har till förfogande. [11]

Vi är till för kunderna och det är inte så att vi ska säga nej till dom. Utan det vi gör är att jämna ut riskerna mellan kunderna /.../ genom våra premier och efter bästa förmåga. Så det är nog bra att komma ihåg just det där med försäkringens princip. [12]

Ja, och om risken är större, nu är det ju kanske lite svårt med stormar för att veta exakt var de ska slå till nästa gång /.../ Men nu pratar vi väldigt mycket teori för det här har inte alls varit på agendan eller som ett förslag överhuvud taget för det finns inget behov ännu. Vi är så pass lite berörda av sådana här klimatkonsekvenser ändå, så att det är bara en sorts krusning i marginalen. [13]

Vårt instrument är ju annars premien /.../ det är den som man kan förändra utifrån vilken risk som man övertar. /---/ Däremot skulle vi kunna sätta en premie som representerade risken, rejält. [14]

Men det är svårt att sia om framtiden /.../ det är mycket som kan påverka försäkringsbolag. [15]