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INSURANCE AND THE ANTHROPOCENE: LIKE A FROG IN HOT WATER

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ABSTRACT

This thesis explores the relationship between the commercial insurance industry, global environmental change (GEC) and what Beck (1992; 1999) termed the 'risk society'. In recent decades, there have been growing concerns that many of the risks impacting contemporary society have undergone fundamental changes. Many of these risks are increasingly being linked to the unintended consequences of humankind's remarkable progress in science and technology, and have been described as *debounded*, given that they so often transcend both geographical and temporal boundaries (Beck 1992).

Within the risk society, the commercial insurance industry – which relies on statistical (actuarial) analysis to help it assess and manage its risk exposure – has been described as demarcating the frontier barrier between bounded (i.e. insurable) and debounded (i.e. uninsurable) risk. However, this claim has been a highly contested one, leading to calls for more empirical data to help clarify how commercial insurance is actually responding under conditions of uncertainty.

Of all the debounded risks, GEC has emerged as one of the risk society's most recognisable. Now understood to be a result of the anthropogenic emission of greenhouse gasses, particularly since the onset of the industrial revolution, its impacts have risen so sharply in recent decades that it has prompted claims that Earth has moved away from the era of the Holocene and into the Anthropocene (Crutzen 2002).

Given that at least 40% of the cost of environmental catastrophes is now borne by commercial insurance, GEC provides an excellent opportunity to gain a deeper understanding of how the industry is responding to debounded risk at the risk society's frontier barrier. Early commentators suggested that the commercial insurance industry would be well motivated to respond proactively to GEC, by taking a more mitigative approach to managing its drivers at both the global and local levels. However, the response by the industry, so far, has been described as more adaptive of its own business activities than mitigative.

This raises questions about whether such claims are true across all three of the insurance industry's activities - as risk carriers, risk managers and as investors, why they have responded in such ways, and what implications this has for broadening our understanding of the complex relationship between commercial insurance, debounded risk and the risk society's frontier barrier.

To consider these questions, a collective case study was undertaken with a variety of commercial insurance companies, re-insurers, asset managers, clients, brokers, industry associations and regulators across South Africa, Germany, Switzerland, the United Kingdom and Belgium.

The research identified how commercial insurers have indeed responded more by adaptation of their business activities than mitigation of the drivers of GEC. This is mainly through the use of *defensive underwriting* to help them manage their exposure. However, the research extends this analysis by highlighting some of the nuances of the industry's response. This includes its focus on centralisation, the influence of the existing paradigm framing its understanding of risk, and by highlighting the irony that the area of insurers' activities, initially believed to be most suited for responding to GEC (i.e. their investment portfolios), have, in practice, been the area recording the least response.

In exploring why this is so, the study draws on understandings of the Anthropocene to argue that commercial insurers are finding their existing risk assessment tools progressively out-dated in a world where risk is no longer as predictable as it once was. This is further compounded by increasingly plural access to the risk society's science and technologies, which, in some instances, are undermining the role commercial insurance plays as society's primary financial risk manager. This raises questions around the role commercial insurance plays in demarcating the risk society's frontier barrier which, ultimately, has far broader implications for why so many of society's institutions are struggling to adapt to risk in the 21st Century.

DECLARATION

This work has not been previously submitted in whole, or in part, for the award of any degree. It is my own work. Each significant contribution to, and quotation in this dissertation from the work(s) of other people has been attributed and has been cited and referenced.

Signed by candidate

Signature Removed

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Karl Marx (1852)

Men make their own history, but they do not make it as they please; they do not make it under self-selected circumstances, but under circumstances existing already, given and transmitted from the past.

Shakespeare - The Merchant of Venice

My ventures are not in one bottom trusted,
Nor to one place; nor is my whole estate
Upon the fortune of this present year;
Therefore, my merchandise makes me not sad.

Michael O'Leary - CEO Ryan Air

It is absolutely bizarre that the people who can't tell us what the fucking weather is next Tuesday can predict with absolute precision what the fucking global temperatures will be in 100 years' time. It's horseshit!

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ACRONYMS

ABI	Association of British Insurers
ART	Alternative Risk Transfer
BBBEE	Broad-based Black Economic Empowerment
CAT	Catastrophe
CDP	Carbon Disclosure Project
COEs	Centres of Excellence
COP	Conference of the Parties
CSI/CSR	Corporate Social Investment/Corporate Social Responsibility
CSIR	Council for Scientific & Industrial Research
ESG	Environmental, Social & Governance
EU	European Union
FIA	Financial Intermediaries Association
FPA	Fire Protection Association
FSB	Financial Services Board
FSC	Financial Sector Charter
GBCSA	Green Building Council South Africa
GEC	Global Environmental Change
GHG	Greenhouse Gasses
GIS	Geographical Information System
IPCC	International Panel on Climate Change
JSE	Johannesburg Stock Exchange
NAIC	National Association of Insurance Commissionairs
PAYD	Pay-As-You-Drive insurance
PPP	Public-Private Partnerships
PRI	UNEP-Fi Principles for Responsible Investment
PSI	UNEP-Fi Principles for Sustainable Insurance
SAM	Solvency Assessment and Management Regime
SAIA	South African Insurance Association
SRI	Socially Responsible Investment
SWH	Solar Water Heater
UNEP-Fi	United Nations Environmental Programme Finance Initiative

CHAPTER ONE - INTRODUCTION

Introduction

This thesis interrogates the intimate relationship between risk and societies' oldest, largest and arguably most powerful industry; commercial insurance (Phelan, Taplin et al. 2011; Mills 2009b). In so doing, it raises and addresses critical questions about how the insurance industry is responding to some of the threats emerging in the 21st Century, especially some of the *debounded* risks that have become a defining feature of what Beck (Beck 1992; 1999) terms 'risk society'. This thesis explores whether commercial insurance, in its current form, is able to respond to these risks and, in so doing, raises fundamental questions about our understanding of the institution that has become society's 'primary financial risk manager' (Hecht 2008, p. 1959).

The Insurance Industry

In contrast to the dour and stolid institution the insurance industry is often believed to be, the reality is quite the opposite. Its influence is wide-ranging; from its clients, to governments and out across the financial markets. It impacts many aspects of society, both directly and indirectly, particularly in the more developed regions of the world where its footprint is bigger, and is often responsible for influencing many decisions.

Recently, however, commercial insurance has come under increasing pressure due to the negative impacts of global environmental change (GEC), associated with the ongoing release of anthropogenic greenhouse gasses (GHGs) (Swiss Re 2012b; Swiss Re 2013). This has resulted in significant changes to Earth's ecosystems – in the form of increased storms, floods and droughts - the economic costs of which are so often borne by the insurance industry (Rockstrom et al. 2009; IPCC 2013).

A History

Since the beginnings of recorded time people have always sought ways to manage their risk exposure (Bernstein 1996). Early examples include how hunter-gatherers pursued prey in groups so as to reduce the probability of

being gored, through to the spread of cargo across primitive trading caravans, in order to limit the likelihood for outright loss occurring (ibid.).

The earliest evidence of property insurance emerged around 3000 BC, in China, when merchants there would be backed by wealthy investors who would stand surety against any loss of cargo at sea (Fink 2011). Under this agreement, should a loss occur, the merchant would be sold into the slavery of the investor until his debt had been repaid. While onerous, such an arrangement provided merchants with the collateral to trade and the potential to substantially increase their wealth.

This concept of spreading risk proved so popular that by 1780 BC the Babylonians had integrated it into the first ever example of a written law; a giant obelisk known as the *Code of Hammurabi* (Hinkelman 1998). The Code required merchants to pay an additional fee, on top of any money borrowed to finance a trade, which obliged lenders to waive their entire loan should the merchant's cargo get lost at sea (ibid.).

By the end of the 13th Century, trading partnerships had started to emerge, widely referred to as the forebears of today's multi-national corporations (Minto 2008). Within these partnerships, one, usually wealthier, investor would remain at home to manage affairs, while his partner would accompany the ship to its destination, oversee the sale of goods and ensure subsequent repatriation of funds. However, while bearing less physical risk, the domiciled investor bore great financial risk, both through the potential loss of ship and cargo, but also the potential loss of their business partner This led to lenders demanding a premium to be paid, regardless of whether a ship, or its cargo, was lost; a structure that is more reflective of insurance policies today.

The first formal insurance policy (or *polizza* in Italian) dates back to the insuring of a ship called the *Santa Clara,* in Genoa, in 1347; a date that marks the birth of modern commercial insurance and its integration into mainstream economies (Nelli 1972). By the 16th Century commercial insurance had spread rapidly across Europe, particularly in Britain, which at the time was the epicentre of global maritime trade (Bernstein 1996).

This led to insurance attracting the attention of some notable thinkers. In 1654, Blaise Pascal – also the inventor of the mechanical calculator and probability theory – and Pierre de Fermet, arrived at a method to calculate a 'scientifically quantified' value of risk, which had previously been achieved only via informal haggling and negotiation (Bernstein 1996). This resulted in the introduction of the first actuarial (life) tables, which in turn helped to reduce the cost of insurance and increase its accessibility among a broader cross-section of the population.

This development became significant a decade later, when in 1666, the great fire of London razed over 14,000 houses across the British capital. The totality of the devastation and subsequent suffering of the city's population prompted an economist, Nicholas Barbon, to open an office to insure buildings against fire loss. The venture proved so successful that by 1680 *The Fire Office* had established itself as England's first official fire insurance company (James 1954; Dickson 1960).

At the same time, an astute businessman, Edward Lloyd, opened a coffee house near the docks in London. It quickly became *the* place to gain reliable information on all aspects of shipping, ultimately emerging as the central meeting place for merchants seeking maritime insurance and those willing to provide it (Bernstein 1996). When a voyage was confirmed, the contract would be presented at Lloyd's and those wishing to guarantee it would sign their name underneath; a process that became known as *underwriting*. By the end of the 18th Century, a group of independent underwriters had formed the *Society of Lloyd's*, that is today the world's oldest surviving insurance company; now known as *Lloyd's of London* (Bernstein 1996).

Insurance only arrived in the United States in 1752, introduced by one of the Founding Fathers, Benjamin Franklin, to protect homes against fire risk. Franklin's *Philadelphia Contributorship for Insurance of Houses from Loss by Fire* was notable - not just for its long name - but for its innovative approach to fire prevention. This included warning clients of the risks they faced and refusing to insure some high-risk assets altogether (Bernstein 1996).

The 1835 ‘New York Fire’ and the ‘Great Chicago Fire’ of 1871 left over-exposed insurers in the United States reeling. The realisation that significant reserves were needed in order to protect them against large, unexpected catastrophes resulted in the insurance industry collectively pooling a portion of its insurance premiums to help cover the cost of infrequent yet expensive catastrophes (Kopf 1929, p. 22). Reinsurance is now a central feature of the modern commercial insurance industry.

Modern commercial insurance

Today, the commercial insurance industry has emerged as ‘society’s primary financial risk manager’ (Hecht 2008, p. 1959). The importance of this role is reflected in that it now accounts for almost 7% of global GDP and turns over in excess of US$4.3 trillion in annual premiums (The Geneva Association 2011). This makes it bigger than the global defence, oil, electricity generation and pharmaceutical industries (Phelan, Henderson-Sellers et al. 2011).

At its heart, commercial insurance performs three primary functions; as a risk carrier, risk manager, and as an investor (Hecht 2008; Arena 2008). As a *risk carrier* it protects communities from *sudden and unexpected* loss by helping them to transfer their exposure to those better adept at managing it. This risk is then combined, to create larger pools of risk, which insurers then diversify widely across time and space.

As a *risk manager* insurance encourages its clients to mitigate their risk exposure – via premiums, excesses and deductibles – but also via lobbying other stakeholders, particularly governments, to manage risk. There is also a long history of insurance directly managing some of the risks impacting insured assets, such as the provision of support for fire-fighting services (O’Malley & Hutchinson 2006).

Finally, with over US$ 19.8 trillion invested in the financial markets, the insurance industry is the third largest institutional *investor*, after pension and mutual funds (Mills 2009a, p. 100; Maslakovic 2011). This provides the industry with a significant degree of economic influence over global markets (Leggett 1993; Paterson 2001).

As such, commercial insurance is increasingly being recognised as crucial in helping to promote financial stability, support trade, commerce and entrepreneurial activities and relieve pressure on government budgets that could otherwise be spent on other, more pressing, activities (UNCTAD 2005). This accounts for the direct correlation between insurance, economic development and growth (Ward & Zurbruegg 2005; Liedtke 2007; Brainard 2008).

The Need and Objective for Research

The Rise of the Anthropocene

In recent decades, Earth's ecological systems have undergone a series of fundamental shifts, driven in particular by the rapidly growing impact of social systems (Science 2011). This has led to *global environmental change* (GEC) pushing many of Earth's ecosystem services close to their planetary boundaries, beyond which safe operating environments are much harder to maintain (Rockstrom et al. 2009; Millennium Ecosystem Assessment 2005).

Climate change, one of the most iconic of these planetary changes, is itself a direct consequence of human development, linked to the widespread burning of fossil fuels since the start of the industrial revolution (Steffen et al. 2007). The result has been an increase in the size and scale of weather-related phenomena now impacting the planet in the form of storms, droughts, floods and rising sea-levels (IPCC 2013).

So dramatic have been many of these changes that some theorists have started to argue that the impact of humans on the planet has effectively shifted Earth out of the Holocene and into the Anthropocene; a new era acknowledging the considerable impacts social systems are having on ecological ones (Crutzen 2006).

One of the features of the Anthropocene is exposure to risks that are increasingly regarded as the unintended consequence of humans' continued quest for a better and safer quality of life. These risks are referred to as 'debounded', as they are unconstrained by both time and space, and are increasingly seen as exceeding traditional forms of intervention and control.

This has led to modern society being termed the *Risk Society* (Beck 1992; 1999).

At the heart of the 'risk society' debate are claims that access to commercial insurance effectively demarcates its *frontier barrier*, as it is at this point where risks shift from being bounded (i.e. insurable) to debounded (i.e. uninsurable) (ibid.). However, these claims have been challenged, with some arguing that simply not enough empirical research has been conducted to support such assertions and that the research that has been conducted hints at an industry that regularly reconfigures itself in response to the changing nature of risk. This means that many debounded risks, previously imagined to be uninsurable, in fact often are (Bougen 2003; O'Malley 2003; Ericson & Doyle 2004).

Insurance and GEC

GEC arguably presents the commercial insurance industry with one of its biggest challenges, linked to the rising losses attributed to climate catastrophes, and the challenge the industry is facing in responding to them (Ernst & Young 2008a). This is being linked to the fact that the occurrence of past GEC perils is no longer indicative of future probabilities. This raises fundamental questions around the insurance industry's ongoing reliance on actuarial analysis as its primary tool for assessing, carrying and managing GEC risk (Berz 1999; Paterson 2001; Bougen 2003). In turn, this has prompted calls that the commercial insurance industry has the most to lose from GEC, and should therefore be well motivated to respond (Leggett 1993).

Many proposals have been offered as to how exactly the insurance industry should respond to GEC. The most progressive argue that the industry should start to mitigate the primary drivers of GEC (such as GHGs), by disinvesting its financial assets from the very industries contributing to the problem, such as the oil and gas industries (Leggett 1993). Others have called on the industry to become more proactive in managing the physical (proximate) drivers of risk (such as land-surface hardening and deforestation) that shape climate risk in the local landscape in which insurers operate (Nel et al. 2011).

However, the overall response by the insurance industry has been described as more adaptive, of its own business activities, than mitigative, a response - in the context of the weakening of actuarial analysis to predict future trends - that may ultimately be self-defeating (Phelan, Henderson-Sellers, et al. 2011).

The Research Direction

Consequently, this thesis sets out to engage with and understand how and why the global insurance industry is responding to GEC. It examines these questions in the context of insurers' three primary activities as risk carriers, risk managers and as investors.

The study also seeks to improve the theory on the relationship between the commercial insurance industry and the Anthropocene and how, in turn, this can better inform our understanding of the association between commercial insurance, debounded risk, and the frontier barrier of the risk society.

As relatively little analysis has been done on commercial insurers, operating in developing regions of the world, this study will also examine this in the context of the global South (Roberts & Parks 2007).

Methodology

This study was framed by *adaptive theory*, that promoted an ever-evolving relationship between theory generation and theory testing and that encourages the use of both qualitative and quantitative tools for generating theory (Layder 1993). A collective case study was undertaken of the commercial insurance industry, with 85 interviews being conducted between 2011 and 2013 with a variety of short-term insurance companies, reinsurers, regulators, brokers, clients and industry associations. In particular, a large number of in-depth interviews were conducted with South Africa's largest short-term insurer ('the Insurer') that had faced significant financial losses (i.e. claims) that it attributed to GEC.

Contribution to the Literature

The study makes several important contributions to the advancement of knowledge within the risk society and general insurance literatures.

First it responds to existing calls for more empirical research to be undertaken to help improve understandings of how commercial insurance has actually responded at the frontier barrier of the risk society (Bougen 2003; O'Malley 2003; Ericson & Doyle 2004;). It contributes to this debate by not only looking at this from the perspective of GEC, but also by examining how insurers in developing regions have responded to the emerging challenges they face.

Second the thesis contributes to the broader insurance literature, by improving our understanding of how and why commercial insurers have responded to GEC (Paterson 1999; Phelan, Taplin et al. 2011; Berz 1999; Gelbspan 1998; Paterson 2001). It expands on observations around why the industry continues to focus on centralising its operations, arguing that reasons for doing so are not simply to reduce operating costs. The study also describes the resilient nature of the actuarial paradigm, which frames how insurers engage the risk landscape to which they are exposed. It argues that this paradigm poses a fundamental challenge to the way the insurance industry is likely to adapt to risk in the Anthropocene and indeed the risk society more broadly. Here the thesis draws on organisational change literature to explain that, contrary to belief, the insurance industry is able to respond more mitigatively to GEC, but that the conditions for such a response are not yet in place (March 1991).

Third, the thesis contributes to our understanding of how the commercial insurance industry responds under conditions of increasing uncertainty, particularly in light of debounded risks (Beck 1992; Beck 1999; Ericson & Doyle 2004; O'Malley 2003; Bougen 2003). It examines the role that science and technology, a core feature of the risk society, plays, both as the cause of many debounded risks but also as a useful tool for managing them. However, the research introduces the irony that, in some instances, the growing access to science and technology, within the risk society, is itself starting to undermine the viability of commercial insurance.

Lastly, the research engages theorists who called on the insurance industry to become more proactive in using their invested assets to engage GEC more mitigatively (Leggett 1993; Phelan, Taplin, et al. 2011; Paterson 2001). It finds that, at the time Leggett called on insurers to respond, a full understanding of

the relationship between the insurance industry, and its invested assets, had not been developed and that this relationship plays a fundamental role in governing the way insurers' investments are used and managed.

Thesis Structure

This thesis is spread over seven chapters including this introduction.

Chapter two provides an overview of the existing literature on the risk society and its relationship with commercial insurance, global environmental change (GEC), how insurers have been responding via their activities as risk carriers, risk managers and investors and why. It ends by identifying the key questions that have emerged and that this study hopes to address.

Chapter three outlines the methodology used in undertaking this research project, including the theoretical framings, the various data collection tools used, an overview of the process and a summary of some of the key challenges faced and how they were overcome.

Chapter four explores how and why the commercial insurance industry has responded to GEC via its risk-carrying activities. It examines their continued use of *defensive underwriting*, and describes how the industry remains stuck in a paradigm that is no longer representative of its understanding of risk.

Chapter five explores how and why the commercial insurance industry has responded to GEC via its risk-managing activities. It examines how the insurance industry mainly continues to try to manage risk by incentivising others to manage theirs. It finds that insurers are stuck in a response focused mainly on trying to tweak their existing ways of engaging risk.

Chapter six explores how and why the commercial insurance industry has responded to GEC via its investment activities. It examines how insurers have responded to GEC mainly by investing in transformative technologies and by integrating ecological, social and governance principles into their existing investment portfolios. It finds that many of the earlier theorists failed to appreciate the challenges associated with leveraging their investment portfolios as risk management tools.

Chapter seven concludes the thesis, by bringing all the findings together, presenting some thoughts and proposing some direction for future research.

Conclusion

This thesis sets out to explore how and why the commercial insurance industry has responded to GEC, in the way that it has, and what consequences this has for advancing our understanding of the relationship between the industry, the Anthropocene and the frontier barrier of the risk society. It explores this in the context of the insurance industry's primary activities as a risk carrier, risk manager and as an investor.

The study conducted a collective case study of a wide array of insurance industry stakeholders, in both South Africa and Europe, using in-depth interviews and extensive documentary analysis. Its findings predominantly contribute to extending knowledge within the risk society and the insurance and GEC literatures.

CHAPTER TWO - RISK, INSURANCE AND GLOBAL ENVIRONMENTAL CHANGE

Introduction

Over the past two decades there have been increasingly loud and persistent warnings by scientists that Earth's physical landscape is changing rapidly and possibly irreversibly (IPCC 2007, p. 2013). It has been strongly argued that one of the main reasons for these changes is the impact that humans have had on Earth's ecological systems (Steffen et al. 2007). So significant has been this impact of social systems on Earth's ecological systems that a recent study found that humans and their domesticated animals now constitute 90% of the planet's entire mammalian biomass; up from 0.1% just 10,000 years ago (Science 2011).

One term proposed to characterise this change is the *Anthropocene* (Crutzen 2002). It accounts for the significant impact that social systems have had on the Earth's ecological systems (including nitrogen, carbon and phosphorus), which have effectively shifted the planet away from its previous interglacial state, the Holocene (Greek for '*entirely recent*'), into the Anthropocene (*the age of humans*) (Steffen et al. 2007).

Some of the most profound changes in the Anthropocene are associated with global environmental change (GEC), particularly linked to the sharp rise in anthropogenic greenhouse gas (GHG) emissions that has occurred since the start of the industrial revolution and the onset of globalisation (Hester & Harrison 2002; Matten 2004). This has caused Earth's climate to shift, which, in turn, has led to increased exposure to larger and more frequent weather-related events.

Today more than 60% of Earth's ecosystem services - which social systems are dependent upon as they act as crucial buffers to extreme weather-related events - are heavily degraded (IPCC 2013; Millennium Ecosystem Assessment 2005). One indication of the severity of this is the rate at which species loss has accelerated in recent decades, leading to suggestions that

we may be experiencing the sixth great extinction on Earth (Leakey & Lewin 1996).

Consequently, the Anthropocene is increasingly being associated with unprecedented levels of societal risk, with some commentators going so far as to label contemporary society as the *Risk Society* (Beck 1992; 1999). It is therefore increasingly important that society finds a way to cope with the higher levels of risk it is facing.

One solution is the global insurance industry. As 'society's primary financial risk manager' (Hecht 2008, p. 1959) the role of commercial insurance has become so important in recent decades that it now accounts for almost 7% of global GDP, turning over in excess of US$ 4.3 trillion in annual premiums (The Geneva Association 2011; Staib & Bevere 2011). This makes it, comfortably, the largest industry in the world, larger than the global defence, oil, electricity generation and pharmaceutical industries (Phelan, Taplin, et al. 2011).

At its core, the insurance industry engages in three primary functions. As a risk carrier it protects communities from *sudden and unexpected* loss by helping them to transfer exposure to those better adept at managing it (Hecht 2008; Arena 2008). It then combines this risk, to create larger pools of risk that it then diversifies widely across time and space and via the use of a range of different mechanisms, such as reinsurance.

Insurance is also a manager of risk. This is done both directly, by encouraging its clients to mitigate their own risk exposure, via the use of excesses and deductibles, or by lobbying governments to manage risk (Centre for Responsive Politics n.d.).[1] There is also a long history of insurers directly managing risk, such as offering support for fire-fighting services or even in the seeding of hail clouds (Wilkins 2010; Ericson & Doyle 2004).

Lastly, with over US$ 19.8 trillion invested in the financial markets, the insurance industry is the third largest institutional investor, providing it with a

[1] Between 1995 and 2013, insurance on average has been the 2nd largest spender on lobbying in the US, the first being the pharmaceutical industry

2 These are, in order of total economic losses: the earthquake and tsunami in Japan (2011); Hurricane Katrina, US

significant degree of economic presence within the global financial markets (Leggett 1993; Paterson 2001; Maslakovic 2011; Mills 2009a).

Consequently, the insurance industry has become key in helping to promote financial stability, support trade, commerce and entrepreneurial activities and relieve pressure on government budgets that could otherwise be spent on other, more pressing, activities. This accounts for the direct correlation that exists between insurance, economic development and growth (Ward & Zurbruegg 2005; Liedtke 2007; Brainard 2008).

Risk Society

In his widely debated thesis, the late Ulrich Beck characterises contemporary society as the 'risk society' (Beck 1992). This refers to the rapid advances society has made in globalisation, individualisation, gender revolution, underemployment, but also, most importantly, linked to the emergence of global risks that are increasingly being defined as being out of control (Beck 1999, pp. 1–2; Giddens 1999; Ekberg 2007).

Of particular concern is that these new global risks are not a consequence of natural causes - these have always impacted society - but are instead increasingly 'unnatural, human-made, manufactured' (Beck 2002, p. 41). This means they can no longer be seen as the product of fate (i.e. an act of God) but instead are now understood to be self-generated by human activities (Beck 1992; 1999). They are inherently linked to the significant progress society has made in developing the science and technologies that have come to define the risk society (Giddens 1999).

However, these risks are not the result of a failure in science and technology, but are instead an unintended consequence of them. They are the side-effect of a quest for a better and safer quality of life, attempts to control health and environmental hazards and to try to ensure that safety, security and survival can be maintained on our planet now and into the future (Ekberg 2007, p.357). The result, however, is that the world has effectively become 'one big laboratory', with new technologies being introduced at a rate far faster than their impacts can be established (Arnoldi 2009, p.181).

Classic examples of such risks include nuclear energy, international terrorism, genetic engineering and climate change. More specific catastrophes include the DDT crisis, Three Mile Island, Bhopal, BSE (commonly known as Mad Cow) disease and the 9/11 terrorist attacks (Beck 1999; Hoffman 1999; O'Malley 2003; Hutter 2010). Asbestos provides a particularly good example of debounded risk precisely because it was once a substance 'so ubiquitous because it prevented harm' (Baker 2002, p.352). Its fire retardant properties led to it being widely used for fire protection, its insulative capacity was ideal for use in boilers and it was even used in the manufacture of vehicle brake pads (Gee & Greenberg 2000). Yet many of the early health-related warning signs, associated with asbestos, went unreported, in particular the sharp increase in lung and mesothelioma cancers and (what is now known as) Asbestosis. It was only in 1998 that the EU finally banned asbestos and introduced laws to govern its removal (Gee & Greenberg 2000). However, by then it was too late and the effects of asbestos are now expected to result in over 400,000 deaths by 2030 (Baker 2002, p.351; McClatchy DC 2010). The liability claims associated with the 'asbestos crisis' has led to it becoming the largest insurance loss of all time. Claims in the United States have already exceeded US$ 65 billion, while in the European Union claims are expected to exceed € 400 billion (US$ 500 billion) (Ericson & Doyle 2004; Gee & Greenberg 2000). It has already led to some insurance companies, including *Lloyds of London*, coming close to bankruptcy (The Telegraph 2011).

These new type of risks are referred to as *debounded,* as, in the case of asbestos usage, they transcend traditional nation-state boundaries, impact across increasingly long time-frames and raise significant questions around issues of liability, accountability and responsibility (Beck 1992; 1999; Giddens 1999). In so doing, debounded risks have managed to 'abolish the four pillars of risk calculus' (i.e. compensation, limitation, security and classification), which means that planning for them is almost impossible (Beck 1992, p.102). This has focused attention on the responsibility of individuals, organisations and communities to start embracing their exposure to debounded risks (Ekberg 2007).

Insurance and Risk Society

For Beck the question of insurability is a pivotal indicator as '[i]t is the insurance companies which operate or mark the frontier barrier of Risk Society' (Beck 1999, p.77). This is the point at which risks shift from being predictable and calculable (i.e. bounded), to unpredictable and incalculable (debounded).

Being at the forefront in the use of statistical technologies to help it assess and manage risk, the insurance industry only insures that which it can calculate through scientific expertise. Everything else lies 'beyond the insurance limit' (Beck 1992, p.88). Consequently debounded risks are incompatible with insurability as they are statistically infrequent and have exceptionally high and long-tailed impacts (Kunreuther 2009; O'Malley 2003). In the example of asbestos, the material is hard to identify and fully remove, the majority of victims will stretch across future generations and the financial costs associated with managing it may be almost limitless. In Beck's words:

> Controversial industries and technologies are often those which not only do not have private insurance but are completely cut off from it. This is true of atomic energy, genetic engineering (including research), and even high-risk sectors of chemical production. (Beck 1999, p.31)

Thus one would conclude that as the impact of debounded risks continue to rise, a corresponding retreat by the global insurance industry is likely to occur. Indeed, there has already been a shift towards more large-scale catastrophic events impacting the insurance industry in recent times and the response by the industry has been well documented (Bougen 2003; Ericson & Doyle 2004; O'Malley 2003; Froot 1999).

However, some theorists have raised a number of concerns with Beck's emphasis on the role of commercial insurance as marking the boundary line between what is calculable with economic precision and not (Bougen 2003; Ericson & Doyle 2004; O'Malley 2004; Collier 2008; Phelan et al. 2008b; O'Malley 2003). This includes concerns that Beck made many of his claims based on a dearth of empirical evidence on just how the insurance industry was responding to debounded risks, which prompted calls to chart the variety of ways in which catastrophic risks were being governed by insurers within

this new environment (R. Ericson & Doyle 2004; Bougen 2003; O'Malley 2003).

While an improved empirical understanding of commercial insurance has subsequently emerged, it is one that has focused on trying to understand the relationship between the insurance industry and international security (i.e. terrorism), insurance and *individual* environmental catastrophes, and its primary response in developing novel ways of responding to these threats (R. Ericson & Doyle 2004; Bougen 2003; O'Malley 2003; O'Malley & Roberts 2013; Collier 2008; Baker & Simon 2002).

Some of these studies have started to paint a picture of an industry that, contrary to Beck's assertions, has always been selective about which risks it assumes (R. Ericson & Doyle 2004; Bougen 2003; O'Malley 2003; Baker & Simon 2002). Insurance has a long history of excluding certain risks, creating special insurance arrangements (such as alternative risk transfers) that connect the insurance market to the financial markets and even partnering with governments to share exposure to what would otherwise be uninsurable perils (such as in the case of flooding, unemployment and in the early stages of aviation) (R. Ericson & Doyle 2004; Herweijer et al. 2009).

These empirical studies also highlight a long history of commercial insurance even insuring the uninsurable, often via the use of highly idiosyncratic methods to help improve their ability to assess and manage even those risks that have a particularly weak connection to statistical analysis. Often they rely on non-scientific forms of knowledge that are 'intuitive, emotional, aesthetic, moral, and speculative' (Collier 2008, p.224; R. Ericson & Doyle 2004). The industry developed, for instance, ways to model natural catastrophes and terrorist attacks as far back as the 1970s (Friedman 1984). The aim of these models was to improve insurers' ability to both spread and diversify its risk exposure (Anderson 1990; Jaffee & Russell 1997; Bougen 2003).

The state is crucial in helping to maintain the insurability of some perils, such as when the Australian government redefined certain droughts as *manageable risks*, rather than *natural disasters*, effectively transferring responsibility for managing them away from the state and over to the potential

victims; to the ultimate benefit of commercial insurance (Higgins 2001). Similarly, the built environment only became insurable once adequate regulations were established that allowed underwriters to take for granted certain basic assumptions regarding construction (O'Malley & Roberts 2013). Even nuclear energy, so central to Beck's insurability thesis, has been found to be insurable when the state agrees to cap the absolute losses the industry may face (Collier 2008; Ericson et al. 2003; Jaffee & Russell 1997).

The state also helps to stabilise insurance by making cover mandatory, thereby reducing the threat of moral hazard (when clients become less risk averse once they know they are adequately covered) or adverse selection (when clients seek insurance only when they know their risk exposure to be particularly high) (Baltensperger et al. 2007; Lorent 2008; Meier 1991; Baker 1996). Examples include obliging car owners to maintain adequate insurance cover, employers to purchase employee compensation insurance or businesses to secure surety bonds prior to commencing any work with the state (Lobo-Guerrero 2011; Baker & Simon 2002).

This all creates an understanding of commercial insurance that has often had to reconfigure itself in the wake of catastrophic events, such as following the 9/11 terrorist attacks in the United States and after Hurricanes Andrew and Katrina (Friedman 1984; R. Ericson & Doyle 2004). Consequently actuarialism should be regarded more as an *art* than a *science* (Collier 2008).

This apparent flexibility has led to the role of commercial insurance becoming far greater than at any other time in history, highlighted by the sheer number of people now insured, the range of risks underwritten and the amount provided in compensation. This suggests that society is inhabiting an '*insurance state'*, where the mantra of 'more insurance for more people' contrasts with Beck's suggestions of a retreat by commercial insurance (Baker 2002, p.350; Ewald 1986).

What is therefore apparent is the need for more empirical evidence of just how the commercial insurance industry is responding to other types of debounded risk. This is based on the fact that although the risk society literature provides an excellent framework for understanding the relationship

between insurable and uninsurable risks, there is a general lack of consensuses about whether the industry is indeed a good indicator of the risk society's frontier barrier.

Insurance & Global Environmental Change

Of all the contemporary risks, global environmental change (GEC) is arguably one of the risk society's most emblematic (Beck 2010). It accurately fits the definition of a debounded risk, as its cause stems from the anthropogenic release of GHGs and its subsequent impacts spread extensively across time and space. Indeed, knowledge of it is only possible as a result of human's significant progress in science and technology (Bulkeley 2001).

Insurance losses, attributed to GEC, have been increasing by about 2% per annum since the 1970s (Ward et al. 2008). In real US Dollar terms, the total decadal economic cost of natural catastrophes has risen from US$ 528 billion between 1981-1990 to over US$ 1,230 billion between 2001-2010 (Kunreuther et al. 2013).

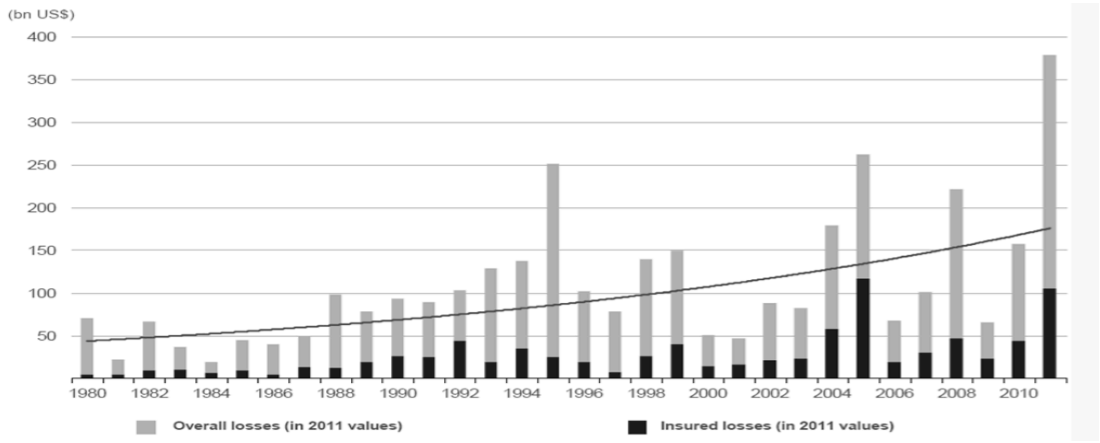

Figure 1: Natural Catastrophes Worldwide 1980–2011. Overall and insured losses. (Munich Re 2012)

Five of the costliest natural disasters ever recorded have occurred in the past decade alone (The Economist 2012).[2] In particular, Hurricane Andrew in 1995, and Hurricanes Katrina and Wilma in 2005 were watershed moments for the global insurance industry, causing unprecedented losses of US$ 16 billion and US$ 120 billion, respectively. Andrew alone wiped out the insurance

2 These are, in order of total economic losses: the earthquake and tsunami in Japan (2011); Hurricane Katrina, US (2005); Sichuan earthquake, China (2008); Hurricane Ike, US & Caribbean (2008); and Niigata Earthquake, Japan (2004).

industry's entire underwriting profits for the previous 20 years, leading to an increase in insurer insolvencies over that period (Santomero & Babbel 1997a; Haufler 2009).

Yet while these individual catastrophes are of concern, it is the steady rise in annual average losses that is most alarming. These have risen from less than US$ 50 billion per annum in 1980, to almost US$ 175 billion by 2011. Today, commercial insurance is responsible for absorbing over 40% of the cost of natural disasters in industrialised countries (The Economist 2012).

The threat insurance faces from GEC is being exacerbated by the fact that their catastrophe models are proving increasingly unreliable in helping them to predict the occurrence and scale of these perils, based on their low frequency yet high impact (Kunreuther et al. 2012; Friedman 1984). Consequently, by 1995, most of the world's leading insurance and reinsurance companies had already voiced concerns that GEC was fast becoming uninsurable, that it risked bankrupting the industry and that future cover may only be available after considerable restrictions were imposed (Leggett 1993; Paterson 2001; Mills 2009a; Berz 1999; Bougen 2003). A number of reports have even identified GEC as the primary threat facing the insurance industry over the coming century, with fears that it could lead to liabilities easily exceeding that of the asbestos crisis (Ernst & Young 2008b; Lloyd's 2006; Mills & Lecomte 2006).

Adaptation or Mitigation

Given that insurers have long been described as having the most to lose, due to GEC, some commentators have suggested that this should motivate the industry to become more proactive in addressing its exposure (Mills 2009a; Mills 2012; Liedtke et al. 2009; Gelbspan 1998).

In the early 1990s, Jeremy Leggett, then head of Greenpeace, encouraged the insurance industry to become more engaged in global climate politics (Leggett, 1993; Paterson, 2001). He argued that the industry had three options as to how it could respond. First it could opt for a business-as-usual approach, hoping the impacts of GEC were only temporary. Second, the industry could overhaul its business activities by promoting co-insurance,

withdrawing from high-risk markets and applying deductibles where the threat of loss was most uncertain. Third, it could strategically influence the markets in which it was operating, via lobbying, to achieve the cuts in GHGs necessary for reducing risk over the long-term.

It was this last option that Leggett promoted. He suggested that it could help to directly address the root cause of GEC, given that viable insurance markets would become increasingly rare as the impacts of GEC continued to intensify. With over US$ 25 trillion invested in the global markets, Leggett argued that insurers could promote the mitigation of GHG emissions by strategically disinvesting their financial assets from the most polluting industries and investing instead in support of new, greener economies (Maslakovic 2011; Leggett 1993; Mills 2012). This would help to reduce GHG emissions and ultimately lessen the future impact of GEC. Leggett also suggested that any loss of income insurers may face, due to disinvesting away from traditionally more profitable, carbon-intensive investments, would be more than compensated for by a reduction in claims over the long-term (Leggett 1993). Therefore insurers had the potential to become 'the most powerful counterbalance to the fossil fuel companies and their allies' and thus lobbying them was the only viable solution for addressing GEC over the long-term (Paterson 1999; Leggett 1993; Gelbspan 1998).

Another, more recent study, identified how human-induced changes to the local physical landscape 'can have an equal or greater effect' on the impact of GEC-related losses than climatic changes alone. Flooding, for example, was found to be as much influenced by deforestation, land-surface hardening or the mismanagement of storm-water drains, than by increasing levels of rainfall (Nel et al. 2011; UNEP-Fi 2011). This resulted in the *Eden Study* calling on insurers to mitigate their exposure to GEC by proactively managing the systemic (or proximate) drivers of risk impacting their underwriting portfolios (UNEP-Fi 2011). This included engaging the stakeholders that contributed to these proximate drivers of risk, including municipalities, landowners and forestry companies.

However, examples of insurers disinvesting their financial assets away from the more polluting industries, as proposed by Leggett, or engaging the

proximate drivers of climate risk, as proposed by the *Eden Study*, have remained largely at the fringe of insurer's business activities (Mills 2009b; Paterson 2001; Leurig & Dlugolecki 2013). Instead, their response to GEC has been described as leaning more towards Leggett's second option (i.e. reshaping their business activities) with claims that the industry has been strongly adaptive (of its own business activities) and only weakly mitigative of the broader drivers of GEC, such as GHGs (Phelan, Henderson-Sellers, et al. 2011; Phelan et al. 2008b; Paterson 2001).

Summary

As the term implies, the 'risk society' has introduced risks that are increasingly being regarded as the unintended consequence of human's remarkable progress in science and technology. For Beck, the commercial insurance industry, which relies on statistical sciences to help it predict and quantify its risk exposure, effectively demarcates the frontier of the risk society.

Yet there are concerns with these claims. Some argue that Beck framed them without enough empirical knowledge of how the industry actually responds in the face of debounded risk; that the industry has always been selective about which risks it underwrites; and that many of the risks Beck claimed to be uninsurable, in fact often are insured. This increases the uncertainty around what is happening at the frontier of the risk society and what role commercial insurance actually plays.

In recent decades, GEC has emerged as one of the most emblematic of the risk society's debounded risks. This is based on the scale of its temporal and geographical impacts and growing unpredictability. Consequently, many commentators have suggested that the insurance industry should be well motivated to respond to GEC, particularly in taking a more proactive (i.e. mitigative) approach to managing its drivers at both the global (i.e. GHGs) and local (i.e. proximate drivers of risk) level. However, most agree that the main response by the insurance industry has been more adaptive, of its own business activities, than mitigative. This raises questions as to why this is the case?

Thus, if GEC poses such a threat to the commercial insurance industry, and that supporting a more mitigative response could help to manage their exposure over the long-term, this raises questions as to why commercial insurers have not been more mitigative in managing the drivers of GEC.

Insurers Response

As has already been described, the response by the global insurance industry, to GEC, has been more adaptive than mitigative. This raises questions as to how and why the commercial insurance industry has actually been responding to GEC (Phelan, Taplin, et al. 2011).

The 'how' aspect of these questions has been well documented by a variety of academic and industry commentators who have helped to paint a picture of an industry responding to GEC via a 'multi-level approach' that spans all three areas of the industry's activities; as risk carriers, risk managers and as investors (Wilkins 2010; Mills 2009a; Mills 2012; Mills 2005; Mills & Lecomte 2006; The Geneva Association 2012; ClimateWise 2012; UNEP Finance Initiative 2013; Leurig & Dlugolecki 2013).

As Risk Carriers

Since the 1970s, insurers have invested substantially in trying to improve their understanding of GEC, how its future impacts are likely to affect them and how best they should be responding (Changnon et al. 1997; Kunreuther 2009; Mills 2009b; Herweijer et al. 2009; Friedman 1984). Today, most of the largest insurers and reinsurers – including Munich Re, Swiss Re and Allianz – have established dedicated in-house research units tasked specifically with coordinating a wide variety of GEC research (e.g. Allianz Group & WWF 2006; Swiss Re 2012a; Lloyd's 2008). This has led to many research partnerships emerging between insurers and a number of organisations including the Intergovernmental Panel on Climate Change (IPCC), the Resilient Coasts Initiative and the Institute for Business and Home Safety (Herweijer et al. 2009). They have also sponsored an array of 3rd party research projects, such as a polar expedition to measure the thickness of the

polar ice caps and another mapping the health of the world's coral reefs (Insurance Journal 2013; Loubières 2010; UNEP-Fi 2011; Triple Pundit 2014).

A particular subset of this research has seen insurers try to improve their ability to model GEC so as to integrate a better understanding of its likely impact on insured assets (Mills 2009a; Kunreuther & Michel-Kerjan 2007; Mills & Lecomte 2006; Mills 2012). This reflects a belief that models are invaluable for helping underwriters to assess risk by creating actual, usable data that they can work with and that compliments their actuarial models (ClimateWise 2012).

The findings of all this research have been widely published. This includes via insurer's own in-house distribution channels and via the various industry and national associations to which they have aligned themselves, including the Geneva Association, the UNEP-Fi, ClimateWise and the Association of British Insurers (ABI) (Lloyd's 2012; Swiss Re 2013; Allianz Group & WWF 2006). The large reinsurers now publish annual catastrophe reports that assess the ongoing impact of GEC environmentally, economically and in relation to the insurance industry (e.g. Guy Carpenter & Company 2013; Swiss Re 2014).

The primary purpose of this research has been to try to improve insurers' response to GEC by tightening the conditions under which they underwrite assets exposed to GEC (Berz 1999; Changnon et al. 1997; Mills 2012; Sturm & Oh 2009; Seifert & Lindberg 2012). This has seen them increase premiums, make more use of excesses and deductibles, withdraw from the highest-risk markets and start to identify ways to diversify their risk exposure (Seifert & Lindberg 2012). This begins to explain why, following major catastrophes, the industry is often characterised by consolidations, mergers, restructurings and reconfigurations (Bougen 2003; R. Ericson & Doyle 2004; Sturm & Oh 2009).

However, insurers are also using their research to realise the 'enormous opportunit[ies]' GEC presents, such as increasing consumer demand for innovative products and services (Mills 2012; Mills 2009b; St. Clair Knobloch & Leurig 2010; Guy Carpenter & Company 2013; Haufler 2009). The renewable energy industry, for example, now expected to be worth in excess of US$ 225 billion by 2016 has resulted in over 65 new insurance product

lines being introduced (Mills 2012; ClimateWise 2012). Other new products are offering insurance for energy-efficiency installations, green-buildings, low-emission vehicles and the liabilities associated with new technologies, such as carbon capture and storage projects (Mills 2009b). Demand for environmental liability cover is also growing, especially among many of the blue-chip companies increasingly concerned by their exposure, and that of their directors, to GEC (Dlugolecki 2004; Seifert & Lindberg 2012; Aon Benfield 2012; Chow & Egan 2012).

Given the catastrophic nature of some GEC perils, insurers have also started to innovate new ways to help spread and diversify their risk exposure (Leurig & Dlugolecki 2013; Changnon et al. 1997). The most significant has been the emergence of catastrophe-financing instruments (such as Catastrophe-Bonds, referred to as CAT Bonds) that effectively spread underwriting risk out across the financial markets (Bougen 2003; Sturm & Oh 2009). These *CAT Bonds* have proven highly popular with both insurers and the financial markets, with demand for them having almost quadrupled in worth, being US$ 4 billion at the start of the century. Expectations are it will quadruple again over the coming decade (The Economist 2013; Bougen 2003; Leurig & Dlugolecki 2013).

As Risk Managers

As risk managers, insurers have focused predominantly on trying to incentivise their clients to adapt to or mitigate the various GEC threats their assets face (Seifert & Lindberg 2012). This is mainly achieved by changing the conditions (i.e. price, deductibles, excesses etc.) under which they agree to provide insurance (see risk carrying).

To support this process, insurers have launched various education campaigns to share their research via the use of newsletters and circulars and via other forms of digital communication, including websites and social media (Ward et al. 2008; Wilkins 2010; ClimateWise 2012; Leurig & Dlugolecki 2013). Some have even partnered with educational institutions; for instance Marsh, the United States largest insurance broker, partnered with Yale University to help

educate corporate board members on their fiduciary responsibilities in relation to GEC (Herweijer et al. 2009).

Some of the larger (re)insurers have even started to offer risk consultancy services directly to their clients, aimed at both promoting risk management practices and helping to generate additional sources of income (Liedtke et al. 2009). Swiss Re's CATNetTM program, for example, offers clients an online global natural hazard mapping tool that provides them with information on a wide variety of environmental perils (Liedtke et al. 2009; Swiss Re 2012a). AIG similarly offers consulting services for rating agencies, project developers and businesses associated with the carbon markets (Mills & Lecomte 2006).

As the global public sector is exposed to the risk of US$ 1.3 trillion of potential flood losses, and US$ 115 billion of possible agricultural losses, this makes the state *the insurer of last resort* (Mills 2012; Huber 2004). Insurers believe that the state is often best placed (and most motivated) to manage many of the threats associated with GEC, particularly some of the more ambiguous risks it presents (Brieger et al. 2010).

This includes improving regulations (e.g. building codes), investing in infrastructural improvements (e.g. flood defences), managing competition pressures (e.g. minimising the threat of destructive competition), promoting levels of climate-risk disclosure and providing subsidies or tax incentives where the cost of insurance is higher than the insured can afford to pay (Kunreuther 2006; Niehörster et al. 2013; Crichton 2008; Warner et al. 2009; Liedtke et al. 2009; St. Clair Knobloch & Leurig 2010; Kunreuther et al. 2012; Kleindorfer & Kunreuther 1999).

Indeed, there is a tacit acknowledgement that in many instances, insurance may only remain available once other stakeholders, such as governments, become more involved (Crichton 2008). This accounts for why the state has emerged as such an essential player in supporting catastrophe insurance markets. Flood risk is a classic example of this, particularly in high-risk areas like the Netherlands (Botzen & Van Den Bergh 2008; Botzen & van den Bergh 2009; Jaffee & Russell 1997).

Insurers often contribute their research in support of this (Mills 2009b, p.47). The formation of ClimateWise and the UNEP-Fi were both attempts by the industry to form a more cohesive voice for engaging in the global governance debate (Phelan, Taplin, et al. 2011). The role of national industry associations, such as the Association for British Insurers (ABI), the South African Insurance Association (SAIA) and the National Association of Insurance Commissionaires in the United States (NAIC) also play a central role in lobbying their respective governments around GEC (Association of British Insurers 2010a; SAIA 2013; NAIC 2008).

This has led to the emergence of a number of public-private partnerships (PPPs) that focus on disaster risk reduction or post-disaster recovery (UNEP Finance Initiative 2013). The Canadian insurance industry, for example, supported its government to seed hail clouds, prior to them reaching urban areas, while a partnership between the insurance industry and the UK government resulted in the construction of flood defences in the most vulnerable parts of Britain, in exchange for the continuation of flood cover (R. Ericson & Doyle 2004; Herweijer et al. 2009). In 2004, the Insurance Australia Group (IAG) partnered with the local government in New Zealand, providing them with risk models to help them adequately plan against flood risk (Herweijer et al. 2009). Some insurers have even been developing early warning systems to inform both their clients and local emergency responders, of impending natural perils. The hope is that this will provide the necessary parties with enough time to adequately protect their assets from loss (Maynard 2008; Guy Carpenter & Company 2013). However, engaging the public policy process is still felt to be nowhere near its full potential (Mills 2009b).

A third and final way insurers have been responding to GEC is in leading by example. This includes improving levels of in-house sustainability, reducing resource consumption and production of waste, sourcing renewable energy supplies, occupying sustainable (green) buildings and engaging their supply chains around improving their own levels of sustainability (Mills 2009b; ClimateWise 2012; Leurig & Dlugolecki 2013). By 2012, at least 26 insurers

had already achieved carbon neutrality or made firm commitments to doing so (Mills 2012).

This coincided with a steady increase in the number of insurers disclosing their sustainability information, or participating in a variety of surveys, with organisations ranging from ClimateWise and the UNEP-Fi PSI to the Carbon Disclosure Project (CDP) (Mills 2012; Phelan, Taplin, et al. 2011). ClimateWise recently reported that almost 82% of its members were now compliant in meeting their disclosure requirements, while the CDP has seen a 74% disclosure rate among insurers aligned with its reporting requirements (ClimateWise 2012; Mills 2012).

There has also been increased activity in the number of insurers leveraging their CSR/CSI budgets in response to GEC (ClimateWise 2012). This includes Progressive's support for the X-Prize, which offered a substantial reward for the development of the first 100-mpg car (Progressive Insurance Automotive 2010). Tokio Marine & Nichido's reforestation of over 8,200ha of mangrove swamps, across south-east Asia, arguing this helps to create a carbon sink, generates employment and helps to build future protection against storm surges (Mills 2012; Tokio Marine Holdings n.d.).

As Investors

Insurers' investment portfolios have become increasingly important, both as an additional source of income and in helping them to diversify and spread their risk exposure. Yet recent attention has focused on how many of the risks insurers' face do not just stem from their underwriting activities, but increasingly from their investment portfolios (Frey & Karl 2010).

Consequently, insurers have started to pay far more attention to the impact of GEC within their investment portfolios, albeit mainly from a sustainability perspective. They are concerned with both the direct impacts (such as climate-related losses) and indirect impacts (such as how future mitigation or adaptation measures might impact these businesses) (Herweijer et al. 2009).

Lloyd's of London offered two strategies insurers could use to improve the resilience of their investment portfolios in responding to GEC. The first was to

avoid ‘companies that are major carbon dioxide emitters’ (i.e. to disinvest), while the other was to use voting rights to exert influence over the companies in which insurers are already exposed and to encourage them to improve their sustainability (Maynard 2008, p.143).

Acknowledging, and accounting for GEC in their investment strategies is a crucial feature of the various principles to which insurers have aligned themselves. This included the UN Principles for Responsible Investment (UN PRI) and the ClimateWise Principles (Herweijer et al. 2009). These call on insurers to engage the companies over which they have influence and to monitor and report publicly on the impact these businesses have with regard to sustainability (Newell and Paterson, 2010 in Phelan 2011; Phelan 2011). Thus insurers are beginning to actively encourage the companies they are invested in to adopt environmental, social, and governance (ESG) factors into their business strategies and to disclose their progress to the broader market (Dlugolecki 2009; ClimateWise 2012; Mills 2012).

However, besides engaging their portfolios, insurers have also been active in directly financing a wide variety of environmentally sustainable projects. The most popular, given their low-risk yet high yields, has been the US$ 23 billion insurers have invested in renewable energy projects in recent years (Mills 2009b; ClimateWise 2012; Mills 2012). Arguably the most ambitious renewable energy project to date was Munich Re’s Deserttec Foundation, which it co-founded in 2009 (Liedtke et al. 2009). Aimed at connecting Europe with North Africa this giant engineering project sought to generate in excess of 15% of Europe’s entire 2050 energy demand, via a complex network of concentrated solar and wind energy plants stretching the length and breadth of the Sahara and fed back into the European electricity network through a series of high-voltage undersea power cables. The project partners included some of Europe’s largest engineering firms, financial institutions, technology companies and governments. However, since the 2011 Arab Spring, the focus of Desterttec shifted towards a more global network of renewable energy generation and distribution.

Insurers have invested a further US$ 5 billion indirectly in transformative technologies, via dedicated ‘green’ funds, such as Allianz’s Global EcoTrends

Fund and AXA's Clean Tech Fund (Mills 2009b). In 2007, Swiss Re announced their role as anchor investor in the US$ 446 million UN-accredited 'European Clean Energy Fund' that provided start-up capital to companies offering environmental benefits or that generated carbon credits (Liedtke et al. 2009).

Summary

In all three areas of its business, insurers have responded to GEC in ways that can be described as more defensive, focused on tightening the conditions under which they underwrite risk rather than proactively managing the systemic drivers of it. In terms of risk assessments, insurers have been investing in trying to better understand the threat GEC presents. With regard to risk management they have been active in trying to encourage their clients, governments and other stakeholders to manage risk and have explored ways to improve their own levels of in-house sustainability. Progress has also been made in engaging their existing investment portfolios around ESG, with some limited investments being made, directly and indirectly, in new technologies that offer the potential for financial returns. However, most of these responses are indeed more adaptive, of their own business activities, than mitigative.

Explaining the Response

Although GEC presents insurers with risks they can no longer ignore, and that proactive mitigation of its drivers has been presented as the most viable, long-term solution to managing the threat, this still raises questions as to why commercial insurers continue to respond in ways that are predominantly adaptive. A number of reasons have been suggested as to why this is the case.

Scientific Uncertainty

GEC remains 'poorly understood, endogenous, collective and irreversible' (Tol 1998). Consequently, insurers often lack faith in even their own research, as it struggles to account for the varying complexity and impacts GEC is having in different parts of the world and across varying insurance markets. This uncertainty includes *micro-correlations* (i.e. the knock-on impact of climate

events, like El Nino), *fat tail distributions* (i.e. extreme events occurring in order of magnitude greater than the last) and *tail dependence* (i.e. catastrophes that coincide, such as a hurricane followed by flooding) (Kousky & Cooke 2010; Seifert & Lindberg 2012). Some studies have even suggested that there is no clear correlation between GEC and increased insurance losses, as natural disasters are often too hard to define or not enough time has passed for their threat to be fully accounted for within insurers' underwriting models (Bouwer 2011; Tol 2013).

There is also uncertainty with regard to the correlated risks associated with GEC, such as natural catastrophes triggering economic downturns or impacting multiple types of business or lines of insurance, as happened following Hurricane Katrina in 2005 (Kunreuther & Michel-Kerjan 2007; Herweijer et al. 2009). As the industry continues to expand, the threat of economic ripple effects, spreading out across the broader industry, continues to intensify, even when the physical impacts of a catastrophe may be confined, geographically, to a specific region (Cummins & Venard 2008b).

This contributes to a fear among insurers of unintended consequences occurring from any response to GEC they might adopt (Mills & Lecomte 2006). These impacts might not only affect insurers' underwriting portfolios, but also their broader investment portfolios. This could be further compounded as insurers are then forced to draw on these depreciating investments, following a catastrophe, to help cover the cost of claims.

Operational Opportunities

GEC also presents the insurance industry with a variety of opportunities (Botzen et al. 2009). Conversely, in some instances, GEC has been found to actually reduce insurers' exposure to risk, particularly in certain lines of health and life insurance, but also regionally, such as with agriculture in some high-latitude parts of Canada and northern Europe (ibid). GEC has even been found to create opportunities for the industry more broadly, including a correlation between the occurrence of natural disasters and increasing demand for insurance cover (Chang & Berdiev 2013)

It has also been claimed that there is ‘absolutely no doubt’ that some increases in GEC-related losses are also linked to a general growth of the insurance market, the mounting economic values of assets being underwritten and due to upwards inflationary pressures (Berz 1999, p.285). For example, while the economic cost of natural catastrophes, in the 1980s, was three times as high as those generated in the 1960s, insured losses were as much as five times as high (ibid).

Stakeholder Influence

Engaging the stakeholders necessary to respond to GEC has always proven to be a significant challenge for the insurance industry. Due to globalisation and the increasing commodification of the insurance industry, competition between companies has sky-rocketed in recent decades (Cummins & Venard 2008a). This is particularly the case in the more developed markets where insurance cover is now over-saturated and, in some instances, facing a decline (UNEP-Fi 2009, p.42).

Under such conditions, destructive competition is a cause for concern, with premiums being forced well below actuarially sustainable levels (Grace & Klein 2008). This influences insurers’ willingness to engage in long-term risk adaptation and mitigation activities due to concerns that by doing so this could benefit competitors as much as themselves. This not only encourages insurers to focus on tightening the conditions under which they insure assets, but also encourages them to manage risks as close to the point of the insured asset as possible, so as to reduce the likelihood of other insurers benefitting from any gains made (Baker & Simon 2002; The Geneva Association 2009; R. Ericson & Doyle 2004).

Levels of competition also create cyclical swings in the cost of insurance premiums and the profits insurers are able to make. This can impact the viability of an insurer’s underwriting portfolio, further increasing uncertainty and focusing attention on ways to spread and diversify risk rather than mitigate it (Cummins & Venard 2008b; Sturm & Oh 2009).

With globalisation, insurance is increasingly structured around reinsurance as a means of helping to spread and diversify its risk exposure (Cummins &

Venard 2008b). Yet while reinsurance is effective in helping to cushion the impact of catastrophes, it also has the tendency to raise its premiums or pull out of vulnerable markets, post-loss, and often at short notice (Sturm & Oh 2009). Primary insurers, however, are not able to simply pull out of markets as they are often constrained by geo-political boundaries, regulatory pressures or by other practical operational commitments, such as the need to protect their brand.

Clients have also proven to be difficult risk managers as they often embody a false sense of security around their risk exposure and even when they are motivated to respond, often lack the finances to do so (Baumann & Sims 1978; Kunreuther 2008; Crichton 2008). They present threats of *moral hazard* - where the client is less likely to manage risk after investing in insurance - and *adverse selection* - where clients only seek cover once they know their exposure to be particularly high (Meier 1991; Baker 1996; Baltensperger et al. 2007; Lorent 2008). In some cases, clients are even beginning to bypass insurance mechanisms altogether, particularly those who have previously struggled to gain adequate cover. Tokyo Disney, for example, placed US$ 200 million in the capital markets, via investment bonds, to help reinsure itself against the risk of earthquake losses (Bougen 2003).

The financial markets also place pressure on insurers to use their investment portfolios in certain ways, fearing that a loss of short-term investment profits would negatively impact the financial stability and profitability of an insurer. Given the presence of insurers' investments, across the financial markets, they often heavily influence the share price. Thus any attempt to sell shares on a significant scale, as proposed by Leggett, could cause share prices to dramatically fluctuate and further compound losses accrued over the short-term (Paterson 1999). This accounts for why insurers' engagement of their investment portfolios has tended to focus more on satisfying their shareholders, via dividend payments, rather than targeting longer-term risk management strategies (Beer & Nohria 2000).

Private rating agencies, such as Standard & Poor, Moody's or Fitch, also play a significant role in shaping how insurers engage their investment portfolios, as the assessments of such agencies are used by many other stakeholders to

evaluate the financial security of a particular insurer (Sinclair 2007 in Thistlethwaite 2011, p. 32). Maintaining a high rating is thus crucial for insurers, as being downgraded can impact their ability to raise capital, which, in the past, has led to an average loss of share price by as much as 66% (Mills & Lecomte 2006). Recently, ratings agencies have started to incorporate insurers' exposure to catastrophic losses, in the calculation of their credit rating (Kunreuther & Michel-Kerjan 2007). While this could be a motivator for insurers to become more proactive in managing GEC risk, it has also led to more uncertainty and ultimately conservatism by the industry.

The consequence of all this is that short-term stakeholder pressures appear to trump any benefits that may be attributed to mitigating GHGs over the long-term (Newell & Paterson 2001).

Regulation

In recent decades the insurance industry has become one of the most heavily regulated sectors in most modern economies (Klein 1995; Baltensperger et al. 2007; Klein 2012; Alemanno et al. 2013). This is because regulators have increasingly seen insurance as offering a range of regulatory risk management tools that complement their own. Insurers govern how people should act, who qualifies for protection, how to allocate blame and responsibility and help to develop systems of surveillance, monitoring and policing (Ericson et al. 2003). Thus the regulatory environment has rapidly evolved to maintain solvency, fairness, access, stability and - in some instances – to even protect the local industry or achieve other, more socially orientated, objectives (Meier 1991).

Inevitably, however, the regulatory environment has started to influence insurers' response to GEC by impacting the fundamentals of the insurance business model, forcing them to underwrite risk that is no longer *sudden and unexpected* (i.e. insurable) or that reinforces the cyclical pricing extremes inherent in the industry (Klein 1998; Liedtke et al. 2009; Guy Carpenter & Company 2010; Seifert & Lindberg 2012). Often this is because government regulators simply fail to appreciate or understand the full role the industry

plays as society's primary financial risk manager and the need to protect this (Paterson 1999; Hecht 2008).

Regulation is 'inherently a political process' and regulators often find themselves under intense pressure from a variety of stakeholders - such as property developers or their electorate - with other vested interests in keeping insurance premiums artificially low and widely available (Meier 1991, p. 700; Klein 2008). This can lead to regulators trying to co-opt insurers into becoming risk managers, often for short-term political gains (Grace & Klein 2009; Kunreuther et al. 2012). Following Hurricane Katrina, for example, regulators in Florida, under pressure from the local electorate facing sharply higher insurance premiums, forced the industry to maintain rates at well below sustainable levels. This led to many insurers withdrawing from the market, impacting not only their own operations, but also the vulnerability of local homeowners, many whom were left without adequate cover (Grace & Klein 2009).

In Europe, recently enacted laws introduced now prevent the use of gender as an actuarial classification (Mabbett 2013). Yet insurers have warned that this will significantly affect the accuracy of their actuarial calculations and, ultimately, transfer the cost of any uncertainty over to the consumer (Association of British Insurers 2010b). Just the fear of regulatory liabilities has been linked to why (particularly in the US) insurers have been responding so conservatively to GEC (Haufler & Walser 2006; O'Malley 2003).

Via the misguided provision of subsidies post-loss, the regulatory environment can lead to a *Samaritan's dilemma*, (or what is commonly termed a moral hazard) where communities become disincentivised to manage risk, as they believe other stakeholders, such as the state, will ultimately bear the cost (Kunreuther 2009; Jaffee & Russell 2013). As such, lobbying government for adaptation to GEC, rather than mitigation, is seen as more likely to lead to tangible results (Brieger et al. 2010). Even where regulators are motivated to mitigate GEC - such as in the case of small-island states increasingly at risk from sea-level rise - they often can't as their actual influence over the cause of the problem (i.e. GHGs) is often so small (UNFCCC 2009). These problems are particularly acute at the global level, where only a few countries are

responsible for the majority of GHG emissions. It's thus easier for regulators, like insurers, to focus on adaptation, locally, than mitigation globally (Brieger et al. 2010).

However, regulation has also been blamed for insurers' conservative response to their investment portfolios (Paterson 1999; Frey & Karl 2010; Doyle & Ericson 2004). This is because the regulatory environment often obliges insurers to use their investment profits to offset premiums, or limits the flexibility fund managers have in switching between different types of securities. In short, the industry is regulated to both maximise financial earnings, from its investments, and ensure that minimum levels of capital are held, in certain types of securities, to cover the costs of catastrophic events.

Insurance Paradigm

Finally, there appears to be a consistent theme that, although insurers feel that GEC presents a high degree of short-term uncertainty, it is yet to be fully recognised as presenting a threat for the long-term viability of the industry. This is because insurers believe they can change their policy prices far quicker than the risk of GEC can deteriorate (Tol 1998).

Thus it is both easier and quicker for insurers to simply reprice risk, on an annual basis. After all, being able to adjust premiums, often at very short notice, has always been a crucial tool that has helped the insurance industry to adapt to changes in the ever present risk environment (Maynard & Ranger 2011b). Short-term policies do not require insurers to commit to policies over which they have no control.

This begins to account for why so much investment has been made in developing new products and services, and by entering into new markets. For insurers, these represent the *lowest-hanging fruit*, as many of these new products are simply little more than bundling/repackaging of existing offerings (Mills 2009b, p.29). CAT-Bonds are one of the more classic examples of just how short-term the insurance industry has become, as it reflects a mentality of investing over the shortest of time scales (Bougen 2003).

Summary

Reasons why the insurance industry has been described as being more adaptive than mitigative of GEC include the uncertainty associated with it, the difficulty in engaging all the various stakeholders influencing the industry, the constraints placed on them by regulation and that insurers still believe the best way to manage GEC is by tightening the conditions under which they underwrite it. This paints a picture of an industry increasingly encouraged to respond to GEC via the traditional ways it has always engaged risk.

Conclusion

Beck's notion of the risk society, has led to considerable debate around his emphasis on the role that commercial insurance plays in demarcating its frontier barrier. Theorists have argued that not enough empirical research has been undertaken to support his claims, that insurers regularly insure the uninsurable and often employ a range of highly idiosyncratic risk assessment tools that take insurance beyond actuarial analysis, and allow the industry to be highly selective in which risks it underwrites.

This suggests that the demarcation of the frontier barrier of the risk society is far more complex and that it cannot simply be delineated by the availability of commercial insurance. Indeed, it is clear that a much broader array of stakeholders (including the state) now play a crucial role in shaping the insurability of many debounded risks.

GEC lends itself particularly well to helping to improve empirical understandings of the relationship between commercial insurance and the frontier barrier of the risk society. Insurers seem largely unprepared for its impacts, especially given that its threat is both genuine and growing and that current actuarially dominated risk assessment technologies are proving insufficient for helping to predict GEC over the long term.

While this has led to numerous calls for the industry to take a more systemic approach to managing its GEC exposure, the general response by the industry has been described as more adaptive, of its own business activities, than mitigative. As risk carriers, insurers have tightened the conditions under which they underwrite GEC risk, relying on their investments in research and

catastrophe modelling to help them do so. As risk managers they have tried to motivate clients and other stakeholders (such as the state) to take a more proactive stance in managing risk. They have also sought to improve the sustainability of their own business activities. Finally, as investors, insurers have started to invest directly in green technologies, particularly renewable energy, and engaged their existing investment portfolios around ESG principles.

Reasons why they have responding in predominantly adaptive ways is linked to the inherent scientific uncertainty around GEC, the actuarial (i.e. commercial) opportunities it produces via increasing demand for new products and services, the challenges associated with engaging third-party stakeholders collaboratively, various regulatory pressures, and an insurance paradigm that encourages a response as close to the status quo as possible.

However, more empirical research, of commercial insurance, is clearly needed to help better understand the nuance with which the industry is responding to GEC, why the industry is doing so and what this can tell us about the relationship between debounded risk and the frontier barrier of risk society.

Three overarching questions have emerged from the literature. First is that although progress has been made in developing an empirical understanding of the insurance industry's response to debounded risk, there remains a distinct lack of clarity on how and particularly why it is doing so in relation to GEC. This is particularly interesting from the perspective of an insurer, operating in the global south.

Second is why the insurance industry, even after acknowledging the unprecedented threat GEC presents, continues along a path focused more on adaptation than mitigation. This raises questions about what the actual relationship is between the insurance industry and the frontier barrier of the risk society.

The third raises questions about what is happening, besides commercial insurance, at the frontier of the risk society and what implications this has for

our understanding of how other societal institutions work. Based on these questions, this thesis seeks to answer the following:

1. How and why is the insurance industry responding to GEC via
    a. its carrying of risk?
    b. its management of risk?
    c. its investment activities?
2. What does this tells us about the relationship between commercial insurance, debounded risk, and the frontier barrier of the risk society?

CHAPTER THREE - THE RESEARCH METHODOLOGY

Introduction

The overarching aim of this thesis is to better understand how and why the global insurance industry has responded to GEC, in the way that it has, and what implications this has for our understanding of the complex relationship between commercial insurance, debounded risk and the frontier barrier of the risk society. However, given the size, complexity and interconnectedness of the global insurance industry, and the modest resources available for conducting this research project, designing a suitable study, that could produce the necessary answers, was crucial.

As such, an empirical research project was undertaken with the commercial insurance industry in both South Africa and Europe. This chapter outlines the methodological approach undertaken by this study, and accounts for how the research was collected via the use of a collective case study, using in-depth interviews and other types of documentary analysis. It also outlines some of the challenges faced and how these were overcome.

Theoretical Perspectives

Nodal Governance

In recent years, understandings of what it means to govern, and to be governed have evolved. No longer is governance seen purely in terms of top-down control, imposed by the state, but instead questions around regulation and control have increasingly started to look 'beyond the state' (Garland & Sparks 2000).

This led to the emergence of the notion of *nodal governance*, which sees the world in the more plural and dynamic way it is increasingly understood to be. Nodal governance regards all actors as nodes, and all nodes – regardless of whether they are state or non-state - as both potential governors or governed (Burris et al. 2005; Shearing & Wood 2003; Shearing 2006). While nodal governance emerged out of the policing and security literature, it is a lens that can equally be applied to most governance scenarios. Its assumptions include that no single node is ever able to achieve absolute control; that nodes do not

have to be formally networked in order to influence one another; and that nodes can easily cross a wide variety of scales, from the local up to the global (Wood 2006; Wood & Shearing 2007; Johnston 2006).

As the commercial insurance industry has been described as *the* institution of governance beyond the state, and interacts so closely with such a large and diverse cross-section of different actors - including clients, governments and the financial markets - insurance can be regarded as a critical node in relation to the governance of risk (Baker & Simon 2002; Ericson et al. 2003). In this light, the use of nodal governance lends itself particularly well to understanding how and why the commercial insurance industry has responded to GEC in the way that it has and accounts for why a nodal governance approach was adopted to frame this research study.

Qualitative and Quantitative Research

Qualitative research attempts to study human activities from the perspective of the social actors involved. It seeks to describe and understand things as they occur in their natural settings and attempts to make sense of, or interpret, phenomena in terms of the meanings respondents bring to them (Bryman 1988; Babbie & Mouton 2009, p. 270; Denzin & Lincoln 2011).

There are several, and often conflicting, definitions of qualitative research (Strauss & Corbin 1990; Corbin & Strauss 1994; e.g. Denzin & Lincoln 2003; Heath & Cowley 2004). Yet most share a number of fundamental elements that provide qualitative research with its distinctive character (Bernard 2000; Ritchie & Lewis 2003; Babbie & Mouton 2009, p. 270; Creswell 2013). This includes its ability to develop an in-depth understanding of the social world, from the perspective of the research participants, which can take into account their social and material circumstances, experiences, perspectives and specific histories.

Given the process required to understand participant's perspectives, qualitative data collection also tends to encourage very close contact between the researcher and the researched. It relies on a wide variety of data collection tools, including open-ended engagements, interviews, participant

observations, detailed field notes and any other reflections that may be deemed helpful (Creswell 2013).

Consequently, qualitative research depends on a much smaller, and more selective group of participants, who are identified as being able to contribute to helping to better understand the specific patterns, themes and features of the study in question (ibid.). The data produced tends to be fairly extensive and highly detailed, with analysis typically open to integration in new concepts that can help the researcher to classify their findings, identify patterns or develop explanations for their observations. This means that while qualitative research is inevitably highly subjective, it can also uncover specific findings that foster conditions for a more bottom-up and nuanced approach to hypothesis building (ibid.).

In contrast, quantitative research relies more on a top-down approach that tests a specific hypothesis and makes predictions that can then be applied, more broadly, across an entire population (Bernard 2000, p. 417). Instead of interviews and in-depth participant observations, quantitative research applies a far more scientific approach to data collection - one that relies heavily on surveys, questionnaires and the collection of other forms of primary data. Unlike qualitative research, it achieves statistical relevance and reduces bias by using a large and randomly selected research pool with whom the researcher usually has little direct engagement.

Of the two, a qualitative approach lent itself particularly well to this study as it was well suited to helping answer both parts of the research question: ‘how’ is insurance responding and ‘why’ it is doing so in such ways. It was felt that a qualitative approach could help to identify the often complex and subtle reasons why the commercial insurance industry was responding to GEC, in the way it is, and allow the study to embrace contextual issues in ways quantitative research is usually unable to do. This includes the context in which the commercial insurance industry exists, operates and how its decision-making strategies are framed.

Of specific relevance to this research was the fact that a large amount of pre-existing literature, on the insurance industry’s response to GEC, already

existed and was predominantly quantitative in its approach (e.g. Dlugolecki 2008; Mills 2012; Leurig & Dlugolecki 2013). This is based on the tendency for business-orientated literature to lean heavily on surveys, questionnaires and statistical analysis. While useful, especially in the context of 'how' insurance is responding to GEC, this type of research struggles to delve deeper into understanding the often more complex and subtle nuances of 'why' insurers are responding in such ways. Thus a qualitative study, offering the opportunity to develop theory that supports and supplements the pre-existing quantitative research was a logical choice.

Research Strategies

The World View

Acknowledging the paradigm that frames the specific research study is crucial, regardless of whether the study is a qualitative or quantitative one (Guba 1990; Feilzer 2010). There are several reasons for this (Huff 2008; Creswell 2013, p. 19). First, a paradigm shapes how researchers frame the particular questions they are asking, helps them to define their research strategy and guides how they will go about looking for answers. Second, a paradigm inevitably changes over time, both in the context of a specific study and as researchers' personal experience and exposure to the world evolves. Third, a paradigm may be influenced by other factors, including the intended audience to which the research will be presented (i.e. an examiner, journal reviewer, research participant, funder or even in the researcher's desire to align with a particular academic framing). This needs to be properly identified and accounted for, by the researcher, from the outset.

This requires the researcher to acknowledge what their own ontological and epistemological understandings of the world are (Creswell 2013). Ontological assumptions concern the nature of a particular reality, recognising that there are often many ways that the same world can be interpreted, based on different perspectives and that these need to be reported within a study. Epistemological assumptions question what actually counts as - or can be known as - knowledge, how such claims can be justified and how the relationship between the researcher and researched might impact this. Given

the subjectivity of knowledge, the only way to overcome this is for the researcher to get as close as possible to becoming an *insider*, relying heavily on quotations, collaborations or time spent in the field to achieve this (Guba & Lincoln 1994; Silverman 2000; Feilzer 2010; Creswell 2013).

Inevitably, there are many paradigmatic approaches that embody a wide cross-section of different ontological and epistemological views of the world and that lean either towards a more qualitative or a more quantitative approach to research. Of the more mainstream paradigmatic approaches, *positivism* and *social constructivism* have been described as falling at either end of the quantitative and qualitative divide (Creswell 2013, p. 22–34).

Positivism applies a theoretical lens that sees the world in much the same way as one would physical objects (Burke & Onwuegbuzie 2004; Hesse-Biber & Leavy 2010; Creswell 2013). This allows subjects to be studied objectively, scientifically, and from a distance, lending itself to research via a series of methodological steps that are inherently quantitative. This includes data collection, multiple levels of data analysis and the publishing of papers that share their structure with physical science papers (i.e. problem, questions, data collection, results and conclusions). In this way, positivism regards knowledge as a single reality that research can only understand relatively imperfectly and probabilistically, given the inherent lack of absolute certainties (Robson 2002, p. 624).

In contrast, *social constructivism* acknowledges that there are often multiple realities and that meanings are often socially (rather than scientifically) constructed. It acknowledges that understandings of the world are often not simply a product of history or culture, but are shaped over time via social interactions with others (Creswell 2013). Consequently, research must be highly subjective and value-bound and must draw as much as possible on these broad perspectives of the world as shared by the array of research participants. This means that such an approach tends to revolve around fairly broad and general topics that leave participants free to share their various understandings of the world. Thus qualitative approaches work well, as they encourage extensive and often open-ended lines of questioning, focusing on interactions between people, the context within which they exist, and the

impact that researchers' own personal backgrounds and circumstances have in influencing this view. It is up to the researchers to look for complexity in their research rather than to simply narrow down meanings into a few broad scientific categories or ideas (Denzin & Lincoln 2011; Creswell 2013).

As these two paradigmatic frameworks lie at either end of the quantitative and qualitative divide, their ontological and epistemological understandings of the world often contrast with one another. This is known as the 'incompatibility thesis' (Howe 1988, p. 10). In practice, this means that research can become either too value bound, missing the subtleties that emerge during the research process, and too casual in the weight given to historical processes (i.e. *positivism*) or too narrow in its assumption that knowledge is always simply constructed (i.e. *social constructivism*).

Why Adaptive Theory

Adaptive Theory offers a more middle-ground approach that accommodates both an inductive (i.e. theory-building) and a deductive (i.e. theory-testing) approach to research (Layder 1998). The exact 'blend' used is dependent on the specific framings of the research being undertaken (ibid, p. 134).

It therefore comfortably accommodates both theorists and empirical researchers, by accommodating a combination of pre-existing theory and theory generated during the empirical research process and helps to address the incompatibility thesis. Thus Adaptive Theory allows for knowledge to emerge via a two-way relationship in which empirical data being generated is constantly analysed in the context of the pre-existing theory and vice-versa (Layder 1993; 1998).

The flexibility inherent in Adaptive Theory allows it to comfortably embrace both an inductive and deductive approach to theory generation. This places it in the middle ground between *positivism* and *social constructivism*. As such, it allows the researcher to assume that the social world is highly complex, multifaceted and dense, while placing a heavy emphasis on the multiple (i.e. nodal) connections that exist between humans, social activities and organisations (Layder 1993, p. 133).

Thus Adaptive Theory is a theoretical mix that relies on a wide array of other theoretical approaches to help it generate knowledge. This means that Adaptive Theory is not restricted in how and where it is allowed to look for this knowledge (Layder 1998, p. 40). Thus it is both highly adaptable (as the name suggests) and open to being shaped by new empirical evidence as and when that emerges.

In practice, Adaptive Theory requires flexibility and an openness to be embedded in a study from the outset (ibid., p. 31). This makes it arguably more consistent with the realities of undertaking research in the real world, especially given the ever-evolving two-way relationship that exists between current and emerging theory (ibid., p. 31–33).

As such, there are several reasons why Adaptive Theory was selected for this study. First, it allowed a more dynamic approach to theory generation to occur, one that explicitly encouraged the use of pre-existing theories in conjunction with new theory emerging during the empirical data collection process. This meant the study could be positioned to best understand the commercial insurance industry's response to GEC via a synthesis of both old and new theory. New theories could emerge from the empirical research process that, in turn, could be framed by, and thus help to improve, the pre-existing theory. Adaptive Theory is also in keeping with recommendations for how a nodal governance study should be undertaken (Wood 2006).

Second, as relatively little of the pre-existing literature on the global insurance industry is grounded in a single body of literature, and even less so in the more qualitative approaches, Adaptive Theory allowed for existing theoretical gaps to be identified and, where possible, closed. As Adaptive Theory allows for any research method to be used, so long as it is relevant, this flexibility was seen as a way of helping to contribute to advancing understandings of how the global insurance industry has responded to GEC and why.

Third, Adaptive Theory's emphasis on the importance of empirical research, in helping to test theoretical claims and develop the pre-existing theories it draws upon was seen as allowing for a better understanding of the insurance industry to emerge via in-depth first-hand experience.

Fourth and finally, given that Adaptive Theory remains open to multiple methodological approaches means it could comfortably accommodate other features of this study, such as the use of collective case studies as an additional strategy of enquiry.

Research Design

In designing this research project, Adaptive Theory encourages mixing up various research methods to help better understand the nuance associated with social experiences. As such, this project relied on the use of *collective case studies* as a tool to help study the commercial insurance industry.

Case Study Research

A case study is a qualitative approach to research that explores real-life, contemporary cases over time and via the use of in-depth forms of data collection that draw on multiple sources of information (Robson 2002; Yin 2009; Creswell 2013). Case studies seek to either highlight the defining features of a specific individual case study or contribute to establishing a much broader theoretical understanding of the truth (Creswell 2013).

While there are many definitions of what constitutes case study research, most embody a number of similar features (Denzin & Lincoln 2005; Yin 2009; Creswell 2013). First, they require the identification of a specific example (i.e. case) to be studied. This can include unique examples (i.e. a single stakeholder responding in unorthodox ways), groups of examples (i.e. stakeholders exhibiting similar or divergent characteristics) or collective examples linked via a specific relationship (i.e. an organisation, partnership, project or social movement). Yet while the nature of a particular case study can vary, in almost all instances cases need to be both bounded by a specific time and space that is, ideally, current and real-life. This allows any data gathered to be neither diluted, by undefined study parameters, nor to have lost detail over time.

Second, the purpose, or *intent*, of a case study must be clearly identified from the outset. This may include better understanding of a specific problem in

need of investigating (i.e. an *intrinsic* case study) or a unique situation worthy of being interpreted (i.e. an *instrumental* case study) (Stake 1995).

Third, all case studies require the development of as detailed an understanding as possible of the specific case (or cases) being examined. This requires the collection and use of multiple forms of data sources, besides interviews. This could include grey literature, regulations, news articles, multimedia sources and any other types of material that are accessible and deemed relevant. This is because relying on just one source of information is often seen as inadequate in helping to develop a comprehensive understanding of the case study in question.

Fourth, the analysis of data, and the researcher's specific approach to doing it, determines what information is looked for, where and how. This contributes to developing theory and, accordingly, must be clearly thought out and executed so that any data that is analysed is done so in as consistent a manner as possible.

Fifth, regardless of how good the data analysis is, accurately describing the study's findings is crucial in helping to identify emerging themes. This encourages different cases to be compared with one another and, ultimately, allows for the generation of high quality theory to emerge.

Last, but not least, case study research requires the generation of conclusions that help to outline the general lessons learned over the course of the research study and how this can contribute to better understanding how the world works.

Why Collective Case Studies

Of the three types of case study, a collective case study was selected as the primary research strategy for this study. This was because, compared to intrinsic and instrumental case studies, a collective case study was best suited to help address the main empirical questions of the research project; how and why the global insurance industry has responded to GEC in the way that it has.

Seeking to understand the industry's response to GEC meant that the study had to collect as many perspectives as possible from a wide array of different stakeholders. This was made more complex given the diversity of the insurance industry's component parts, including primary insurers, reinsurers, broker networks, fund managers and industry associations. There were also a number of complex interactions between the industry and variety of external stakeholders, including regulators, clients and the financial markets.

A collective case study allowed the project to be clearly bounded, defining the insurance industry as all stakeholders that contribute - directly or indirectly - to its various activities. This allowed for replication to occur, which in turn encouraged comparisons to emerge, or similarities identified. This helped to identify and expand upon the nuances that inevitably exist, and frame, the insurance industry's response to GEC (Yin 2009).

In practice, the research study had significant access to a number of key insurance companies (see 'Identifying Case Studies' below) and specifically with one South African short-term insurer that became the central focal point of the study. Interviews with other industry stakeholders (including insurers, reinsurers, clients, brokers, industry associations and regulators) were used to help replicate the research and to confirm, contrast or elaborate on the various findings being generated.

This was further supported by the fact that, as the largest industry in the world, commercial insurance had already produced a wide array of data that could help to expand understandings of how it is responding to GEC and why. These included industry publications, research reports, annual integrated reports, news articles, policy papers and marketing material. This meant that the additional analysis of data, an important feature of collective case studies, was able to occur and added richness to the primary interviews being conducted.

Finally, the study was designed in light of the fact that most of the grey literature being generated by the industry (e.g. The Geneva Association) was already quantitative, mainly as this type of research is often easier to produce, when dealing with industry, and allows for a larger number of respondents to

be engaged. This helps to reduce issues associated with bias or favouritism that industry associations are often so keen to avoid.

Yet, while these quantitative studies are helpful in understanding how the industry has been responding, and some of the reasons why, it is less effective in understanding the nuance associated with why the insurance industry is responding as it is. A collective case study, therefore, was exceptionally well suited to exploring the nuances behind these questions, in turn helping to generate a far more concrete theoretical understanding of the truth.

Identifying the Case Studies

In order to maximise the breadth of understandings of the particular study, it was important that as many different perspectives as possible be captured during the research process (Creswell 2013). The study was fortunate in that it was able to build upon a pre-existing partnership between the University of Cape Town, the WWF and one of South Africa's leading short-term insurance companies ("the Insurer"). This partnership was initially established for the organisation of a large industry-wide conference, entitled 'The Eco-Centric Journey', that explored the impacts of GEC on the South African insurance industry. It led to a multi-disciplinary research project that examined the physical impacts certain climate risks (e.g. flooding, wild (veld) fire and storm surge) were having on the local environment in which the Insurer was operating (UNEP-Fi 2011).

This existing partnership proved invaluable in providing this research study with access to respondents. This was because the study was able to build on the *access* and trust that had already been established. This was further supported as the outputs of the study were regarded, by many respondents, as helping the insurance industry to better understand some of the challenges associated with GEC.

This existing partnership also helped in establishing contact with other respondents, in other parts of the industry. This included other insurance companies, reinsurers, brokers, regulators and industry associations. Most of these stakeholders were aware of the research already published and were

therefore less guarded in participating in a study they saw as directly benefitting the industry. This allowed the study to engage a variety of primary insurers, reinsurers, brokers, investment houses, national industry associations (including the SAIA and ABI), international industry collaborations (such as UNEP-Fi and ClimateWise) and various regulatory bodies across South Africa and Europe.

Of course, dealing with an industry the size of commercial insurance meant that it would be almost impossible to embrace all the different opinions and attitudes of all stakeholders involved in shaping the industry's response to GEC. Therefore this research project narrowed its selection criteria down to the pool of insurance stakeholders who had already shown a commitment to addressing GEC via their active membership of UNEP-Fi and ClimateWise.

Identifying the Respondents

To achieve a diversity of perspectives required identifying and engaging as many respondents as possible, besides the basic requirements of who was accessible, willing to provide information, distinctive in their accomplishments (or ordinariness) or who could help to shed light on the specific issues, or sub-issues, being explored (Creswell 2013).

This was consistent with Adaptive Theory that calls on respondents to be pro-actively selected, by the investigator, based on their potential to contribute to the generation of theory rather than being randomly selected from a pool (Layder 1993; Hesse-Biber & Leavy 2010; Creswell 2013). Thus selecting which respondents to interview, especially during the early stages of the research, was allowed to remain a fairly organic process. It started with those closest to the work that had already been carried out and, via a process of s*nowballing* (where respondents were asked to recommend others they felt could help to further elaborate on the study) a greater depth of insight was able to be achieved (Morrison 1988).

While no potential respondents were automatically excluded from the study, focus was given to those that were identified by others, represented areas of the insurance industry that were found to have potential insights or were felt to be in a position to provide a counter argument or opinion.

The Respondents

The Insurer

The Insurer is the largest short-term insurance company in South Africa, with a 23% market share, annual premiums valued at over R 16 billion (US$ 1.4 billion) and a staff base of over 2,700 (Santam 2013b). Over the past decade, the company has grown into a highly diversified insurance company, dominant in many lines of short-term insurance that now includes corporate and commercial, agriculture, engineering, transport and liability, alongside its more traditional domestic and motor lines. Today, the Insurer's annual premiums are divided roughly into R 10 billion (US$ 900 million) for commercial, specialised and niche lines of underwriting, and R 6 billion (US$ 500 million) for personal lines (motor and home). Besides South Africa, the Insurer has extended its underwriting footprint across the developing world with operations now in Namibia, Malawi, Mozambique, Tanzania and India.

In South Africa, by far its largest market, the company's distribution structure remains largely dependent on a network of around 2,500 intermediaries (brokers) that help it to actively market, distribute and, in some cases, even administer claims on their behalf. This broker network has historically been supported by over 60 administrative offices (across South Africa and Namibia) that acted as decentralised insurance hubs doing everything, from the pricing and issuing of policies, through to the handling, assessing and payment of claims.

However, in recent years the company had been particularly exposed to a number of environmental perils that have caused significant losses. This included floods and droughts, fires, coastal erosions and more frequently, from lightening and hailstorms (UNEP-Fi 2011).

Other Respondents

Other interviews were conducted with a number of insurance companies, reinsurers, industry associations, industry organisations, investment fund managers and regulators across South Africa, Britain, Germany, Switzerland and Belgium. These included companies such as Munich Re, Swiss Re,

Allianz, Lloyd's of London, the Association of British Insurers (ABI), the South African Insurance Association, UNEP-Fi, ClimateWise, Santam, Old Mutual, Mutual & Federal and Nedbank, who were all identified based on their membership or affiliation to the UNEP-Fi or ClimateWise (ClimateWise 2012, p.60; UNEP-Fi 2013).

The Research Schedule

Four research phases were conducted between January 2011 and July 2013.

1st Phase: Jan–Feb 2011 (Cape Town, Eden Municipality)

The first phase of data collection was a pilot project and was guided by key contacts within the Insurer. This scoping phase consisted of 17 interviews with respondents who were at the heart of the Insurer's response to GEC. The phase also included a field trip to the Eden Municipality in South Africa - a region particularly hard hit by GEC losses - to interview local representatives, brokers, clients and municipal workers there.

2nd Phase: Apr-May 2011 (Cape Town)

The second data collection phase was conducted once a basic theoretical understanding from the pilot project had emerged. In this phase respondents were selected more carefully and more independently. The questions posed to them were targeted more towards their specific areas of competency. The research focus was not just on the staff involved, in responding to GEC, but also on trying to develop a more holistic understanding of different views and opinions (including underwriting, claims, distribution, marketing, systemic risk management, investments etc.).

3rd Phase: Mar–Nov 2012 (Cape Town, Germany, Switzerland, Belgium, UK)

The third phase of data collection included 22 interviews. These were conducted both with the Insurer as well as during an international field trip in Europe where other insurers, reinsurers, industry associations and regulators were interviewed. This gave an opportunity for replication to occur.

4th Phase: Jan–Jul 2013 (Cape Town, Johannesburg)

The final phase of the research project included 16 interviews with a large international financial management company and its subsidiaries. These interviews were focused on trying to understand the specific challenges associated with insurers' investment portfolios, an area of research felt to have not been covered enough in the preceding phases.

Summary

Table 1: Type of respondent, interview periods and number of interviews per respondent category

Type of respondent	**Phase 1** Jan- Feb 2011	**Phase 2** Apr - May 2011	**Phase 3** Mar - Nov 2012	**Phase 4** Jan - Jul 2013	**Total**
The Insurer	5	30	8	-	**43**
International (re)insurers	-	-	8	3	**11**
Investment Fund Managers	-	-	-	13	**13**
Government employees/regulators	3	-	1	-	**4**
Industry associations (RSA)	-	-	1	-	**1**
Industry associations (Int.)	-	-	3	-	**3**
Independent brokers	3	-	-	-	**3**
Clients/Misc	6	-	1	-	**7**
Total	**17**	**30**	**22**	**16**	**85**

Data Collection

In-depth Interviewing

In-depth interviewing was used as the primary means of data collection, as it helped to provide an insight into the research topic from both an objective and subjective perspective (Silverman 2000). This provided a logical fit with Adaptive Theory in that it allowed respondents to report both on the actual practical ways in which the insurance industry was responding to GEC but also allowed for the capture of interpretations, insights, mentalities and frustrations, all crucial elements in developing a strong theoretical understanding. Thus the interview process needed to be as complete as possible, so that all respondents with the expert knowledge, or inside involvement, of the research topic could be identified and engaged (Teddlie & Yu 2007; Creswell 2013).

The interviews were conducted in a semi-structured manner. This is an open-ended approach, encouraging flexibility that in turn allows for theory already generated to be tested and the space for respondents to generate their own

concepts, themes or theories, that in turn can be tested on future respondents (Bryman 1988; Fontana & Frey 2008; Hesse-Biber & Leavy 2010).

Unlike unstructured interviewing, semi-structured interviews require the use of an interview guide that is a written list of broad questions and themes that need to be covered in no particular order. This gives the interviewer the freedom to focus on particular areas of discussion in more depth and to respond to key areas of knowledge that may emerge over the course of the interview process. It also insures that a partnership can emerge between investigator and respondent, which promotes a sense of collaborative problem solving, rather than a more formal - and rigid – Q & A-type session. This can help to build relationships of trust and sustain the rapport necessary for conducting successful interviews. This, in turn, can allow rich theory generation to occur (Creswell 2013).

Most of the interviews conducted were one-on-one, although some involved two or more respondents. The latter allowed for a more interactive and dynamic, workshop-style discussion to emerge. In general, relatively few notes were taken during the actual interview process - besides those aimed at flagging immediate topics for discussion - so that full attention could be given to maintaining the two-way focus of the conversation. Each interview was recorded and after each session, thoughts and reflections were noted down.

As the interviewing process occurred over the course of two years, this created space for reflection, analysis and fresh theory development that could then be tested in subsequent rounds of interviewing.

Document Collection

Documentary analysis was a crucial feature of this study as it was seen as both a source of information and as a way to help shed light on how the world is both understood and framed by those creating it (Prior 2007). In this light, documentary analysis was used partly as a starting point for the study, to gain a preliminary insight and understanding into how the insurance industry was responding to GEC, and partly as a way of expanding upon the findings of the interviews as the empirical process continued. Being such a large and interconnected industry it would be practically impossible to engage all

relevant stakeholders in all parts of the world. Thus having access, particularly to the industry's grey literature, was valuable in providing an understanding of the broader industry. It also helped to map out the industry's different nodes and the relevant influences they exert upon one another.

Types of documents collected included company and industry reports, company statements, newsletters, journal and policy papers, and media articles. New forms of electronic social media (e.g. YouTube, Twitter and LinkedIn).

Participant Observation

To a small degree, participant observation was undertaken. This sought to try to deepen the understanding of the social meanings and practices of the respondents and was helpful in supplementing the in-depth interviewing process (Hesse-Biber & Leavy 2010). Participant observation does not involve actively participating with respondents, but instead refers to engaging respondents as they do what they do (Delamont 2007).

In this study, attendance was made at a number of industry conferences, workshops and seminars on the relationship between the insurance industry and GEC. The purpose was to try to understand what conversations the insurance industry was having around the topic. These often offered an excellent opportunity to learn more about respondents, how their perspective on the world compared to others and to provide valuable lessons on the correct language and terminology that should be used.

Challenges

Inevitably a number of challenges were faced over the course of the data collection process. Most were fairly standard challenges but needed to be acknowledged and addressed, early on.

This included the risk that with a more open-ended, semi-structured approach to interviewing there is a tendency for respondents to start rambling off-topic (Bryman 1988). While this could be viewed negatively, in terms of getting value out of the often-limited interview time available, rambling also allowed respondents to talk more freely and flowingly. As flexibility is consistent with

an Adaptive Theory approach, each interview was carefully managed in a way that allowed respondents the freedom to express themselves, but also to ensure that all aspects that needed to be covered were.

Another challenge was the role the interviewer inevitably played in influencing the respondent. Influences might include factors such as age, sex, ethnicity or even how the interviewer presents themselves, which, in turn, impact the way respondents engage the interview process and the answers they provide (Bryman 1988; Baker 2004; Miller et al. 2004; Fontana & Frey 2008). Adaptive Theory regards the flow of information from interviews as not limited to a one-way flow between respondent and interviewer, but rather a ‘collaborative accomplishment’, where theory is developed in partnership (Holstein & Gubrium 1997, p. 154). Thus the role of the interviewer is to separate out knowledge, which, in turn, accounts for why gathering multiple perspectives of the same topic is so important.

On several occasions, the challenge of interacting with respondents outside academia became evident. This was because academics tend to have their own, more scientific, terminology, while insurers have their own very explicit language that reflects their business environment. Learning this terminology became crucial, as being able to speak the language of insurance meant that misunderstandings could be avoided, and it helped to increase levels of trust and rapport, as respondents felt the interviewer had more knowledge of their world and was thus seen as an ‘insider’.

Fortuitously, as this study built on the work of a previous project, much of the insurance language had already been learnt. However this did not mean that misunderstandings, over the course of the study, did not occur. On one particular occasion a draft paper was shared among a number of industry collaborators for comment. It described the tendency of the insurance industry to respond to GEC by seeking to ‘exploit’ their existing technologies, rather than ‘explore’ new ones.

Exploitation is a common, and generically used term in the institutional change literature, used to describe why institutions struggle to adapt to new operating challenges (March 1991). However, a number of industry

stakeholders, unfamiliar with this academic terminology, regarded the paper as accusing the insurance industry of exploiting their clients with regard to GEC, which was not the case. The reaction was one of anger and defensiveness, even though to an academic the term is innocuous. Only following a series of emergency meetings, aimed at explaining the true meaning of the paper, was the research study preserved, although significant lessons were undoubtedly learned on both sides.

Data Analysis

Analysing collected data involves breaking it up and seeing its parts in relation to the whole (Stake 1995; Ragin & Amoroso 2010). This process also does not occur during a predetermined phase of the study, but in keeping with Adaptive Theory, is an ongoing, iterative process that should begin from the outset of the project (Stake 1995; Ritchie et al. 2003; Rapley n.d.). This is because Adaptive Theory encourages the researcher to start the study with a mind clear of theoretical ideas and assumptions and rather allow them to emerge, organically, over time as data is constantly recollected, reanalysed and reinterpreted (Layder 1998, p.51; Hesse-Biber & Leavy 2010).

Transcription and Memoing

The digital recordings were fully transcribed by a professional transcriber. The transcripts were then re-read multiple times (often in combination with the original audio) and further notes and reflections made. After key quotations were extracted, they were carefully grouped according to associated themes, a process that was further honed as the study progressed.

Documentary Analysis

All documents collected were stored on Mendeley, a digital bibliographic archive (www.mendeley.com). Given the large array of documents collected, careful organisation of the digital library was crucial in helping to locate data and to spot the emergent themes. Accordingly, on uploading new documents, each one would be assessed, tagged according to a specific tag list and a short, targeted abstract created on its specific relevance of the study.

Reaching Theoretical Saturation

Ideally, the data collection process should reach a point where enough information has been gathered in order for it to fully develop answers to the research questions (Creswell 2013, p.89). At this point, a pattern starts to emerge of interviews failing to create fresh observations and increasingly begin to reconfirm previously generated observations. While this point is undoubtedly useful, in helping to confirm the truth or understand its nuances, it also marks when the data collection process has reached a suitable conclusion.

In this study, this occurred over the course of 4th data collection phase when discussions started to become more focused on reconfirming findings than generating new ones. At this point it was concluded that theoretical saturation had been reached.

Ethical Considerations

Ethics clearance was considered at all stages of the project. The University of Cape Town (UCT) Faculty of Law required an annual ethics clearance to be secured for each year that research took place. Furthermore, all respondents, or the organisations they represented, were asked to sign release forms that acknowledged their participation in the study and outlined the responsibilities, of the researchers, with regard to their interviews and the maintenance of anonymity.

Although the research was bound by a confidentiality agreement, the university ethics clearance required each respondent to read and sign an agreement that explained the purpose of the study and the intended use and storage of the information collected.

Conclusion

This chapter has outlined the methodology used for this research study and the reasons why such choices were made. It described how the study was framed by nodal understandings of governance. A qualitative study was designed, drawing on Adaptive Theory and the use of collective case studies. This made use of in-depth interviewing, participant observation and

documentary analysis to help develop theories of how and why the insurance industry has responding to GEC in the way that it has.

CHAPTER FOUR - INSURERS AS RISK CARRIERS

Introduction

This chapter explores how and why the commercial insurance industry has responded to GEC, in the way that it has, via its risk carrying activities. It explores, in particular, how a large short-term insurance company in South Africa has been responding. The chapter is divided into three parts. The first deals with how the insurance industry, with a particular focus on the Insurer, has responded to GEC, the second explores why they have responded in such ways, while the last discusses our understanding of commercial insurance in relation to debounded risk and the frontier barrier of the risk society.

In Support of Defensive Underwriting

Research and Modelling

Over the past decade the Insurer began to face growing concerns that it was being impacted by underwriting losses that its risk assessment models could neither predict nor account for. Much of this was linked to the increasing impact of extreme weather events impacting South Africa, including storms, floods, droughts, wild fires and coastal erosion. These impacts were particularly bad in the Southern Cape coast of South Africa where, between 2003 and 2008, more than R 2.5 billion (US$ 222 million) worth of total economic losses occurred, of which R 60 million (US$ 5.4 million) was paid out, via insurance claims, by the Insurer alone (Disaster Mitigation for Sustainable Livelihoods Programme 2010; Nel et al. 2011a).

Of particular concern was not just the scale of these catastrophes, but that their frequencies were no longer matching those predicted by the Insurer's actuarial models. Predictive flood-lines in the affected region, for example, were proving to no longer be indicative of the actual impact floods were having. This forced the Insurer to redefine many of these flood lines (e.g. from 1-in-50 down to 1-in-10 year events). This uncertainty began to eat into the company's underwriting margins and, as it had over R 38 billion (US$ 422

million) worth of exposure across the Southern Cape Coast alone, led to growing concerns that it needed to identify ways to respond.

> … we realised but the flood-lines is really 1 in 100 and 1 in 50 and 1 in 200 years – and a large percentage of properties are within those flood-lines, so our risk appetite is larger than what the flood-lines that's available dictate. So we're sort of at a space now where we're thinking of using, of letting the engineers create a flood-line of 1 in 10 years, and we say if somebody has a large flood loss more than once in 10 years it's a problem for us, then we wouldn't want to enter and just give full flood cover. (General Underwriter, the Insurer [21])

Trying to better understand its exposure to emerging risk, and how to manage it, has always been a fundamental feature of the insurance industry. Being aligned to the international insurance community, the Insurer had already tapped into the emerging discourse around *global environmental change* (GEC). This focused, in particular, on the need for the insurance industry to better understand how it could identify the statistical patterns necessary for accurately managing its exposure to GEC. Leading this drive were the large reinsurers, many of whom had long been engaged in trying to identify the patterns of GEC and its impact on the industry. However the Insurer saw them as having an advantage, in this regard, due to the considerable size and extent of their existing data sets:

> … so they can see every four years there's a quake in San Francisco, every three years they can see there's a flood in Germany, the Rhine or whatever the river is. Every five years they can see there's a Katrina in New Orleans. Every six years – they actually have these stats, they can see, they do it like this. (Reinsurance Manager, the Insurer [08])

From the Insurer's perspective, improving its own understanding of GEC was regarded as crucial in helping it to more accurately price its policies, decide which markets to enter or withdraw from and how to negotiate with other stakeholders - such as clients and governments - around adaptation or mitigation measures. However, aware that their understanding of GEC lagged someway behind that of their international peers, and that valuable work had already been undertaken, the Insurer's first step was to join the various industry associations – such as ClimateWise and the United Nations Environmental Programme Finance Initiative (UNEP-Fi) – that had already started to lobby for a more collective response to GEC. As the Head of Strategy at the Insurer explained:

> … [we] then thought, actually we don't have to reinvent the wheel, there's this group of almost 40 insurers, global insurers talking about climate change. (Head of Strategy, the Insurer [41])

The Insurer regarded its participation with these organisations as helping it to leverage progress that had already been made in responding to GEC and to participate within an international community with whom they could share ideas and the risk of uncertainty inherent with new areas of research:

> … we then joined ClimateWise, because we felt we don't want to do everything on our own, I don't think that that's wise. And it's also a huge risk area, a lot of the risks we can't do on our own, we have to work with others. Plus, we don't have the depth of expertise, so that's why we joined ClimateWise, because there's all these people working on it, Lloyds are there, Alliance is there, ACSA is there – and they come together and they talk about climate risk for the insurance industry – and it's been quite useful because a lot of information has come through there. (Head of Strategy, the Insurer [41])

In late 2009, the Insurer organised and hosted a South African conference, titled *The Ecocentric Journey*, that brought together various stakeholders from across the local insurance and finance sector, together with climate scientists, politicians and a host of other GEC practitioners (Santam 2011b). The aim was to raise awareness of GEC within the industry and position the Insurer as a first mover in that space:

> … that was really the start of it, because then we went public and we started saying, let's talk about it and we're not holding ourselves out to be the experts, we're not saying we're the best at this, but we really need to talk about this. (Head of Strategy, the Insurer [41])

Coinciding with this, the company's underwriting department had started to coordinate a response to the emerging vulnerabilities GEC was presenting its underwriting portfolios. To try to strengthen their underwriting portfolios, the underwriters started to commission various GIS engineering models, initially to assess flood and coastal erosion, but later expanded to include other perils such as lightening, earthquakes, soil erosion and even access to fire and emergency services.

The underwriters felt that these GIS models would help them to assess risk at higher levels of 'granularity', ideally on an erf-by-erf basis, and understand which properties were likely to be impacted in the future. This would allow them to tighten the conditions under which they insured risk:

> Now this is why we feel we have the need to get a GIS system, because we want to almost underwrite per street (General Underwriter, the Insurer [01])

From an underwriting perspective, GIS models were an ideal response to the inherent weakness their actuarial models were facing. This was because they not only helped to assess the future probabilities of risk occurring, but complimented the Insurer's existing risk assessment tools, allowing it to continue to carry risk via the use of its traditional actuarially-dominated underwriting systems.

However, one of the shortfalls of these new GIS models was that, although they started to identify the properties likely to be most impacted by specific GEC perils, such as flooding, they failed to account for how or why the floods occurred in the first place, how the risks were likely to change over time, as the variables shifted, and how the perils could be better managed. This meant that these GIS models required regular and costly upgrades just to stay abreast of the deteriorating risk landscape:

> GIS was already in the equation of projects that we were looking at, and that was specifically to do exactly that, to predict data and not to really look at the future as, not to predict as in – ja, predict better – that's where we're into. (Sustainability Manager, the Insurer [25])

> I tell you that our climate change is so rapid that you can probably find your flood-lines are migrating all the time and that's where the cost is because of your hydrological costs. (General Underwriter, the Insurer [40])

Aware of this, and spurred on by the apparent success of the *Ecocentric Journey* conference, the Insurer participated in a research collaboration with the WWF, the Council for Scientific & Industrial Research (CSIR) and a host of academic institutions, in an effort to understand the nature of flooding, wild-fires and storm surges in South Africa. The resultant 'Eden Study' was published in collaboration with the UNEP-Fi at the COP-17 in Durban in 2011, and represented a major contribution, by the Insurer, to the international insurance community (UNEP-Fi 2011).

The report examined GEC in the context of the local physical environment in which it occurred. Crucially it found that GEC risks impacting insurers' underwriting portfolios were often a combination of both climatic drivers and other (*proximate*) drivers of systemic risk within the local physical landscape in which they occurred. Worsening floods, for example, were not just the result of increasing rainfall, but was linked to other physical factors, such as deforestation, land-surface hardening and the mismanagement of storm-water

drains. In fact, the study found that these *proximate drivers* of risk often accounted for more than half of the eventual impact of a GEC peril (ibid.). As many of these proximate drivers of risk are themselves shaped by the activities of third-party stakeholders - such as landowners, property developers or municipalities – the study concluded that engaging these stakeholders, to better manage proximate risk, could ultimately help to lower insurers' exposure to GEC. In conclusion, the report called for the adoption of a more systemic approach to assessing and managing GEC (ibid.).

Armed with this research, the Insurer began to engage the South African insurance industry, via the South African Insurance Association (SAIA), to become more proactive in responding to GEC. It called on SAIA to represent the industry nationally, just as ClimateWise and the UNEP-Fi were doing internationally, and other domestic associations - such as the Association for British Insurers (ABI) and the US National Association of Insurance Commissioners (NAIB) - were doing in their respective domestic markets (Association of British Insurers 2005; 2008; NAIC 2008).

> …we realised that we can't act on this alone, and we started actively lobbying the SAIA. At the same time SAIA also started becoming more vocal… I ended up being seconded to SAIA, because the association said, well, what should the industry then do? And my job, the last few months… was then to actually do what we did for Eden, go and interview people, understand what the lay of the land is and make a recommendation. (Head of Strategy, the Insurer [41])

The Insurer agreed to second their Head of Strategy to SAIA, tasking her to try to understand the specific challenges facing the South African insurance industry and to make recommendations on how best it should be responding:

> So in essence [their] role is to get that whole thing set up in structure and obviously SAIA is going to appoint a sustainability manager and to then embed that into proper committees or forums to drive certain areas. (Sustainability Manager, the Insurer [25])

By the end of 2011, SAIA had launched an industry-wide 'Strategic Risk Forum' and appointed a permanent staff member to manage it. The forum focused on developing partnerships with other stakeholders, particularly around agricultural risk and crop insurance, engaging the National Disaster Management Centre (NDMC) and developing closer ties with organisations like ClimateWise and the various Fire Protection Associations (FPAs) actively combatting fires in rural parts of South Africa. Together, SAIA and the Insurer,

the latter that had now successfully positioned itself as the go-to insurer in South Africa around GEC, facilitated the drafting and launch of the African chapter of the UNEP-Fi's 'Principles for Sustainable Insurance' (PSI) (Santam 2013b).

Internally, the Insurer realised that, as a consequence of its comparatively small size and corresponding lack of resources, instead of creating a new internal unit to address systemic risk, it would work instead within its existing structures. This began with the renaming of the company's 'Environmental Risk Forum' - established in 2008 to foster collaboration across the company - to the 'Systemic Risk Forum' (Santam 2012f). This new-look forum was tasked with becoming the company's primary 'think tank' and first line of defence in responding to GEC.

> … the Systemic Risk Forum… represents everybody at very senior levels and Exec and Exco. And whatever recommendation is proposed there, we have all the parties around the table from marketing, through sustainability to distribution, claims and risk services, and at strategy level as well, that they will make a decision. (Sustainability Manager, the Insurer [25])

Crucially, the forum was comprised of representatives from across the company's various operational units. While the Head of Strategy initially held the chair, responsibility was soon transferred to the Head of Risk Services, as the Insurer sought to embed the forum into the heart of the *golden triangle* (i.e. underwriting, distribution and claims) in the hope that this would routinize systemic risk management into the company's core operations.

At the same time, the Corporate Responsible Investment (CRI) department was moved away from Marketing and Brand to become a sub-division of Risk Services. The intention was to align the company's CRI obligations and rebranding efforts more closely with systemic risk management. These changes led to a number of projects emerging, including an index of fire readiness for all local municipalities across South Africa, a coastal GIS mapping project, and a Business-Adopt-a-Municipality programme to support struggling municipalities to address some of the challenges they were facing (see chapter five).

By hosting the *Ecocentric Journey* conference, participating in the 'Eden Study' and by engaging with SAIA, ClimateWise and the UNEP-FI, the Insurer

was building a positive external profile for itself and one it believed could help it to offset any losses associated with being the first mover in the GEC space. As the Head of Corporate Communication explained:

> Climate risk is a subject that we're now leading with regards to the industry because of our association. (Corporate Communication Manager, the Insurer [46])

This led to the Insurer being awarded the 2011 South African Climate Change Leadership Award (CCLA) that further contributed to their marketing and branding campaign both domestically and within the broader industry (Risk SA 2012b).

This all appeared to be a logical first step by the Insurer, as it reflected on the traditional way it responded to new risks by improving its ability to strengthen its ability to assess risk.

Centralisation

As the Insurer began to acknowledge that GEC was shifting the nature of the risks it was being exposed to, it became increasingly aware that it needed to correspondingly adjust the way it managed the pools of risk it underwrote. Traditionally, the Insurer had distributed the bulk of its insurance policies via a large network of semi-autonomous regional offices and brokerages. Within this structure, regional representatives of the company were responsible for assessing risk, often relying on hard-copy actuarial tables to help calculate premiums before applying discounts based on any perceived mitigation or adaptation measures the client may have undertaken.

> Historically the broker has had a fairly large discount window that he could offer on that premium based on his experience of the risk and based on his own experience of his book of business. (Actuarial Manager, the Insurer [28])

However, as their underwriting portfolios came under increasing pressure, from risks impacting ever greater geographical areas, the Insurer started to see its regional structure as too 'localised' (Head of Risk Services, the Insurer [42]) and thus limited the control they needed over their underwriting portfolios. This was compounded by other concerns, including how their brokers tended to negatively impact the pricing of risk or acted as a barrier between the Insurer and its client, limiting the extent at which the latter could be engaged

over adaptation or mitigation measures. Some staff went as far as to suggest they were sometimes ‘virtually held to ransom’ by their brokers, who would threaten to move their clients over to less onerous competitors should they be required to do too much:

> … what they do is they build up a book with you to such a state and then if you don’t give them what they want or give them the underwriting pen – there’s always this veil, unsaid threat – well, I’ll move my book. (General Underwriter, the Insurer [40])

This was reflected in the many segregated systems that emerged during this time, across the company’s various lines of insurance, and often unable to share underwriting data between them:

> … at the moment our personal lines, so your car and your home insurance, is one part of our business, and your business insurance is on another system. And we’ve been managing those two pretty much separately for a helluva long time. But now you realise one doctor might have his house and his car covered with you and he might have his practice with you – but you can’t see that because they’re on two different systems. And the way the computer systems were made up in those years was two different computer systems running two different types of businesses. (Product Development Manager [36])

The Insurer had also given some of its largest brokerage firms a degree of autonomy that allowed them to assess, underwrite and settle many of the smaller claims independently, with the Insurer simply acting in the capacity of a reinsurer. Yet this further limited the Insurer’s access to all the data it needed to manage its risk exposure.

> … there’s 16 national brokers working on their own systems where we provide them with a black box and rating and everything. So we are not hands-on to see how many of that clients do you also add into this equation. So you we could have been out to say we’ve picked up 50 clients but it could actually be 100 or 120. (Risk Services Manager, the Insurer [22])

Consequently, and as a result of its traditional approach to underwriting, the Insurer often struggled to adjust the conditions under which it agreed to underwrite risk, achieve more consistent underwriting results and to gain access to all the data it needed to fully understand the changing risk landscape it was being exposed to.

In response, the Insurer started to centralise many elements of its underwriting activities, seeking to regain control over its clients, improve the quality of the data it collected and automate as many parts of the underwriting process as possible. It closed many of its regional offices, redefining the

remaining staff as Relationship Officers. They were now tasked more with liaising with brokers, around administrative issues, than participating in the underwriting of risk and settling of claims. As one Relationship Officer reflected:

> … we were 12 in the office, we are now 2 in the office ... and we did everything here, issued new policies we did our claims here, I was the last one to sign the cheque. And then we said we are going to centralise everything ... I don't quote any more, I don't deal with claims anymore. (Relationship Officer, the Insurer [05])

In their place, the Insurer established a series of large centralised underwriting hubs, called 'Centres of Excellence' (COEs), through which all underwriting activities began to be channelled. Dedicated and highly specialised underwriting teams managed these COEs.

> … you feed a lot of details and rules into the system and then you use that to screen your quotations for new business acceptance, and no longer to rely on a person because you have a team of people there trained exactly the same, at the end of the day they will apply the rules differently, different standards and what they see. So to get more consistency – now, to be able to do that, you need a lot of external data. And the problem is that a lot of the external data that's supposed to be available is in many instances worthless. (General Underwriter [21])

At the heart of the COEs were a series of *rules-engines* that sought to combine the Insurer's traditional actuarial models with the new forms of data it was increasingly beginning to use. This included the use of clients' claims history, credit records and the various GIS models in development. The intention was to assess the threat individual risks faced from GEC to as high a degree of 'granularity' as possible.

> Where we're now where everything is centralised, the underwriting is centralised – you cannot rely on any local knowledge really, so you have to centralise whatever, either historic or predictive knowledge you can put your hands on and then you must try and get it into a system so that you can apply it. (General Underwriter**,** the Insurer [21])

Many brokers and brokerages also saw their freedom to offer discounts or administer claims either cancelled outright or heavily curtailed, as the COEs took over increasing responsibility for processing new policies as uniformly as possible. The large brokerages were also required to synchronise their own databases and to share with the Insurer the client data they had collected.

There were a number of perceived benefits attributed to the Insurer centralising its operations in this way. First, as the COEs became a

comprehensive central data depository, all underwriting data could now be collated under one roof, improving the Insurer's ability to identify any changing patterns of risk and to respond accordingly.

> So we are becoming more and more and more sophisticated; it's not a paper environment any more, so for all practical purposes, if there's a big thing coming, you can say that we will be able to get the information wherever it is into one environment and we will make one decision about that. (General Underwriter, the Insurer [21])

Second, by gaining more control over the underwriting process, the Insurer was able to become more selective in which risks it underwrote, as its ability to scientifically and actuarially assess them increased. The Insurer was increasingly in a position to select the best risks to underwrite and avoid the worst. Describing this in relation to its agricultural policies, one underwriter explained how:

> … we put in a questionnaire, I think it's about 30 questions, taking his environment, his physical environment – the type of soil, his rainfall, his management practices – everything. And there's a scorecard; so if he scores above 80%, he can be classified as an A1, that's the best. And then we can offer him higher guarantee values. (Crop Insurance Manager, the Insurer [32])

Third, the COEs allowed the Insurer to regain control over the claims process, by taking a similar 'rules-engines' approach to help identify fraudulent claims, manage errant suppliers or detect where future savings could be realised.

> There's a couple of fundamentals we did put in place which we believe is a central point of entry: all registration of claims going through a central place, we don't have decentralised claims, so we have a call-centre, everything goes in there. And then from there we can undertake activities in terms of how we want to do it, but also recoveries, where we need to recover from third parties … (Claims Services Manager, the Insurer [30])

Thus centralisation was regarded as a logical response to a deteriorating risk landscape as it allowed the Insurer to bypass its regional networks, reduce operating overheads and maximise economies of scale. It gave the Insurer a way to respond to the emerging weaknesses it was seeing in its actuarial tables by improving the efficiency with which they underwrote risk, allowing it to adjust the terms and conditions of its insurance policies or to simply pull out of markets regarded as having too high a probability for loss.

> … we're looking at efficiency to a large extent because of the cost of actually going to each individual risk. (Head of Risk Service, the Insurer [42])

It was also hoped that this would help to reduce the level of human interference that had started to creep into the Insurer's underwriting activities.

> If you look at some of the local knowledge then you find that people do really stupid things sometimes. So it's better to try and centralise, learn from it and try and put something in place that will allow you to sort of regulate that the stupid bit won't happen. (General Underwriter, the Insurer [01])

Thus, as the impact of GEC continued to grow over ever larger geographical areas, and the Insurer's traditional, more localised underwriting models struggled to adapt, so a strategy of centralisation emerged as a logical response in helping the company to expand its risk pools.

New Products & Services

Traditionally, the Insurer responded to the changing risk landscape by adjusting the portfolio of products and services it offered to its clients and by making more strategic use of the resources at its disposal.

Based on its involvement with the various international industry associations it had aligned itself with, the Insurer began to see examples of the new products and services and new markets that were emerging as a result of GEC (Mills & Lecomte 2006; Mills 2012; ClimateWise 2012). The Insurer saw these as a way other insurance companies were beginning to diversify their risk exposure, in response to GEC, by improving their competitive advantage or enhancing market share and profit potential. As the Head of Product Development explained:

> … in our business we've got one great differentiator and that is that we have got various different product lines that can actually cross-subsidise each other in good times and bad. So we're the one company that can differentiate ourselves in that way, that different lines of business actually then help us to ride the tide of a crop not doing well the one year. (Head of Product Development, the Insurer [36])

This was helped by the Insurer's improved access to data, deriving from its research and modelling activities, and through centralisation that gave it more control over who, what and where it was underwriting risk. This led to a strategy emerging around 'investigating opportunities' that could help to create benefits from the Insurer's response to GEC (Santam 2011d).

This led to the introduction of various insurance products that staff felt would help to promote risk reduction. These included a Pay-As-You-Drive (PAYD)

insurance policy, which calculated premiums based on the actual distance driven each month, via the use of vehicle trackers that monitored real-time driver habits, including speed, acceleration and deceleration. Clients were offered an automatic premium discount of 20%, with an additional 5% if safe driving standards were maintained. The Insurer argued that this not only helped to reduce the risk of accidents occurring, but promoted more efficient driving habits, reduced fuel consumption and, ultimately, mitigated GHG emissions (Santam 2011d).

The Insurer also launched a Solar-Water Heater (SWH) replacement scheme allowing its clients to replace their geysers with more energy efficient ones in the event of a claim (Santam 2012f). Again, the Insurer highlighted the energy savings and reduced environmental footprint this created, although internally the initiative was lauded for its ability to reduce the probability of claims reoccurring as SWHs are usually located on a property's roof and thus less likely to cause future water damage.

The company also started to engage other stakeholders, such as the Green Building Council of South Africa (GBCSA), to try and identify ways it could support progress that third-party organisations were making, such as promoting a market for sustainable construction, or by introducing insurance products that incentivised such growth (Santam 2011d; 2012b).

However, besides these new products, the Insurer also realised that it needed to develop 'multiple distribution channels' to help it diversify its risk exposure and to capitalise on the potential new lines of underwriting and markets emerging as a result of GEC (Santam 2011a). This mainly reflected concerns that the Insurers traditional markets were becoming too saturated:

> … there's a saturated market for conventional insurance. So if we have say 25% of the market, we can either grow by increasing rates or increasing share, or going into India or other countries and expand the market, which obviously we will do … (Reinsurance Manager, the Insurer [27])

Consequently, the Insurer acquired a number of smaller, independent and often highly specialised underwriters and brokerages that offered either the expertise or the footprint, or both, to help it move into new markets without the need to grow organically. In essence, the Insurer saw such acquisitions as the purchase of intellectual property (IP):

> IP is definitely the biggest component of it. So that's a strategy where we see buying certain investments could unlock a lot of value. (Investments & Corporate Finance Manager, the Insurer [37])

Key acquisitions included an independent commercial risks and property underwriting company that has since coordinated the Insurer's entry into the emerging renewable energy market in South Africa. Projects it has become involved in included a giant R 5.28 billion (US$ 480 million) concentrated solar parabolic trough project in the country's Northern Cape (Cover SA 2013). In their own words they are:

> … committed to renewable energy development and, by providing the appropriate products to unlock funding by the Lenders of large renewable energy projects, contributes to the development and sustainability of renewable energy in South Africa and Africa. (Cover SA 2013)

As the direct-insurance market has grown to over 20% market share in South Africa, another acquisition, regarded as one of the more strategic for the Insurer, was of a direct-insurance company. This allowed the Insurer to respond to the growing pressure it was facing from direct insurers in ways that did not threaten the more traditional, broker driven, side of its business (Moneyweb 2012).

However, the Insurer was also aware that it needed to expand beyond the physical borders of South Africa, to gain access to opportunities elsewhere, especially in some of the less saturated markets in the developing world. This led to 'a well-articulated strategy' of increasing the Insurer's presence across Africa and India, leading to a number of tactical investments in existing insurance companies in these regions (Santam 2011a). This also led to the Insurer realising that, besides being a primary insurer, it could start to offer reinsurance as a quick, easy and relatively low-risk way for the company to expand its business interests:

> … the idea is that could be a nice expansion initiative to get access to African markets … not to go and have to make the investment but to go and say – okay, you need capital, you need capacity – we've got a balance sheet that can handle your capacity. And it's a quicker way to get business from different sources and different places than to actually go and buy stakes in those entities. But there's also a regulatory environment to understand in all of that. (Investments & Corporate Finance Manager, the Insurer [37])

Thus, by realigning its resources, the Insurer was able to stay abreast of the changing underwriting needs of its clients, continue to expand the boundaries

of its risk pool, as it had started through centralising, and create market opportunities from the new boundaries of risk that were emerging.

Summary

Ultimately, the primary intention of the Insurer's research and modelling projects, its centralisation drive and the introduction of new products and services and entry into emerging markets was aimed at responding to GEC by improving the resilience of its underwriting portfolios. This response can be described as *defensive underwriting*.

The inherent value of defensive underwriting is its ability to link the cost of premiums directly to the actual probability of loss occurring. This allowed it to avoid exposure to the riskiest assets, make use of deductibles and excesses, diversify its risk exposure or simply withdraw from the highest risk markets altogether. This reflects why the Insurer felt that to adequately respond to GEC it needed to fully understand its exposure to GEC and to tighten its underwriting activities accordingly, diversify its portfolios and communicate its knowledge with the stakeholders best placed to promote adaptation and mitigation:

> Our philosophy then from a communication's point of view is to tell the person the story; be open and tell them what the story is. They are more likely to believe in what should be done once they understand what the issues are. And the conversation around then how we want to kind of get involved and get our hands dirty in terms of kind of maybe choosing to do the sand dune thing or whenever, is the second part of the process. (Corporate Communication Manager**,** the Insurer [46])

This view was reinforced by many of the industry principles the Insurer had aligned itself too, including the ClimateWise Principles and the UNEP-Fi PSI. Both emphasised how improving the ability of insurers to asses GEC risk was one of the most important responses the industry needed to undertake (ClimateWise 2012; UNEP-Fi 2012).

The Risk of Uncertainty

This raises questions as to why defensive underwriting was regarded as such an appropriate response to GEC. Here a number of reasons emerged including the various uncertainties associated with GEC, competition pressure,

operational and regulatory constraints and the ongoing influence of the paradigm that defines the short-term insurance industry's relationship to risk.

Scientific Uncertainties

While the Insurer continued to invest its resources in research and modelling, to help it better understand the threat of GEC and to strengthen its underwriting portfolios, ongoing concerns continued to emerge that its research was struggling to account for.

First, the Insurer found it increasingly hard to distinguish between whether the various environmental catastrophes it was being exposed to were indeed a consequence of GEC or a result of cyclical weather patterns. If the latter, it was felt that this exposure could simply be addressed within the Insurer's existing actuarial models. The result was that some staff, especially the Insurer's underwriters, felt that the actual contribution of GEC, as a driver of environmental catastrophes, remained a relatively small one:

> … it seemed that those losses were happening in the wetter cycle and it went for a two, three years in a drier cycle … So these natural cycles and let's call it variability in the weather … Now the long-term climate change that everybody talks about, where's the border between the normal variability between wet and dry and that? And that's not so clear. (General Underwriter, the Insurer [21])

This perception, that environmental catastrophes were inherently part of a cyclical process, was often reinforced by the Insurer's exposure to past losses. This was especially true in some of its more vulnerable lines of insurance - such as agriculture – that had always been highly exposed to variable weather patterns:

> … our CEO says, if you want to be in this business, we've made good money in crop for the last few years – guys, you have to deal with it, you're not always going to make good money. (Product Development Manager, the Insurer [36])

Second, even in instances where GEC was understood to be driving exposure to certain catastrophes, these were often found to be so statistically infrequent and irregular, that adequately assessing them was almost impossible. Examples included flash floods, hail and lighting strikes:

> The next thing is hail in Bethlehem. So next year … it's not an issue anymore, the hail is not in Bethlehem anymore, it's now in Brits. (Risk Services Manager, the Insurer [22])

This meant the Insurer often found itself lacking the necessary data to help it identify the patterns needed to defensively underwrite against such perils, as even the research and predictive GIS models being developed were proving insufficient. Thus formulating a response, either actuarial or otherwise, presented a challenge.

> … so we'll look at potential earthquake losses, flood losses, hail losses, etcetera. Now the problem with that side of it is there's very little data in South Africa on these sorts of events. (Reinsurance Manager, the Insurer [27])

Third, and partly as a result of their involvement in the Eden Study, the Insurer became aware that other systemic risks could further compound the impact of GEC. Examples, the Insurer saw elsewhere, included how increased sea-levels and unusually enhanced precipitation accentuated the losses associated with super-storm Sandy in the United States in 2012 or how a shift in the Jet Stream led to a cold snap impacting large swathes of Europe and North America in December 2013 (C2ES 2012; Frizell 2014). Closer to home the Insurer saw first-hand how an estuary mouth, in one of the areas of the country most impacted by flooding, saw an increased risk of flooding after silting up, and the local national parks agency failing to breach it in time, when the rains did eventually arrive (J. Nel et al. 2011a).

The result was that the insurer struggled to trust even its own analysis of GEC as there was simply so much inherent uncertainty in its drivers and potential impacts.

Actuarial Uncertainties

Similar uncertainties were found when it came to the Insurer's actuarial understandings of GEC. First, the Insurer had seen from international experiences how the proportion of insured loses, versus total economic losses, attributed to GEC, was far from uniform. For instance, while total insured losses, linked to Hurricanes Andrew and Katrina, exceeded 50%, only 13% of the 2011 Japanese earthquake and tsunami, was borne by the industry. This was mainly due to the low availability of tsunami cover in Japan (The Economist 2012). Even in Europe, exposure to environmental perils differed widely; for instance, flood cover is usually included as standard in UK policies but almost universally excluded across the Netherlands (Botzen et al. 2009).

Second, GEC often results in a wide variety of secondary actuarial impacts that insurers are often unprepared for. The Insurer's CEO, for example, provided an example of how floods in Thailand, in 2011, led to severe disruption of the local computer disk drive manufacturing industry. This, in turn, led to a significant downturn in global computer supplies and many global technical firms having to revise their financial projections as their profitability dipped (Kirk 2012; Carbon Disclosure Project 2014). Similarly, Hurricane Katrina resulted in a 95% and 88% drop in crude oil and natural gas production, respectively, in the Gulf of Mexico, while another study identified how the cost of labour and materials often rises, post-catastrophe, pushing reconstruction costs way above what insurers may have originally estimated (Kunreuther & Michel-Kerjan 2007; NAIC 2008). This means that accurately pricing policies, for the likely claims attributed to environmental perils, is even harder to do

Third, and as reflected in the Insurers search for new products and services, GEC also has the potential to be highly profitable for the industry. It offers insurers an opportunity to develop new, innovative ways for their clients to manage the risks associated with GEC (Mills 2009b).

Competition Pressures

Many of the inherent uncertainties, associated with GEC, were further compounded by fears of competition that had grown progressively in recent years. Like most commercial insurers, the Insurer's underwriting activities were framed by the need to maintain a stable underwriting profit, which, historically, averaged just 5%. However, this figure often deviated considerably, between the good and bad years and was often associated with the natural (hard and soft) cycles of the insurance market. The result is that, in reality, there is often 'not a lot to play with' (Broker Services Manager, the Insurer [33]) and the Insurer often found itself having to focus more on keeping its head above water, just to maintain financial stability.

> This means that often it is the markets that dictate what you're going to do, there's certain underwriting cycles and you get the soft and the hard markets - so it depends what the market is like. (Commercial Underwriter, the Insurer [24])

Part of the challenge is that, even when underwriting returns were good, and the underwriters exceeded their 5% profit target, there were concerns this could be regarded as excessive, and lead to pressure from regulators, clients and competitors to return excess profits back via reduced premiums or dividends (Economist Intelligence Unit 2012). Furthermore, given such small underwriting margins, the Insurer feared that its competitors were waiting to capitalise on any mistakes they might make, or risks they inadequately priced and to use the opportunity to steal market share.

This raised fears of *destructive competition* - where competitors choose, or are forced to reduce their premiums, well below actuarially sustainable levels, to grow or just protect market share (Leurig & Dlugolecki 2013). While this is less of a concern for the smaller insurance companies that are more mobile and flexible in their underwriting strategies, it was harder for the Insurer, as South Africa's largest short-term insurer, as they were under intense pressure just to maintain their existing market share. As summarised by one agricultural underwriter:

> The premiums drop and that's a benefit to the client; it's not necessarily a benefit to the broker or ourselves – we try and do that all the time because we think we can steal a margin on competitors and for us we think that scientific rating is, and not just scientific rating but proper assessment of risks is a competitive advantage - because with us the game is really about trying to obviously expand the market and to get risks that aren't presently covered – but for the existing market the competitive gain is about picking away misprice risks from your competitor. And they're trying to do that from us. (Head of Risk Services, the Insurer [20])

Thus the reality is that it is often levels of competition that ultimately dictate the pricing of risk. Indeed, premiums charged were rarely allowed to accurately reflect an assets true risk exposure. This meant that enforcing other elements of defensive underwriting - such as incentivising adaptation or mitigation measures - became far harder to achieve.

> I think the whole issue around market cycles of insurance, what we term soft and hard cycles, where insurers either try and gain business or try to put up pricing and have a harder stance or risk acceptance. And then the cycle where we're at the moment, we're in a softer market cycle; we tend to find that there's less underwriting done, so it becomes more difficult to enforce risk behaviour in a soft cycle. In a hard cycle it's easier and there's more congruence around the insurers. (Specialist Business Manager, the Insurer [39])

Of particular concern was the recent surge of new competitors that had entered the South African insurance market as this contributed to further diluting market share for the incumbents, as was happening with the Insurer's agricultural lines:

> … in the past three years our competitors became very very strong – and so we were not used, eight years ago we were the only insurer in South Africa… and now there are four competitors and our market share in terms of agriculture is probably now less than 50%. (Crop Insurance Manager, the Insurer [32])

Most evident was the sharp rise of the direct insurance market, the introduction of highly specialised niche underwriters. Even banks started to offer insurance (known as *bancassurance*) as part of a package with their traditional products, such as home loans (Cummins & Venard 2008b).

> … what I'm seeing in the market is you're getting more niche players coming and you're seeing it overseas as well, smaller players that will concentrate on those gaps that you leave now, because you'll just do the volumes here and the volumes there and the rest. (Commercial Underwriter, the Insurer [24])

The Insurer's biggest concern was that these new players did not compete on a level playing field. They used highly targeted and selective underwriting models and efficient and low-cost administrative hubs. This allowed them to be more selective about accepting only the best risks, which further diluted the quality of the remaining risk pool that the larger, less mobile, traditional insurers were forced to be exposed to just to maintain market share.

> … our personal lines market share has dropped quite significantly over the last four, five years – direct players have taken a lot of that market share … (Actuarial Manager, the Insurer [28])

The ability of these new insurers to enter a market, previously limited to those with the longest and most extensive data sets, was helped by the emergence of third-party modellers and risk assessors. This allowed even the newest and smallest insurers to apply highly sophisticated underwriting, that in the past only the larger insurers and reinsurers could afford. As one of the Insurer's underwriters claimed:

> … [they are] very sophisticated, which also could lead to other problems unless you get more sophisticated because we end up with all the bad risks and [they] could end up with all the good risks because they can price it better than what we can. (Claims Services Manager, the Insurer [30])

Furthermore, their centralised distribution models allowed these new players to bypass broker networks altogether and sell direct to the client, further increasing their control over their underwriting.

> OUTsurance has a claims ratio … of about 55% on a motor book, whereas we … will have maybe a 68% claims ratio on our motor book. So that's a fairly big difference in terms of profitability, and they can do that because they control their price, they pick and choose more … (Actuarial Manager, the Insurer [28])

Consequently, the growing levels of competition had started to undermine the willingness of the Insurer to engage the systemic risk landscape and encourage instead a focus on solutions that were inherently short-term.

Resource constraints

A host of other challenges led to the Insurer finding itself constantly facing an array of resource constraints that further compounded the pressures it was facing due to growing levels of competition.

These operational pressures meant that the Insurer struggled to allocate the necessary resources (i.e. time, money and human resources) to respond to even the normal everyday challenges it faced, let alone the broader, more uncertain and longer-term threats associated with GEC. As the Head of Enterprise Risk Management described:

> … everything is fighting for priority, everything's important, everything's, everything's costing something. (Product Development Manager, the Insurer [36])

While limited resources were a universal challenge facing the Insurer, this was most pertinent for risks lying at the periphery of the company's activities.

> … there's so much that needs to be done; we have to upgrade our technology, we have to develop our people, we have to expand our distribution. (Head of Strategy, the Insurer [41])

This meant that protecting the *golden triangle* (i.e. underwriting, distribution and claims) emerged as the primary focus of the Insurer's response to GEC.

The Insurance Paradigm

Over time, the insurer had established itself as an effective user of actuarial-based risk assessment tools to help it price and underwrite risk.

Staff continued to believe in the ability of actuarial analysis as a highly effective tool for managing risk and felt that most GEC exposure could still be addressed via the traditional underwriting tools within the golden triangle. This belief stemmed from the fact that actuarial analysis had worked so well for the Insurer in the past that staff struggled to imagine that any risk assessment technology could be as effective in protecting them from loss. As one underwriter explained:

> … how do you change something when people look back and say 'It has worked for us very well indeed.' So, why would we want to change something and begin to look at areas where we've got less? … (Stakeholder Relationship Manager, the Insurer [18])

Consequently, the Insurer understood that it had evolved to work in a certain way, with historical (actuarial) data continuing to play a central role in almost all of its underwriting activities. Given the time it takes for data to build up, those insurance companies with the most data have a competitive advantage and better actuarial accuracy, as data improves the accuracy at which they can assess risk.

> … we've got a lot, a lot, a lot of data – 92 years we've been in this business – there's a lot that we can do in terms of that. And if that was possible – for me that is on some level something needs to be happening on that level to do exactly what you are saying. (Personal Claims Underwriter, the Insurer [23])

This accounted for the popularity of predictive (GIS) modelling as it effectively integrated into, and built upon, the Insurer's pre-existing actuarial models, thereby continuing to justify the substantial investments it made in supporting its underwriting.

> … because we've got all this information, we know what the risks are and that's why we can put the necessary solutions in place and other people can't necessarily because we're big and we've been around the block and we've been here for a long time. (Market Development Manager, the Insurer [47])

This also reflected a far deeper industry-wide belief that ultimately actuaries remain well equipped to deal with GEC, even though they themselves currently acknowledge that there is a lot of work yet to be done (Grace 2012).

> So the whole risk division pride themselves on their competence in terms of assessment. In fact the Insurer's the best at it in the marketplace. (Head of Strategy, the Insurer [41])

This led to a resilient paradigm emerging within the Insurer that its role was to provide a market-based solution for managing risk and that as commercial

insurance has come to be defined by its use of actuarial analysis as a means of guiding defensive underwriting, this remains the most favoured response.

> … the actuaries run the risk systems in organisations. I mean [our competitor] yesterday have also now appointed an actuary as CEO. So we really need to almost in a way go and engage with the actuarial profession and say, you are at a cross-roads. (Head of Strategy, the Insurer [41])

This also accounts for why staff believed that the safest response to GEC was to simply avoid it if their historical data was unable to asses it adequately. In other words 'if you don't understand your risk, you shouldn't be writing it' (Actuarial Manager, the Insurer [28]). Consequently, some staff felt that what they were already doing, with regards to their risk-carrying activities, was enough and that GEC was just another threat to which the use of defensive underwriting would be capable of responding. Indeed, some even felt the Insurer had already gone beyond its mandate with regard to GEC, by sharing its research, seeking to support its clients to engage risk proactively and by introducing new products and services.

Thus the resilience of the Insurer's paradigm, that saw it primarily as a financial risk management tool, meant it was less inclined to respond to GEC in more systemic ways.

Ongoing Concerns: the *Actuarial Regression*

However, although the Insurer's primary response to GEC continued to try to identify ways to strengthen its ability to defensively underwrite, there were ongoing concerns that such a response failed to fully account for many of the changes it was beginning to see in the risk landscape.

This was due to the struggle the Insurer's actuarial models faced in trying to predict the future, based on the inherent uncertainties associated with GEC. As one of the underwriters explained:

> … we have historical data for many years obviously. But now that's also where the problem comes in, because it's no use, things don't stay the same, they change – so we must sort of predict. (General Underwriter, the Insurer [01])

This led to internal questions emerging about why the Insurer relied so much on actuarial analysis to help it manage its exposure to GEC. Some staff felt

that it was proving increasingly unhelpful in accounting for some of the uncertainties associated with GEC, as summarised by one of the actuaries:

> What do I insure, because nothing is going to be insurable maybe in 50 years. (Enterprise Risk Management Manager, the Insurer [26])

The fear was that the Insurer's on-going reliance on defensive underwriting could ultimately prove to be self-defeating. This was because focusing on defensive underwriting alone could lead to the Insurer responding to GEC in one way only, i.e. by excluding risk, but in an environment where the proportion of uninsurable risks (i.e. no longer sudden or unexpected) is continuing to grow exponentially. Some felt this to be a potentially unsustainable approach.

Summary

The above research has attempted to provide an insight into how the Insurer has responded to GEC, via its risk-carrying activities, and why. It described how the Insurer's main response to GEC has been to try and improve its ability to *defensively underwrite*, by re-pricing or withdrawing cover, tightening policy terms and conditions, or diversifying its portfolios, either by extending the risk pool or making use of various risk transfer mechanisms, like reinsurance.

It also describes how, in support of defensive underwriting, the Insurer invested substantially in research and modelling to try and better understand the threat and to develop new products and services to help it capitalise on the emerging opportunities. However, to streamline their operations and improve their ability to defensively underwrite, the Insurer embarked on a process of centralisation, closing many of its regional distribution centres, reducing broker influence over the pricing of risk, and channelling as much underwriting as possible via centralised - and increasingly automated - distribution centres.

There are a number of reasons why the Insurer continued to rely on defensive underwriting in this way. First, GEC presented it with an array of scientific and actuarial uncertainties that made understanding and responding to it highly challenging. Second, competition pressures discouraged the Insurer from

becoming more innovative, for fear of losing market share. Third, in practice GEC is just one of many operational and regulatory challenges insurers face. Fourth, insurers continue to believe in actuarial analysis as a means of helping them to avoid uninsurable risk.

However, this led to concerns that, by continuing to focus on defensive underwriting alone, an *actuarial regression* might result, where, by continually avoiding uninsurable risk, this actively reduces the Insurer's potential market of insurable risks.

Discussion

This chapter set out to improve our understanding of how and why the commercial insurance industry has responded to GEC, via its risk-carrying activities, in the way that it has, and what this tells us about the relationship between commercial insurance and the frontier barrier of the risk society (1992; 1999). It begins its analysis by drawing on claims that, contrary to calls for the industry to become more proactive in managing the various drivers of GEC, the industry's primary response has indeed been far more adaptive, of its own business activities, than mitigative (Leggett 1993; Paterson 1999; Paterson 2001; D. Nel et al. 2011; Phelan, Taplin, et al. 2011).

The Value in Centralisation

The insurance literature describes how, in responding to GEC, insurers began to invest substantially in climate research and in developing predictive models to help them better understand the specific exposure the assets they were underwriting were beginning to face (Changnon et al. 1997; Paterson 2001; Mills 2005; Mills & Lecomte 2006; Collier 2008; Mills 2009b; Mills 2012). This allowed them to develop new products and services (Kunreuther & Michel-Kerjan 2007; Mills 2012; Seifert & Lindberg 2012) and to tighten the conditions under which they underwrote risk, a process extensively described, but one this thesis terms as *defensive underwriting* (Changnon et al. 1997; Cummins & Venard 2008; Grace & Klein 2009; Sturm & Oh 2009; Mills 2012).

The findings of this chapter broadly support many of the claims in the existing literature. It describes how the Insurer's initial response to GEC was similarly

to strengthen its ability to defensively underwrite, by streamlining its actuarial models and systems, reducing its underwriting exposure to the most vulnerable assets and trying to better understand GEC by investing in research and the development of more forward-looking, predictive GIS models.

The Insurer became an active signatory of several international industry associations, including ClimateWise and the UNEP-Fi. This was done to both publically associate the Insurer with responding to GEC but also to leverage what other insurers have been doing internationally. Its hosting of the *Ecocentric Journey* conference and help in establishing the SAIA Climate-Risk Forum were driven by similar ambitions.

However, while many of the reasons behind these responses was to try to position the Insurer as a first mover in the GEC space in South Africa, it also became a means of helping the company to centralise its underwriting activities. It is here that the existing insurance literature fails to expand the full role centralisation now plays in helping insurers respond to GEC.

Traditionally, centralisation has been understood as a means of helping insurers to improve their operating efficiencies and to diversify risk more effectively via the use of mechanisms such as reinsurance (Morgan n.d.; Orie & Stahel 2013, p. 26). However, this study identified a far more important reason for centralisation. As GEC impacted the risk landscape the Insurer was being exposed to, the Insurer began to see its traditional underwriting models as increasingly out-dated and inefficient. This was due to the way risk was assessed at its satellite offices, its brokers being able to apply policy discounts and the numerous unaligned underwriting systems that had emerged.

By centralising, the Insurer believed it could adapt its underwriting model. This accounts for why the company reduced the size of its regional administrative footprint, centralised its underwriting activities within its COEs, reined in the negative influence its brokers had over the pricing of policies, and tightened the way it administered claims.

The Insurer believed that centralisation would help to improve its ability to defensively underwrite by standardising the conditions under which it underwrote risk or help it to avoid uninsurable risks altogether. It also helped the Insurer to more effectively diversify its risk exposure, as it had more access to the information needed for introducing new products and services and entering into new markets. This was reflected by its rapid expansion across Africa and Asia and into new lines of underwriting, such as reinsurance.

This deeper understanding of centralisation also helps to reinforce the existing claims that insurers have responded to GEC more via adaptation, of their existing business activities, than active mitigation of the drivers behind their increasing exposure (Paterson 1999; 2001; Phelan, Taplin, et al. 2011).

The Actuarial Paradigm

In trying to understand why insurers have continued to focus on defensive underwriting, as their primary response to GEC, the existing literature raises a number of suggestions. This includes the scientific and actuarial uncertainties associated with GEC, that make engaging it highly uncertain (Tol 1998; Mills 2005; Kron 2009), competition pressures and other constraints linked to the cyclical nature of the insurance market (Kunreuther & Michel-Kerjan 2007; Herweijer et al. 2009; Botzen et al. 2009; Sturm & Oh 2009; Mills 2009a), the fact that GEC creates opportunities linked to new products, services and markets (Dlugolecki 2008; Botzen et al. 2009; Grace & Klein 2009; Mills 2012; Chang & Berdiev 2013) and a much broader array of day-to-day operational (Santomero & Babbel 1997c; Mills 2005; Cummins & Venard 2008) and regulatory pressures (Cummins & Venard 2008b; Klein 2012).

This research helps to confirm most of these findings. However it also emphasises the sheer resilience of defensive underwriting in being regarded as a tried-and-tested means of protecting commercial insurers against risk exposure. Because it has worked so well for them in the past they continue to regard it as their primary risk-assessment tool. Actuarial analysis, for all the challenges it faces, continues to be a highly effective tool for helping insurers to both manage and respond to GEC, particularly over the short-term. Evidence of this is reflected in the resources the Insurer started to invest in, in

order to improve its actuarial models, and extend their capabilities where signs of weakness were emerging, such as by developing GIS models.

Traditional understandings of actuarial analysis suggest that the more extensive the data sets the better an insurer's ability to be able to asses risk and differentiate itself from its competitors (Tol 1998). However, security associated with large amounts of data is not automatic. The generation of government polls, for example, highlight how it's not always the size of the datasets that count, but rather the way the data is analysed (Priest 1996). This helps to account for why the Insurer, after identifying the threat of GEC, first tried to improve its ability to analyse its existing data (by centralising) and only then started to generate fresh data (by investing in GIS models).

This reaffirms how commercial insurance remains primarily about accurately pricing and managing its risk exposure via the use of defensive underwriting. It also accounts for why insurers appear broadly dis-incentivised from engaging GEC in ways that are different to how they have otherwise engaged risk in the past. This has led to a strategy where avoiding risk remains a more attractive option for insurers, as the threat of GEC continues to grow.

Actuarial Analysis and the Anthropocene

While issues of centralisation and the paradigmatic resilience of actuarial analysis are helpful in developing our understanding of how and why commercial insurers have responded to GEC, it also points to a more fundamental challenge facing the industry. Despite the fact that GEC has been identified as posing a threat to the insurance industry, and despite the fact that actuarial analysis - as insurers primary tool for predicting the future – is struggling to account for the changing risk landscape, insurers continue to have much faith in it (Leggett 1993; Berz 1999; Paterson 2001; Bougen 2003; Mills 2012).

To begin to understand this response, we turn to Beck's *Risk Society* thesis (Beck 1992; 1999). In it he describes the changing nature of risk in contemporary society, especially the way in which human development over the past 10,000 years - but in particular since the start of the industrial revolution - has fundamentally impacted Earth's ecosystem services

(Rockstrom et al. 2009; Science 2011). The risks associated with this are now recognised as both man-made and out of control (Giddens 1999). This is why claims have emerged that Earth is no longer in the era of the Holocene but has instead entered the Anthropocene (Steffen et al. 2007; Rockstrom et al. 2009; Biermann et al. 2010).

For the insurance industry, actuarial analysis evolved during a period when risk was understood in the context of the Holocene. This was when risk was regarded as a product of fate, relatively stable and thus predictable (Beck 1992; Giddens 1999). Environmental risk was seen as an *'act of God',* the drivers of which humans neither had control over nor needed to fully understand in order to calculate the probability of it occurring. Thus, accurately assessing risk only required the identification of the patterns of past loss, which happened often over very long-time frames, in order to help predict the future probability of them occurring again.

In the Holocene, actuarial analysis was the perfect risk assessment tool in a world where human activities were not believed to have impacted on nature and why actuarial analysis so quickly emerged as the primary tool insurers relied upon to help them assess their risk exposure (Tol 1998). In this context, actuarial analysis has been a highly successful and reliable risk assessment tool, with a long and strong track record of profitability that has allowed insurers to engage the risk landscape quickly and efficiently (Tol 1998; Maynard & Ranger 2011a). Indeed, actuarial analysis has helped commercial insurance to become the largest industry in the world, firmly establishing it as *society's primary financial risk manager* (Phelan et al. 2008a; Hecht 2008).

Yet, as the Anthropocene has become more entrenched, and social systems more aware of their impact on Earth's ecological systems, insurers have become more cognisant of the threat that debounded risks now present. GEC, in particular, can no longer be regarded simply as an *'act of* God', as GEC is now known to be caused, in particular, by the release of anthropogenic GHGs (Young et al. 2006).

This means that risk-carrying technologies that primarily look back, in order to predict the future, are becoming insufficient in a world where the probability of

future risk can no longer be assumed to reflect the past. This suggests that actuarial analysis, which evolved in an understanding of the world as framed by the Holocene, is increasingly inadequate for assessing risks in the Anthropocene, where environmental catastrophes no longer match the predictable patterns they once did.

Thus, this research highlights how the core assumption of actuarial analysis - that it is able to manage exposure to environmental perils as they are stable and predictable and therefore assessable over the long term - is beginning to appear increasingly like the industry's Achilles heel. Such fears would account for the continual warnings, by the industry, on how GEC is emerging as the primary threat facing the insurance industry over the 21st Century (Mills 2009a, p. 326).

However, one of the reasons why commercial insurance continues to carry so much faith in actuarial analysis, is precisely because it has worked so well for the industry in the past and that there are so many perceived and embedded advantages with having the most extensive data sets and strongest actuarial models (Tol 1998; Maynard & Ranger 2011a). This is why insurers' first response to GEC has been to try to strengthen their ability to defensively underwrite, improve the reliability of their existing data sets, increase their control over the underwriting process, diversify their risk exposure via the introduction of new products and services, enter into new markets and to focus on centralisation.

However, by continuing to focus on actuarial analysis, insurers may be committing themselves to risk assessment tools that are increasingly unsuited for helping them to assess and carry risk in the Anthropocene.

Commercial Insurance at the Frontier of the Risk Society

Understanding the complex relationship between actuarial analysis and the Anthropocene also begins to account for why some 'risk society' theorists have suggested that debounded risks often lie 'beyond insurance' and why traditional commercial insurance mechanisms are now struggling to assess and carry them (Beck 1992, pp. 100–101; Baker & Simon 2002).

One of Beck's most important claims is that commercial insurance is *the* institution that operates at, or marks, the frontier barrier of the risk society. It is therefore commercial insurance that defines whether a risk is *debounded* or not (Beck 1999; Bulkeley 2001). However, other theorists have refuted this claim. They have argued instead that commercial insurance has always been selective about which risks it underwrites, that many of the risks Beck claimed to be uninsurable (such as nuclear energy and terrorism) in fact often are and that not enough empirical research has been undertaken to confirm such claims (Ericson et al. 2003; O'Malley 2003; Bougen 2003; Doyle & Ericson 2004).

Doyle and Ericson (2004), for example, examined the way in which commercial insurance responded to the 9/11 terrorist attacks, concluding that insurance systems worked 'reasonably well' in adapting to the new risk landscape they faced and that, since then, terrorism cover has remained widely available (2004, p. 169). They conclude that insurers thrive on the uncertainty associated with catastrophic risks and that the industry has a strong track record of turning uncertainty into opportunity, dating as far back as the 1970s (Friedman 1984; Collier 2008, p. 164). Similarly, Bougen (2003) argued that one particularly effective adaptation by the industry has been the securitisation of catastrophe risk and the spreading of exposure across the financial markets, particularly via the use of CAT-Bonds.

Yet terrorism catastrophes differ from GEC induced ones in that, although the scale of the former's impact has increased in recent decades, they still meet the basic insurability test; that they remain defined as both *sudden and unexpected*. This accounts for why insurers have responded 'reasonably well' to absorbing or accounting for even the largest terrorist catastrophes via the continued use of defensive underwriting (Ericson & Doyle 2004).

In contrast to terrorism however, the impacts of GEC, while often sudden, are becoming less unexpected in the Anthropocene (Swiss Re 2013). Even the Insurer was seeing this at the local level, in how it had to repeatedly readjust its flood lines, in certain areas, reflecting the changing risk landscape it was being exposed to. In one example the flood risk changed from a 1-in-50 year, down to a 1-in-10 year probability. In this instance, once the risk of flooding

was no longer unexpected (i.e. below 1-in-10) the Insurer argued the risk was uninsurable and withdrew cover.

This suggests why, in contrast to terrorism, the tendency of insurers has been to retreat from GEC, rather than to try and identify ways to accommodate it (R. Ericson & Doyle 2004). Even the efficacy of CAT-Bonds - as a means of responding to GEC - still needs to be proven by a quick succession of large losses (Bougen 2003). Thus the frontier of the risk society appears to be not as clearly defined as Beck initially suggested, nor as automatically insurable as others have subsequently implied (Beck 1992; 1999; Bougen 2003; O'Malley 2003; Ericson 2005). Instead, insurability appears to vary depending on the type of debounded risk and its inherent degree of sudden and unexpectedness.

This research also found evidence of other forms of *insurance* emerging in areas where actuarial analysis had already prompted a retreat in commercial insurance. One example, from the Insurer's agricultural business, was when the risk of drought became so high that the corresponding cost of insurance rose to unsustainable levels for many of its clients. The result was that some farmers turned to other forms of *insurance* to protect them from loss. They started to make direct use of climate models, undertake scientific soil analysis, diversify their types of crops and geographical spread of farms and make use of genetically modified (GM) plants and fertilisers to improve agricultural yields.

Farmers, shunning the high cost of insurance, were turning to the same *science and technologies* that had created the unintended consequences of debounded risk within risk society and historically, within the Holocene, had also helped commercial insurance to emerge as society's primary financial risk manager (Beck 1992; 1999; Hecht 2008).

This pluralism of *insurance technologies* within the risk society is beginning to impact other, more traditional lines of commercial insurance, raising questions about what impact technological advances may have in rendering some actuarial-based insurance redundant. Examples include advances in engineering that led to the almost 'indestructible' design of One World Trade or Google's driverless car that could eliminate, almost entirely, any negative

human influence so often associated with vehicle claims (Matson 2011; The Actuary 2014). Even developments in genome mapping are now improving the ability to predict diseases and reduce the need for protection against certain sudden and unexpected illnesses (Carroll & Ciaffa 2003).

Furthermore, many other high-risk industries, such as aviation and shipping, are beginning to reinsure themselves away from commercial insurance, thanks both to an increasingly connected financial market - willing to gamble on risks insurers often won't or can't – or via the establishment of compulsory disaster funds by governments (O'Malley 2003; Ericson & Doyle 2004, p. 163).

This builds on the theory of Ericsson and Doyle (2004), who hinted that it is not private insurance that marks the risk society's frontier barrier, but instead a far broader array of *insurance* that can be termed the *technologies of insurance*. In this light, the risk society really is balancing 'its way… beyond the limits of insurability' (Beck 1999, p. 30–31). However this insurability appears to be less about commercial insurance and more about the new technologies of *insurance* emerging within the risk society.

Conclusion

The aim of this chapter was to try to understand how and why commercial insurance, via its role as a risk carrier, has responded to GEC in the way that it has and whether this could improve our understanding of the relationship between the industry and the frontier barrier of the risk society.

In so doing, the research confirms how the commercial insurance industry has responded to GEC mainly by trying to improve its ability to *defensively underwrite*, by investing in research and modelling, introducing new products and services and centralising its administrative and underwriting operations, both to reduce overheads and, as the study highlighted, to gain increased control over their underwriting.

The reasons why insurers continue to focus on defensive underwriting, as their primary risk-carrying tool, is linked to the scientific and actuarial uncertainties associated with GEC, increasing competition pressures and a host of other operational and regulatory challenges. Furthermore, insurers

continue to remain trapped within a paradigm that focuses their role as providing society with a financial means of transferring risk to others better equipped at carrying it, rather than directly engaging the drivers of risk.

This chapter described how actuarial analysis evolved during the Holocene, when risk was regarded as stable and predictable and the past therefore a good indicator of the future. However, in the Anthropocene, where exposure to risk is now growing exponentially, actuarial analysis is proving increasingly inadequate for accurately assessing risk.

This has led to the emergence of an irony for the insurance industry: the very science and technologies that helped it to grow into the industry it is today, are the same science and technologies that now provide society with an alternative form of *insurance* as the cost of commercial insurances grows too high. Thus, the chapter found that it is not commercial insurance that marks the frontier barrier of the risk society, but rather the science and technologies that collectively make up a much broader bricolage of *insurance*.

CHAPTER FIVE - INSURERS AS RISK MANAGERS

Introduction

This chapter explores how the commercial insurance industry has responded to GEC via its activities as a risk manager. It does so by drawing on an empirical investigation of a large South African short-term insurer, supported by several interviews with a number of large insurers and reinsurers internationally.

The chapter is divided into three parts. The first examines how the insurance industry has responded to GEC as a risk manager. The second tries to understands this response in the context of the operating environment increasingly facing insurers. Lastly, the discussion builds on the findings of chapter four by understanding why insurers have responded more mitigatively than adaptively to GEC.

Managing the Impact of GEC

The Value of Research

As the Insurer became more aware that its traditional underwriting models were struggling to adapt to the realities of GEC, and that defensive underwriting might be a potentially unsustainable response over the long-term, so staff started to become more cogniscent of the need to be more pro-active in managing risk.

There were two main reasons for this. First, the company was beginning to identify how many of the catastrophes, previously assumed to be isolated incidents, were now reoccurring. This raised questions around their future insurability, as one local representative described in relation to recent flood losses:

> I said look, this is the first time, maybe there is going to be a second time. What can we do to reduce risks? And they said ... maybe it's once off, we are not going to worry about it now. So afterwards [the second event] they realised and started to listen to us ... We must make a profit in the Garden Route and can't say every year sorry we had a flood ... (Insurance Relationship Officer, the Insurer [05])

Second, its participation in the Eden Study accounted for how many GEC-related threats, impacting the Insurer's underwriting portfolios, were themselves influenced by 'proximate' drivers of risk, which key stakeholders, such as municipalities and large landowners, often influenced. The impact of deforestation and land-surface hardening, for example, fundamentally influenced flood risk (UNEP-Fi 2011; Nel et al. 2011).

The Eden Study had proposed a number of strategies insurers could explore to become more proactive in responding to GEC. This included directly engaging key stakeholders to start improving their influence over proximate risk (e.g. harvesting plantations at the end - rather than the start - of the rainy season or making more informed planning decisions). As the Head of Strategy explained:

> We're on UNEP-FI, we're on ClimateWise, we're talking, we're publishing – we've done enough externally in terms of engagement. What we now need to do is look at our value chain and change how the business runs. (Head of Strategy, the Insurer [72])

The new awareness of the drivers of GEC highlighted to the insurer how many risks could be managed outside of the traditional client-insurer relationship.

Promoting Loss Prevention

This led to the Insurer starting to explore how it could manage risk within its existing underwriting portfolios and try to identify how it could promote loss prevention responses.

The broader insurance industry has always regarded its clients as best placed to manage their own risk exposure. This is because they are often not only the most aware of the risks they face, but are often best placed to undertake the necessary adaptation or mitigation measures required (Mills 2012; ClimateWise 2012). The Insurer similarly felt that its clients needed to take more responsibility for managing their exposure to GEC:

> …the risk landscape has changed and that demands a different behaviour from the client. And if a fire brigade, as an example, can no longer take 10 minutes to get there but now but takes one hour – well, then the client needs to take certain actions. (Specialist Business Manager, the Insurer [38])

Its primary approach to achieving this was to rely on defensive underwriting (as outlined in chapter four) to help tighten the conditions under which it agreed to underwrite such risks. The centralisation of its underwriting activities and integration of the various research and GIS projects, it had either commissioned or participated in, were crucial in this regard (e.g. UNEP-Fi 2011; Santam 2012f).

The marketing department launched a project to try to improve its understanding of what their clients' specific needs were in relation to GEC, hoping this would allow the company to increase the value it offered them via the services it provided.

> And what we did some time ago is look at… what are our major risks and what can we do to help our clients proactively mitigate those risks before they actually have a claim. (Product Development Manager, the Insurer [35])

The project identified how, after cost and ease of administration, clients sought a collaborative risk partnership with their insurance company, one that would support them in the event of loss and provide the technical advice necessary for helping them to properly manage their risk exposure:

> We've recently done quite extensive work with our marketing department to determine what clients, what value proposition they are actually looking for. And it's interesting that of course they want value for money and they want everything to be very easy – but they're looking for a collaborative relationship with the insurer: they want a technical specialist, knowledge, access to that, so that I think there is an awareness already that things are changing but we don't always have sufficient information to take a pragmatic approach to that. (Property & Corporate Underwriter, the Insurer [30])

In response, the Insurer's staff realised that good communication and education was crucial in helping them to account to policyholders why they needed to tighten the conditions under which they underwrote risk and what their clients could do, in response, to reduce rising policy costs:

> So we need to be able to explain risks to people, first of all. Now you need to have – there has to be a relationship even with the client in terms of the client understanding their risk – and then being able to help them either transfer the risk or find other means of mitigation. (Personal Claims Underwriter, the Insurer [22])

The company also started to engage its clients via its traditional communication channels. They published a regular stream of media releases, on a wide array of GEC-related topics, to both inform clients around GEC and promote adaptive or mitigative responses (Santam 2012d; 2012a; 2013a). In

some instances the Insurer even started communicating directly with its clients around some of the specific threats they were facing, particularly those that their GIS models had started to identify. The hope was that this could encourage a more concerted response to risk management (Fin24 2009).

On its website, a ‘Manage Your Risk’ section was established. It offered extensive information on how to both ‘Know’ and ‘Control’ an array of environmental hazards (including flooding, hail and wild fire) and across different lines of insurance (such as personal, commercial and agricultural) (www.santam.co.za). The website also collated news articles published by third-party media sources, ranging from advice for farmers on how to plant crops in the face of changing climate patterns, through to extreme weather warnings aimed at giving clients the time to protect their properties (Santam 2013e; 2013d).

The Insurer also explored ways to engage its clients via the introduction of a loyalty scheme. By doing so it hoped to build closer ties with its clients, improve levels of client retention and reduce the risk of loss by promoting low-risk, or risk-averse behaviours:

> … some of the primary drivers behind the loyalty scheme, just really to keep customers by giving them some of the benefit of our procurement power essentially. And what we want to do as well is to direct, to encourage risk appropriate behaviour and provide more reward as people demonstrate that … But fundamentally we sit with a strategic problem that because we mostly deal through brokers, customers don’t know that they’re with [the Insurer] … and then you hook them in and you say, well, actually there’s a whole world of risk appropriate behaviour out there … (Head of Risk Services, the Insurer [41])

Outcomes from this loyalty programme included the pay-as-you-drive (PAYD) insurance product that rewarded clients, via reduced premiums, for maintaining safe driving habits (see chapter four), a 20% premium reduction for clients that used one of the company’s preferred ‘risk partners’ to install lightning and power surge protectors, and support for the installation of solar-water heaters (SWH) following a burst geyser (Santam 2012b). The Insurer argued that this SWH project would help to raise climate awareness amongst its clients, influence them to reduce both their ecological footprint and energy bills and improve the company’s relationship with key stakeholders, such as Eskom (South Africa’s national energy supplier) (Santam 2010).

Encouraging their clients to manage their risk emerged as a logical first step for the Insurer, as it helped it to respond to GEC in traditional ways to emerging risk. This was by engaging the client to become a more proactive risk manager.

Directly Managing Risk

However, the Insurer also started to try to identify ways to directly manage some of the systemic elements of GEC it was beginning to face, and that had emerged out of its various research and modelling activities.

The company's sustainability report provides an insight into how it saw its role in this regard, especially the belief that other stakeholders should be encouraged to take more responsibility in managing GEC risk:

> We engage with policymakers, clients, government and other affected stakeholders to develop constructive collaborations that enable us to continue playing our role in supporting sustainable socio-economic growth in our country. (Santam 2012f)

In the past, some of the company's regional staff had represented the Insurer at various community organisations that, to some degree, had attempted to address risk locally. One of the Relationship Managers described how he was on the board of both the local Chamber of Commerce and represented the Insurer at a number of regional farmers associations, which he saw as vehicles for helping to escalate local concerns up to the municipality.

> I'm a member on the chamber of commerce. And from there we put certain problems on the table and from there it gets escalated to the municipality (Relationship Manager, the Insurer [05])

However, he cautioned that the role he played was more to highlight concerns, rather than actively try to manage them, mainly due to a perceived lack of influence, and authority, these associations often had over the actual drivers of risk:

> Look we can get involved in so many things on, involved the chamber of commerce, at the farmers association, on involved in certain committees here, trying to represent [the Insurer] ... Look at the end of the day we can't resolve that problem but we can be the spokesperson and I can bring the right person to the table, to say look, we have this problem. (Relationship Manager, the Insurer [05])

However, following the Eden Study, the Insurer became more aware that it was not an independent stakeholder, acting alone in underwriting risk, but

instead part of a much broader risk management community. It increasingly saw active participation in collaborative partnerships as a viable option for helping to manage its risk exposure (Santam 2012f).

> I think it has dawned on the business that our way of operating, into the future, it will have to begin to be inclusive, to involve partners and partnerships. (Stakeholder Relationship Manager, the Insurer [17])

The Eden Study prompted the Insurer to begin to refer to the risk landscape more as a 'collective' environment, where systemic risks impacted a wide variety of different stakeholders and often in multiple ways (UNEP-Fi 2011; Nel et al. 2011). Thus, responsibility for managing risk inevitably became a 'shared' one, a term that itself was growing in use within the business management literature (Porter & Kramer 2011a).

> I think everybody realises you can't do it on your own. I mean, the more and more we unpack the systemic risks, you realise how are you going to approach the mitigation – and I'm not talking mitigation in terms of climate change but our normal risk mitigation, saying, okay, [we] can price and we can do this but we have a market in which we compete, we have a system, we have economy that needs to be viable, and how do you play all those cards almost? (Enterprise Risk Management Manager, the Insurer [25])

However, as the Eden Study was a pilot project, the Insurer needed access to more research to help inform it where it should focus its attention if it was to become better at managing the systemic drivers of risk. It saw universities as a crucial research partner in this regard, as it felt it could collaborate with them, as it had done with the Eden Study. The Insurer believed this would help to not only spread the uncertainties associated with undertaking GEC research but also the cost.

> So our lever must then be to fund projects around scientific work that's by credible stakeholders that actually gets out into the domain where it's heard, understood, grappled with and worked with. We could facilitate but it's more a facilitation role than anything else. (Head of Risk Services, the Insurer [19])

This reflected concerns that any research programme would need to be extended to a dialogue between the commercial insurance industry and academia and that insurers needed to play a far more active role by highlighting any errors, mistakes or misguided assumptions they saw emerging from the research:

> You've got to go to the universities and say, listen, guys, I don't agree with your design concepts; you're not compartmentalising, you're not lifting this, you're not doing that, you're not doing this. (General Underwriter, the Insurer

[39])

This led to the Insurer launching a number of research projects that sought to put the findings of the Eden Study into practice. It engaged the South African Council for Scientific & Industrial Research (CSIR) and the WWF to identify tangible ways it could start to engage systemic risk within the Eden Municipality.

Such a response was not entirely new to the company. Indeed, the Insurer had historically engaged in research, in-house, around commercial farming, as its agricultural business had always been particularly vulnerable to GEC and its farmers often needed support to either adapt to or mitigate some of the risks they faced, just to maintain the cost of insurance at sustainable levels. This led to the establishment of an experimental test farm, where ongoing research explored the impact that changing weather patterns were having on crops and livestock and how new cultivars were responding within a South African context (Moneyweb 2014). The Insurer also used the farm to help justify to its agricultural clients how it assessed claims and to help provide reasons for sometimes avoiding the underwriting of certain crops altogether.

> We've got an experimental farm in the Free State, where they look at crops, drought-resistant crops, where they give farmers advice on weather patterns, when to sow, when not to sow, hail impact, etcetera, etcetera. So it's very much around working with the crop farmers and learning and how they adapt to the environment – which has been very interesting. I'm not so close to that but the agricultural guys work very, very closely and they even sort of share weather reports and things like that with the farmers – so it's very proactive. (Head of Strategy, the Insurer [40])

A well-known agricultural specialist was employed who not only brought with him a scientific agricultural background, but also extensive experience in supplying farmers with detailed information on when to plant crops, how to understand medium-term weather forecasts and other, more systemic, factors such as how global crop production might impact local prices. The Insurer hoped this would all help to make agricultural policies more relevant and applicable for farmers while improving the accuracy of their own underwriting models (Santam 2012f). As the agricultural specialist explained:

> … because of my involvement with farmers and risk, I joined them with product development, to see if I can develop products for insurance, taking the climate risk into consideration. (Specialist Crop Insurance Manager, the Insurer [31])

Support was also offered for some of the more specific environmental threats farmers faced. This included the funding of several Fire Protection Associations (FPAs), that pooled local resources to fight wild fires and that prioritised its own members when fire threatened. The Insurer offered premium discounts to participating farmers on the basis that this would ultimately improve their risk profile.

> So we work closely with the FPA, Fire Protection Association. And they did a whole survey of all the fire brigade – so we classify areas and say in this area we know the fire brigade is not effective – so we add higher fire rating in that area. So we've done that to an extent, but it's more to adjust your rating according (Commercial Underwriter, the Insurer [23])

Besides their specific response to GEC, examples of systemic risk management were also found in other parts of the company. The claims department, for example, responding to a general increase in the cost of administering claims, had started to rein in some of its more errant suppliers. It made a number of small, strategic investments in key suppliers that it felt represented a microcosm of their respective supply chain. The claims staff hoped this would provide them with an insight into how these supply chains worked and, ultimately, how they could start to manage the costs over which they had previously no control.

These investments included a company responsible for assessing the merit of high-value claims, made by the client, hoping that this would help to improve how they administered claims, and address the threat of fraudulent claims occurring in the future (Santam 2013c). As the Head of Claims explained:

> With the [supplier] we felt that we needed to move very close to them to see what they were going to do because they are in the first line of interaction with the policy holder and that could potentially be very sensitive and it could be sensitive for our brokers as well. So we had to be close to the action, beyond the management committees and board representation and all of that … (Investments & Corporate Finance Manager, the Insurer [36])

They also invested in a small mobile vehicle windscreen and dent repairer (Santam 2013c). Again, this was done as it represented an element of their business they lacked full control over and was a service for which they often ended up paying well above market rates. By better understanding the dynamics of these supply chains, the Insurer hoped it would allow them to negotiate more confidently with other suppliers in order to reduce their costs.

> … we want to have access to how do you truly cost how much it costs to repair certain elements of a car. We've never had access to that data, I think there's so many suppliers in the chain that takes us for a complete ride and we never knew what the true data is. (Investments & Corporate Finance Manager, the Insurer [36])

The solar water heating (SWH) replacement scheme was also an initiative of the claims department, albeit in partnership with the Corporate Social Investment (CSI) department (see chapter four). This was based on the large number of geysers the Insurer replaced each year. They felt the project could offer them significant support for the growth of the SWH industry, but also create significant branding and marketing opportunities:

> … [the Insurer] replaces hot water geysers by the thousands every year. And there's a project to drive with Eskom the replacement of these electrical geysers with solar driven geysers. So that initiative is already running. (Adjustment Services Manager, the Insurer [37])

However, the scheme struggled to grow, not just because it was hard to administer but because clients proved reluctant in contributing additional funds to upgrade their geysers, even though the long-term savings in energy were so clear.

Although the Insurer had become more active in managing risk, the main focus of its risk management continued to focus on directly managing the threats faced by individual assets, rather than engaging the broader drivers of GEC as the Eden Study had proposed. The establishment of its experimental test farm, the introduction of its PAYD policies and SWH scheme reflects this rational. Ultimately, these responses helped to improve the company's underwriting losses.

Engaging Governments

The Insurer believed that it was the responsibility of the various spheres of government, in particular local municipalities, to manage GEC, as they were far better placed, and motivated, to manage its systemic drivers. Having already assumed the role as the representative of the local South African industry on GEC, the company became increasingly active in its participation in many of the global dialogues around climate adaptation and mitigation, including the UNEP-Fi, ClimateWise and the Carbon Disclosure Project (CDP) (Santam 2012b).

Consequently, the Insurer was invited to join the governing board of the UNEP-Fi's Principals for Sustainable Insurance (PSI), and to start hosting the African chapters of its regional meetings (Santam 2014). It used these affiliations to actively promote the findings of the Eden Study and call for a more concerted response to systemic risk management across Southern Africa.

The Insurer also became a regular attendee at many of the international meetings on climate change, such as the UNFCCC climate conferences (Santam 2011e, p. 1–2). The official report of the Eden Study was launched, in partnership with the UNEP-Fi, at a high profile side-event at the COP-17 in Durban in 2011 (UNEP-Fi 2011).

At the national level, the Eden Study helped to reinforce just how important the government was as a driver of proximate risk and how, through its actions or inactions, it could significantly exacerbate the degree of risk that insured assets faced (ibid.). One recurring example of this was the role governments played in allowing development to occur in geographic regions known to be high-risk and which could ultimately lead to excessive risk exposure for home owners and, ultimately, the insurance industry (Kunreuther & Michel-Kerjan 2007; NAIC 2008; Grace & Klein 2009; Nel et al. 2011b; Staib & Bevere 2011; Swiss Re 2012b). As the Risk Services Manager explained:

> Because you have now to go to government … to say – listen guys, you can't develop … any more properties in this area or in this fashion – we need to change collectively … it's a new environment, it's a lobbying environment, it's a collective environment. (Risk Services Manager, the Insurer [21])

However, part of the challenge was that the Insurer regarded government as struggling to adequately enforce rules, let alone to start engaging the systemic drivers of risk. Illustrating this, one underwriter described how municipalities tended to rehabilitate flood-damaged roads, rather than use the opportunity to upgrade them against future flood damage. Many of the Insurer's staff felt this was often linked to a lack of resources or capacity within local government that, in itself, has long been identified as a challenge facing development in post-Apartheid South Africa (Boraine et al. 2006; Swilling 2010; Marais 2011):

> In the olden days you had the fire inspector going to the petroleum depot once a year and check that everything is in order – and that's not happening. We have a lot of buildings that's not complying to the national building regulations,

> and we're finding more and more buildings that's been built according to a rational design, which are being signed off by a municipal person or a fire brigade department there, that doesn't understand the impact of what he's signing off. (Property & Corporate Underwriter, the Insurer [30])

Nonetheless, the Insurer did attempt to incentivise local governments to become more proactive in managing proximate risk. However, they believed that their only viable negotiation tool was threatening to withdraw insurance cover altogether away from the most high-risk areas:

> We had flooding in 2003 or 2004; the government didn't sort of clean everything and make sure that everything works. And we then told government, guys, you need to manage this thing otherwise we won't be able to insure you. In 2008 – same thing; our damage was double of our catastrophe claims. We then went to government to say, but, sorry, now we can't insure you anymore – and the whole industry did. So Mariental today doesn't have any storm damage cover. (Broker Services Manager, the Insurer [33])

This underlined a general consensus that engaging municipalities was often not worth the effort as it failed to yield results and was akin to 'farting against the thunderstorm' (Adjustment Services Manager, the Insurer [37]). It was therefore seen as easier, and safer, to simply rely on defensive underwriting to avoid exposure to excessive risk than try to manage it.

However, in 2010, the Insurer created a new position within the company and appointed a Stakeholder Engagement Manager. His initial role was to act as an 'access card' to 'new, unconventional or non-traditional markets' (Stakeholder Relationship Manager, the Insurer [06]). He was to offer strategic financial support to municipalities in the expectation that this would help to foster future business opportunities:

> So the whole concept is driven from a point of view – how does [the Insurer] position itself into getting access into new markets? And so market development … is a division which I report into. And within that division sits the three subsidiary departments … Sustainability, CSI and then Stakeholder Management … we are the access card for [the Insurer] into the unconventional new and non-traditional markets … We do it by … making donations, by supporting initiatives financially. (Stakeholder Relationship Manager, the Insurer [06])

Following the publication of the Eden Study, however, and increased awareness of the benefits attributed to managing systemic risk, the role of the Stakeholder Relationship Manager was changed to explore how the Insurer could engage local governments specifically around GEC-related issues (Risk SA 2012a). This acknowledged that the Insurer could no longer continue with

a policy of simply withdrawing from poorly run municipalities, as this would ultimately undermine their long-term sustainability. Instead, to remain a relevant, responsible South African corporate citizen, the Insurer needed to be seen to be partnering with government around the management of shared risk.

One of the first projects to emerge from this was the Insurer's participation in the South African government's newly established Business-Adopt-a-Municipality (BAAM) programme. BAAM sought to 'foster a closer working relationship between government, private sector and State Owned Entities (SOEs) towards supporting vulnerable municipalities' (South African Department Cooperative Governance 2012). A strategic Memorandum of Understanding (MOU) was signed by the Insurer, the South African Local Government Association (SALGA) and the Department of Cooperative Governance (DCoG) focused on improving disaster resilience within five local municipalities, through the provision of financial and organisational support (Risk SA 2012a). A number of initiatives emerged out of this. Following the storm and flood losses the Insurer had faced in the Eden Municipality, it supported the local Disaster Risk Management (DRM) department to establish an early warning system that informed local residents and disaster responders of impending weather threats (Santam 2013d). The Insurer also donated over R 2 million (US$ 177,000) worth of fire-fighting equipment to support other municipalities struggling to manage wild fires (Santam 2013f).

Staff argued that by offering support to weak municipalities in this way, not only helped the company to meet its CSI obligations but potentially helped to reduce claims and to promote the Insurer as an active corporate citizen in South Africa. As one of their annual reports conclude:

> To ensure business continuity in the aftermath of a disaster, risk management initiatives - involving government, business and municipalities - are essential to preserving lives, property and economic vitality. (Santam 2013d)

Furthermore, as CSI spend is legally mandated in South Africa, the money the Insurer was spending was obligatory. This was seen as helping to reduce pressure on those coordinating the Insurer's engagement with BAAM and to prove their investments from an operational perspective. However, the

expectation was that any long-term gains made in managing systemic risk, might encourage other departments to buy in:

> … we just have to show the benefits… so that we can get buy-in and support. But that funding sits directly in our control and it's already been committed. (Sustainability Manager, the Insurer [24])

Yet BAAM was not straight forward, and presented the Insurer with a series of challenges, in particular the need to accommodate political considerations, such as avoiding to be seen to favour one political party over another. This meant that many of BAAM's efforts were not always done purely from a risk management perspective:

> … if [the Insurer] only pumps in money here, you've got all kinds of political things as well. You know, yes, this municipality is vulnerable, we adopt that one – it sits in an ANC constituency – oh, Santam promoting ANC. You know, it sits in a DA constituency – oh, whatever – so we're sitting with that. (Stakeholder Relationship Manager, the Insurer [17])

Corruption has long been a problem in South Africa, with the country dropping, in 2013, to a ranking of 72 out of 152 countries recently surveyed in the Corruption Perception Index (Lodge 1998; Corruption Watch 2013). This highlighted serious concerns within the Insurer around the risks associated with engaging government, as any funds provided might not achieve what they were initially intended for and this would ultimately impact the Insurer's influence over systemic risk. As one of the Underwriters explained:

> I've always said it's not about paying the money; it's about putting somebody in that can think a little bit out of the box to create solutions. (General Underwriter, the Insurer [39])

Thus, although the Insurer regarded government as a crucial manager of systemic risk, there were many challenges associated with engaging it, and, in some instances, this appeared to be so high that there were concerns that this outweighed any possible risk reduction benefits.

Leading by Example

In keeping with a broader shift within the insurance industry, the Insurer also started to lead by example, particularly by improving its own levels of in-house sustainability. This was prompted by the Insurer's obligations as a signatory to both the ClimateWise Principles and the UNEP-Fi PSI (UNEP-Fi 2012; ClimateWise 2012). However, staff acknowledged that there were significant

monetary benefits associated with reducing the company's consumption of energy, water and in its generation of waste. Responsibility for this fell on the shoulders of the CSI & Sustainability teams who argued that if the Insurer was to carry any weight in influencing other stakeholders to manage risk, they too needed to be seen to be doing the right thing:

> We don't believe that we can actually go out there and really be authentic and really stand for green if we're really not green all over. So we realised that we had to start looking at finding ways to make sure that we do the right things first. (Product Development Manager, the Insurer [35])

The initial response focused on 'the activities of [the Insurer's] employees and suppliers, and the resources consumed in [its] buildings' (Santam 2012f, p. 18). This included managing energy consumption, water use, the production of waste and business travel (ibid.). Most of the interventions were linked to various resource efficiency targets that saw the installation of low-voltage lighting and motion sensors, water filters, the introduction of an in-house recycling scheme and support for the rollout of 'electronic document processing' (Santam 2010). The company also started to annually calculate and publish the progress it was making towards achieving environmental neutrality (Santam 2012f; 2013b).

However, as the company's Head of Strategy noted, the actual environmental footprint of an insurance company is a relatively small one, especially compared to companies in other, far more carbon-intensive industries, such as mining, energy generation or steel production (Herzog 2009). This led the Insurer's staff to believe that their influence over other stakeholders in the insurance value chain, especially their suppliers, could result in far greater environmental benefits than by focusing entirely on their own in-house contributions. In this regard, the company's Risk Forum (see chapter four) started to play an increasingly important role in helping to facilitate supplier engagement:

> … for an insurer the direct impact is actually very small – it's the indirect impact that really creates the leverage – and that we got through bringing the Environmental Forum together. (Head of Strategy, the Insurer [40])

Here the claims department started to explore which of its suppliers could be incentivised to improve their environmental footprint, turning first to the panel

beating industry in order to try to manage some of their more polluting activities:

> … we have a serious influence in the panel beating industry. Obviously the emissions of all the diesel generators that runs, spray booth, the solvent-based versus water borne paints. (Adjustment Services Manager, the Insurer [37])

However, the Insurer struggled to make any significant in-roads in engaging these suppliers, admitting that further work needed to be done for sustainable change to occur further down the value chain and that by doing so was proving to be a long-term process:

> … we probably are best equipped at this stage to change our selection criteria of our network of panel beaters that we deal with, to such an extent that when we choose the next round and going into the next year's of negotiations, that we add their carbon footprint as a criteria onto our selection criteria. (Adjustment Services Manager, the Insurer [37])

This led to a disjuncture between how the Insurer was using its CSI funds and how these funds could create additional benefits from a marketing perspective, with the marketing and brand department arguing that there needed to be far more strategic use of such funds.

> I know it's wonderful to build houses for people and I think it's wonderful, but maybe we should bring it closer to home where it aligns with our core business. (People & Brand Manager, the Insurer [28])

This was off the back of a recent rebranding exercise, which saw the company starting to promote itself as offering insurance 'Good and Proper' (Santam 2013g). As such, it was felt that the two parts of the business needed to be closer aligned so as to highlight the positive role the Insurer was playing both as a good corporate citizen and as an active manager of risk:

> … I do believe that for our long-term sustainability we need to be seen as a brand that is representative of and that adds value to South African society. So that sort of sense of community is what we need to build on as the next part. (People & Brand Manager, the Insurer [28])

Thus the company got more involved in communicating to a broader array of stakeholders, including its clients, around issues of sustainability. It partnered with FLOW ('For Love of Water'), a water conservation NGO, collaboratively sponsoring a series of music festivals where it promoted sustainable water issues, replaced bottled water sales with vending machines, provided hand sanitisers and offered guests a waterless car wash service (Santam 2012c).

> … we opted not to sell bottled water, we got the city of Cape Town to bring in a water station. So we try and take as strong a position as we can where we can. (Digital Brand Manager, the Insurer [43])

The Insurer also sponsored the publication of the City of Cape Town's Green Office Toolkit, a guide to improving sustainability within the work place (City of Cape Town 2013). This contributed to a steady media campaign, which complemented the Insurer's ongoing marketing campaign (see above), highlighting their work around GEC. Outputs included: an opinion piece for ClimateWise's *Thought Leadership* series, by the company's CEO, in which he presented the company's vision of shared risk; articles in various trade magazines, highlighting the Insurer's participation at the various global climate debates; and a wide variety of other articles, conference presentations and interviews (Fin24 2009; Porter & Kramer 2011b; Cover 2012; Risk SA 2012a; Kirk 2012).

This response, of leading by example, appeared to be driven as much by the potential reduction in operating costs, or perceived benefits from a marketing and brand perspective, than in identifying ways to reduce its underwriting exposure, over the long term.

Summary

This all suggests that the Insurer was becoming far more active in responding to GEC as a direct consequence of its increasing awareness of the threat systemic risk was presenting. This included: trying to identify ways to incentivise its clients to manage their risk exposure, by educating them of the specific risks they faced; attempting to directly manage some risks that directly impact its underwriting portfolios; influencing other stakeholders (such as government) to become more proactive risk managers; and in leading by example, by improving their own levels of in-house sustainability. However, most of these responses appeared to reflect the Insurer's historic approach to managing risk that saw it manage risk only at the point where it was directly impacting insured assets rather than taking a more systemic approach to engaging risk.

The Challenge of Global Environmental Change

The next section explores the challenges the Insurer faced in trying to manage risk and why it opted to focus more on risk that impacted the client-insurer relationship than the broader, systemic drivers. It highlights a host of constraints that limited its ability to collaborate with other stakeholders, the unreliability of reinsurance, clients unaware of the risks they face and even the company's own brokers resisting attempts to involve them in risk management.

Collaboration

While many of the Insurer's staff showed initial enthusiasm for becoming more pro-active in managing systemic risk, as the Eden Study had proposed, they also raised concerns that an initiative so dependent on collaborative partnerships would struggle to gain traction (UNEP-Fi 2011). This was based on fears that the insurance industry had historically been particularly bad at collaboration, only joining forces when it was absolutely imperative (or unavoidable) to do so, such as responding to emerging regulatory challenges. As the Head of Strategy explained:

> We want to work together when it's in our individual interests. When it's in the collective interests and it costs me something then I don't want to work with you. (Head of Strategy, the Insurer [40])

Most of these collaborative challenges are linked to increasing levels of competition. Some respondents raised concerns that newer market entrants, particularly the smaller and more selective direct insurers, were now so focused on the risk-carrying side of their business that they all but ignored the risk management side. This was partly linked to their small size - compared to the larger and more established traditional insurance companies - meaning that they often lacked the resources to adequately manage risk and they inevitably became more focused on maintaining market share.

> I also think that's something the direct guys can't do… they're focused on the sale. They're not there to give you a lot of advice, they're there to make sure you buy the policy. (Broker Services Manager, the Insurer [33])

Consequently, the Insurer became concerned that should it invest in managing systemic risk beyond the insurer-client relationship, this would allow other insurers to benefit (or *free-ride*) off any improvements they might

achieve within the risk landscape. This was because managing systemic risk, by its nature, benefits all assets in an area, regardless of which insurer was underwriting them or not.

A correlated fear was that, after investing in ways to improve systemic risk, competitors might then steal the client once their risk profile had been improved. Thus the Insurer risked not only losing its clients, but also the investment they had made in improving the clients risk exposure in the first place. Staff questioned how they would then justify this to their boards and shareholders:

> … but some of the other insurers say, well, we'll look at what [the Insurer] is doing and then we'll do the same, or we'll do nothing and we'll just sort of pick up all these claims. (Broker Services Manager, the Insurer [33])

Therefore, as a consequence of increasing levels of competition, the Insurer's first priority was to maintain and protect market share, which, in turn, significantly impacted its inclination to engage in systemic risk management.

> … we really struggle to maintain that 24% [market share] because of various factors: direct writers coming in, competition – everybody wants to grow – so can't just go out there and say I'm going to do this and this and this because you will could have a flight of business to another company, so you need to be really open and transparent in whatever you are doing. (Risk Services Manager, the Insurer [21])

Some staff referred to a project run by one of the Insurer's competitors called the Pointsmen Project. This placed branded traffic marshals at faulty traffic lights to assist with traffic flow and to help reduce the risk of accidents occurring (see http://www.outsurance.co.za/pointsmen). The Insurer's staff reflected on how this project helped to both reduce risk (systemically) for the broader insurance community – by reducing traffic accidents – but was also a success, from a marketing perspective, for the individual insurer. They argued that this was a model that justified similar projects:

> If you just typically look at the Pointsmen issue. I mean, OUTsurance has actually benefited, [the Insurer] is benefiting from the fact there's a more controlled approach to traffic lights not being operational; less claims from an accident point of view. But they're leveraging off that from a branding point of view. (Sustainability Manager, the Insurer [24]).

This suggested that the some of the staff were beginning to think beyond the traditional confines of risk management and to see how systemic risk

management could be established in a way that had individual benefits alongside the communal ones.

External stakeholders

The challenge of engaging external stakeholders, vital in achieving collaborative risk management partnerships, introduced other concerns. Many staff believed there was simply too great a difference between the Insurer and many of the stakeholders it needed to engage, especially with government, whom they saw as often unreliable and unpredictable risk management partners:

> … its difficult to make an impact because they have their regulations and their systems and their way of working and our industry has our way. I don't think they wanted to listen to our insurance industry … We don't link, we don't listen to each other. (Relationship Manager, the Insurer [05])

Prior to the launch of BAAM, there was little evidence of the Insurer having established any formal partnerships with local government, aside from its ad hoc representation on boards of local disaster risk management committees or indirectly via their membership of local Chambers of Commerce. However, following publication of the Eden Study, the Insurer's BAAM initiative was an attempt to reach out to local government, albeit tentatively, and one done as much for political considerations as for the potential to realise meaningful risk management opportunities.

> Well, it's political as well, and really understanding what the political levers are in that equation because clearly you have to get the key stakeholders together and really understand how to balance that particular set of competing interests, and inform that with the best science, the best sort of kind of social consequences, etcetera. And each of them have different priorities in terms of what's important. (Head of Risk Services, the Insurer [41])

Even at the global level, there was a general consensus that the role of both government and insurers was essentially ring-fenced. This meant that while they shared similar objectives, the means of achieving them often differed. As one international reinsurer explained:

> Traditionally you would not expect that governments would speak to insurance companies about these risks – they would take their part and try to minimise risks for the society and we will basically then calculate the risks and which is basically a mirrored risk to the government (Head of Sustainability, International Insurer [64])

Dealing with other stakeholders, such as landowners, forestry companies, developers and national parks agencies, all of whom were identified by the Eden Study as shaping systemic risk in the local environment, was also mired in practical challenges. This was because the Insurer felt it rarely had influence over the full range of stakeholders that influenced systemic risk. Indeed many of these stakeholders would often even be clients of competing insurance companies.

> But there you start to ask yourself, but is it poor management of our dam levels and opening them in time – or, you know, there are so many factors to say, yes, it was this, it was more rain or it was bad management of the dam; is it building regulations. (Commercial Underwriter, the Insurer [23])

Internal stakeholders

Even internally the Insurer regarded its clients as often unreliable risk managers as they are either unwilling, or unable, to manage their own risk exposure. Staff felt that clients tended to only became motivated to manage risk post-loss, by which time both they and the Insurer had been impacted. However, even in instances where the Insurer had managed to encourage its clients to manage their risk, a potential counter-incentive would emerge, as lower risk exposure would result in demands for correspondingly lower premiums.

> … clients themselves are sometimes reluctant to incur the costs of putting in place additional risk protections when they haven't had the losses. So you tend to find that the practices that if this has occurred, a client is a lot more receptive to the insurer advice. Where the loss hasn't occurred you tend to find his line is – actually I know what I'm doing – and he obviously doesn't want to incur the cash flow position of incurring additional capital costs. (Specialist Business Manager, the Insurer [38])

In some instances, clients were beginning to identify other, more cost-effective ways to protect themselves from loss, often helping them to bypass commercial insurance in the process. One example was within the Insurer's agricultural business, where it found that farmers, experiencing a 400% growth in loss ratios - and an equivalent rise in insurance premiums - were turning to other solutions to help them manage their risk exposure (Cover SA 2011; Risk SA 2013). This included diversifying their farms and crops, making use of genetically modified seeds and fertilisers to improve yields or decrease the risk of disease, and using climate models and long-term forecasts to

predict the best time to plant and harvest. As the Specialist Crop Insurance Manager explained:

> So one of the major changes in agriculture is that the farmer has become a scientific businessman, if I can call that. So he's not a farmer anymore, he's a businessman, and he manage his risks. Lots of them do what they call precision farming, where on a grid basis every hectare, they take annually soil samples in terms of the chemical composition and they do the fertilisation or the additions according to that. So a lot of risk is now accepted or taken up by the farmer again – so that usually it was our risk, now it's his risk. **…** the other thing associated with that is the contribution of biotechnology; improved varieties and improved fertilisation, the technology around that. So it's becoming a totally new ball game. And what we are facing now in agriculture and you're talking about the multi-peril where we cover a lot of perils in one, is that farmers don't want to insurance anymore because they say, we can manage risk on our own … especially your large farmers – because he has the technology and his risk is spread over different districts, even a lot of farmers now are going into Africa. (Specialist Crop Insurance Manager, the Insurer [31])

Brokers were also seen as presenting an obstacle for managing risk systemically as they often acted as a buffer between the Insurer and its clients, limiting the Insurer's access to the knowledge it needed to accurately assess and propose management solutions for the various risks its clients faced:

> … they will negotiate because they don't like to tell the client to do things because they just want everything for the client. So it's quite a battle usually as well, it's a negotiation thing, and sometimes they will convince us to drop certain things … (Commercial Underwriter, the Insurer [23])

This distance between the Insurer and the client was being further compounded by its centralisation activities, evidenced by the fact that the company was losing much of the nuanced local knowledge it had previously had within its regional offices and brokerages. Many of the new staff and brokers were seen as lacking the skills necessary to even asses risk, let alone advise the clients on adaptation and mitigation measures, as so many of their responsibilities had now been transferred over to the COEs. As one broker explained:

> …there is still a lot of expertise within [insurers]. Like brokers … and that experience is drifting away. (Insurance Broker, Independent [04])

This loss of knowledge was raising concerns that one of the Insurer's historic advantages, especially over its more direct competitors, was that it had local representation that could help it to understand systemic risk in the context of how it occurs. As one local representative explained:

> At this stage we are losing knowledge because I don't quote any more, I don't deal with claims anymore. How do you get all your knowledge? Its about working with your stuff itself. (Relationship Manager, the Insurer [05])

Thus the Insurer was beginning to see a conflict as, on the one hand, centralisation was an attempt to improve risk assessment but at the same time was actively reducing its access to the actual environment within which systemic risk was being produced.

Short-Termism

Given the short-term nature of the insurance industry, this underlined the challenge of managing systemic risk, over the long term. Much of this was due to the increasing levels of competition that had led to many of the Insurer's lines of insurance becoming heavily volume driven. This accounted for the emphasis on centralisation and standardising of risk assessments that received so much attention (see chapter 4). This was compounded by a high turnover of policies, inherent within the short-term insurance industry, especially in personal lines, which often reached 20% per annum (Santam 2006, p. 13).

Consequently, staff felt it was easier and safer to simply cancel high-risk policies, identified by the improving granularity of their risk assessments, than trying to manage the multitude of systemic risks these assets faced. In practice there simply weren't resources to engage in systemic risk management.

> … because the volumes of work is just like that, that on that day that person just – I'm not going to engage with this guy, I don't have time to talk to him, I'll just cancel this policy and get another one – that sort of thing. (Commercial Underwriter, the Insurer [23])

Concerns with short-termism were also reflected in how the Insurer designed its GIS modelling projects, to identify the properties most vulnerable to systemic risk, rather than its drivers. The models were also only designed to inform the Insurer of the risks GEC presented, rather than to predict how risk was likely to change in the future.

Consequently, given the uncertainty associated with managing GEC risk, the Insurer feared that even if it were to enter in to long-term contracts with its clients, these would be inherently costlier than shorter-term ones and harder

to manage or cancel should the clients' future risk profile change in ways that were not predicted:

> … because these risks are so difficult to measure and price for over longer periods of time, we're not actually allowed to guarantee terms for more than a year or two – so it's hence the short-term insurance industry. (Stakeholder Relationship Manager, the Insurer [17])

This suggests that engaging in anything other than short-term relationships was simply seen as too risky for the Insurer to be exposed to.

Organisational Constraints

The Insurer also found itself facing an array of internal and external pressures that actively discouraged it from taking a more systemic approach to risk management. Staff reflected on the inherent pressures they faced, on a daily basis, due to a lack of available resources. This underlined concerns that, ultimately, the Insurer's ability to manage systemic risk was based on whether it could afford to do so or not.

> Because the challenge for us as an organisation is going to be that whatever initiatives we come up with, it's going to cost money around branding, marketing and whatever else we put into place. (Sustainability Manager, the Insurer [24])

Staff reflected on how important resources were for managing risk and how, coupled with the Insurer's daily resource demands, everything became a trade-off. The most resilient of these were those either closest to the operational heart of the company or that showed the greatest potential for a return on investment:

> The key is in all of the trade-offs that we're doing in our business, there's so much that needs to be done; we have to upgrade our technology, we have to develop our people, we have to expand our distribution. (Head of Strategy, the Insurer [40])

This underlined just how defined the Insurer was by its *golden triangle* (i.e. underwriting, distribution and claims) and the various systems it had invested in so heavily. This referred, in particular, to the integrated underwriting systems and COEs at the heart of its centralisation drive.

> If you really want to get recommendations approved, you need to show the benefits to the Distribution and the Risk Servicing areas, and our Claims division – is a golden triangle. (Sustainability Manager, the Insurer [24])

There were also concerns in South Africa that the local insurance industry was so small, especially when compared to the more developed markets of Europe and North America (Swiss Re 2014; J David Cummins & Venard 2008b). This raised questions about whether the local industry even had the capacity to manage systemic risk, given the imbalance between the size of the industry and the scale of GEC threats facing South Africa.

> … our gross income is miniscule in comparison to the rest of the world. (General Underwriter, the Insurer [39])

Reinsurance

Reinsurers presented another challenge, as reinsurance tended to re-price policies on an annual basis, taking into account any losses accrued over the previous year. This allows reinsurers to withdraw from markets or adjust their rates, often at very short notice, meaning that reinsurance rates can often be highly unpredictable (Risk SA 2013).

> … if there's a lot of reinsurance capacity, insurance can just reinsure – so they will take on poorer risk and be more aggressive on this thing because they can just pass the risk onto the reinsurer and when the reinsurers get hurt, they will tighten up capacity – and that's almost international impact because you will find that after 9/11 that happened suddenly (Commercial Underwriter, the Insurer [23])

Consequently, this meant that the Insurer tended to take a more conservative approach to engaging its reinsurers for fear of losing access to cover or being subjected to unsustainable costs.

> The thing is, the danger for us if we don't do it, what will happen – the insurance rates will go up, we won't get capacity, it will become more difficult to renew the contracts. So then the company is exposed more, it becomes a higher risk. (General Underwriter, the Insurer [01])

Some staff described how managing the availability of reinsurance also disincentivised them from managing systemic risk, as it gave the Insurer a way to diversify away from excessive exposure and limit the absolute losses it would have to face. In the case of the Insurer, it was liable for all CAT losses that fell below a minimum threshold of R 25 million (US$ 218,000). This meant that it was often the frequent, yet smaller, CATs, recording losses below the reinsurance deductible, that were of more concern for the Insurer, as it would be liable for a greater proportion of those losses.

> … we carry a huge deductible, we've got R 25 million, sometimes R 50 million

> … will we suffer more with losses up to the deductible than the ones above the deductible. (Reinsurance Manager, the Insurer [32])

The Regulatory Environment

The regulatory environment has seen significant expansion in recent years due to its attempt to govern business and, in particular, the insurance industry and GEC (Meier 1991; Braithwaite & Drahos 2000; Gunningham 2009; Freiberg 2010; Klein 2012). Based on the role insurance now plays as society's primary financial risk manager, the regulatory environment has become increasingly focused on governing the industry's response to GEC, which, in turn, often frames how the insurance industry is able to respond to the various challenges it faces (Association of British Insurers 2006; Baltensperger et al. 2007; NAIC 2008; Hecht 2008; Rothstein et al. 2012).

Unsurprisingly, therefore, the role of the regulatory environment frequently featured in how it negatively influenced the Insurer's ability to manage proximate risk (Lascelles 2011). Respondents reflected on the tendency of regulation to try to co-opt insurers, or to respond with knee-jerk reactions that often conflicted with sound underwriting practices, as was happening in other markets (Grace & Klein 2009). Recent changes to European insurance regulations, for example, which banned the use of gender as a factor in determining policy costs, was one example of the conflict that often occurred between the objectives of regulators and the need for insurers to engage in more accurate risk-based premium pricing (Association of British Insurers 2010b; Wagner 2011; Oxera 2011). Similarly the Insurer regarded regulation as a growing threat in South Africa:

> It's also on our … risk thermometer … it's increasingly coming up as a big risk ... (Enterprise Risk Management Manager, the Insurer [25])

Staff felt that some tightening of the regulatory environment was necessary, in order to control some of the negative behaviours by some insurers. However, most respondents felt that the general increase in regulation represented a global trend, and one that had grown significantly in size since the 2008 financial crisis:

> … I think it was triggered by all the recession and all the international happenings and failures, and all of that. So people are clamping down on how do you regulate financial companies. So I think a lot of that is coming from

> there. But in South Africa in the insurance industry, I think also people have used practices that's not in the best interest of the client – so in terms of that what you see is there's always been legislation but the business practices for the FSB or the regulator not acceptable. (Enterprise Risk Management Manager, the Insurer [25])

Some of the regulatory changes were seen as benefitting the Insurer, such as helping to promote a more stable industry and by excluding many of the newer competitors (in particular the banks) from entering the market as the industry struggled to meet the obligations required of them. However, the cost of meeting the increased regulatory requirements was on a clear upwards trajectory, and one that often led to resources being diverted away from other projects on which the Insurer had wanted to focus (Deloitte & Touche 2011).

Concerns centred around how most of these new regulations simply focused on protecting the client, from erroneous insurance practices, rather than supporting the industry to collaborate to manage (systemic) risk. One example was how the Insurer's risk assessors were legally prevented from advising clients on how they could reduce their risk exposure as they were not registered to do so under the applicable licensing laws:

> None of the assessors are registered FIAS compliant advisors, so our recommendations would purely be an internal recommendation, which a formal surveyor from underwriting would then have to consider and then pass onto a broker or to an underwriter to go and advise the client (Adjustment Services Manager, the Insurer [37]).

Thus the regulatory environment presents both a benefit, in helping to rein in wayward competitors, but also a disadvantage in negatively impacting the way the insurer could engage its clients around systemic risk management.

The Financial Markets

The financial markets were also identified for their tendency to influence how the Insurer approached systemic risk management (KPMG 2012b, p. 31). Part of this was linked to the fact that the performance of commercial insurance is measured on an annual basis, sometimes even quarterly (Santomero & Babbel 1997b). This meant that the Insurer was constantly under pressure to deliver results that the markets, and in particular its shareholders, would approve of:

> … at the end we're responsible to deliver shareholder returns, good shareholder returns, and if the proper vehicles and funds are not in place to

> invest in then it's very difficult to justify to our shareholders why we make certain decisions. (Investments & Corporate Finance Manager, the Insurer [36])

Consequently, many strategic decisions were made that were inevitably framed by how they would affect the Insurer's financial standing at the close of the financial year. Staff felt this hampered the company's ability to engage in long-term risk management:

> … if you look at the financial reporting system, it's on an annual basis, you see, is from January to December – and is what has been done for this here – and bonuses and everything is allocated based on what the performance of this year (is). (Stakeholder Relationship Manager, the Insurer [17])

This was further compounded by feelings that, should the Insurer improve its underwriting by managing the systemic risk the assets it insured faced, the Insurer would be under pressure to return any profits made back to shareholders, via dividend payments, rather than reinvest them in managing additional risk. Thus, the possibility for systemic risk management projects, to become financial sustainable, would always hang in the balance.

> I think from [our] point of view it's unbelievably difficult to give some advantage or some benefits back to the people. My personal view is that if you make lots of money, you can plough some of the money back, but it's going to the shareholders. (Specialist Crop Insurance Manager, the Insurer [31])

Thus, the inherent short-termism in the financial markets ensured that staff were constantly under pressure to focus on annual profits rather than long-term underwriting sustainability.

The Role of Insurance

When questioned why it was a struggle to integrate systemic risk management into the Insurer's core activities, as the Eden Study had proposed, respondents suggested that this was because engaging risk in such a way was yet to be accepted as something insurers did.

> … when it comes to the implementation it has to be embedded into what we do; it cannot sit on the peripheral … [but its] not embedded, not at all, it's still being discussed very much at your executive, gone one level down into senior leaders (Sustainability Manager, the Insurer [24]).

Part of the reason for this was linked to the fact that systemic risk management was still regarded as the responsibility of the CSI, and

sustainability departments, and not as a core feature of the operations of the company (i.e. the golden triangle).

> … you can attach those two words or three words to anything – you know, sustainability of procurement, sustainability of HR (Sustainability Manager, the Insurer [24])

There was a perception that anything branded 'sustainability' tended to be seen more as an organisational add-on rather than as a core risk management strategy that was a tool to managing risk impacting the heart of the company's activities:

> … you need to show the benefits to the Distribution and the Risk Servicing areas, and our Claims division – is a golden triangle – and it then happens because the approval is given … So it has to be embedded into what the business does. (Sustainability Manager, the Insurer [24])

This reflected the tendency of the Insurer to respond reactively to changes in the risk landscape rather than more pre-emptively. This is reflected in its focus on defensive underwriting as its primary response to GEC:

> It could be around our engagement, institutions could be, whether it be associating institutions, whether it be universities – institutions that had a direct impact on us as an organisation. And that brings me to the point where why this is so critical: because one of the focus areas is about engagement with these institutions and influencing where we can and visa-versa. And then obviously embedding that into how we do business, our structures, our processes, and so on. So not just from an environmental perspective, it's across the organisation. (Sustainability Manager, the Insurer [24])

This appears to reflect the limitations of the insurance paradigm, as framer of the industry's response to systemic risk and its role as society's primary financial risk manager.

Discussion

Much has already been written on how the insurance industry has responded to GEC, via its risk management activities (Mills & Lecomte 2006; Liedtke et al. 2009; Seifert & Lindberg 2012). This research agrees with many of these findings. This includes how the Insurer's first response to managing GEC was to identify ways to reduce the likelihood of future loss occurring. It did this by trying to motivate its clients to manage their own risk exposure by educating them on ways to adapt to or mitigate the risks they faced or by incentivising them to do so via the use of defensive underwriting. Here, the extensive investments the Insurer had made, in developing its GIS models, as part of its

risk assessment response, proved crucial in helping the Insurer to strengthen the accuracy with which it engaged its clients.

However, the research also highlighted how the Insurer tried to identify ways to motivate other stakeholders, especially governments, to become more proactive in managing some of the systemic elements of GEC impacting insured assets (Huber 2004; Kunreuther 2006; Crichton 2008; Brieger et al. 2010; Mills 2012). This prompted the Insurer's active participation in the global dialogue around GHG mitigation, via its membership in organisations like ClimateWise, the UNEP-Fi and SAIA, and - at the local level in South Africa - by involving itself in BAAM and donating fire-fighting equipment and early warning systems to a number of vulnerable local municipalities.

Even in keeping with calls for a more systemic approach to risk management, the Insurer started to directly manage some of the risks directly impacting insured assets, such as by establishing its experimental test farm, offering support for the FPAs and employing a specialist to advise its most vulnerable agricultural clients on ways to reduce their exposure. The introduction of its SWH replacement scheme, and introduction of its PAYD insurance policy, was also claimed to have been put in place as much for its systemic environmental benefits (i.e. reduction in GHGs) as for its potential to reduce underwriting losses.

Finally, the research helped to corroborated existing claims that insurers were trying, to some extent, to lead by example (Mills 2009a; Mills 2012; Leurig & Dlugolecki 2013). In the case of the Insurer, this included trying to improve its own levels of in-house sustainability, managing its consumption of resources and production of waste and by promoting sustainability within the various CSI, brand and marketing initiatives in which it was involved.

Thus, overall, the general response by the Insurer appeared to confirm claims that the broader insurance industry was responding to GEC more adaptively, of its own business activities, than mitigatively (Phelan, Taplin, et al. 2011).

Adaptation in the Anthropocene

Given the improved understanding of the relationship between commercial insurance, actuarial analysis and the Anthropocene (see chapter four), this research continues to question why insurers continue along a path that focuses more on avoiding risk than managing it, especially given the implications this may have for the viability of the insurance industry over the long term (Leggett 1993; Gelbspan 1998; Berz 1999; Paterson 2001; Bougen 2003).

In addressing this question, this study again confirmed many of the existing claims within the literature (Baker & Simon 2002; Ericson & Doyle 2004; Crichton 2008; Kunreuther 2008; Cummins & Venard 2008; Grace & Klein 2008). It found that the Insurer's response was constrained by fears of collaboration. This included growing levels of competition that introduced concerns around *free riders* and destructive competition and that effectively deterred the Insurer from engaging risk more systemically. Establishing risk management partnerships, particularly with third-party stakeholders outside the insurance industry - like governments, landowners and property developers – was also seen as presenting a major challenge, as the Insurer regarded such collaborators as unreliable and unpredictable (Klein 1998). Even the industry's own clients had the tendency to undermine risk management activities, due to the threat of *moral hazard* and *adverse selection,* while brokers were often seen as acting as gatekeepers, limiting access to the knowledge necessary for effectively understanding many of the systemic risks impacting insured assets (Meier 1991; Baker 1996; Baltensperger et al. 2007; Lorent 2008).

Other organisational challenges included high levels of internal bureaucracy, limited resources, unreliable access to reinsurance cover, ever-tightening regulatory frameworks and a financial market more focused on short-term returns than realising the benefits attributed to longer-term systemic risk management.

Overall, these findings reaffirm the paradigm framing the insurance industry's role as society's primary financial risk manager (Hecht 2008). In this light, the role of commercial insurance is limited to providing its clients with a financial

means of spreading their exposure to GEC. This accounts for why insurers are more interested in managing risk at the point at which it impacts insured assets and why the industry's response to GEC has focused on defensive underwriting (Kunreuther et al. 2013). This further accounts for the predominantly adaptive nature of the industry to date (Phelan, Taplin, et al. 2011).

However, there are clearly concerns that GEC is presenting the insurance industry with risks it has not previously faced, given that the past is becoming so unrepresentative of the future (Berz 1999; Paterson 2001; Bougen 2003). This raises questions as to why the insurance industry is finding it so hard to become more proactive in managing systemic risk - even though it has acknowledged that such a response is not only necessary but potentially fundamental for its long-term viability - and to start shifting its paradigm away from one framed by the Holocene to one that is more accommodating of the realities of risk in the Anthropocene.

Continued Exploitation

To try to account for why the industry is struggling to shift to a more systemic approach to risk management, we draw on March's (1991) theory for organisational change. This theory describes the tendency of large institutions, when faced by new challenges, to first try to 'exploit' their existing systems before 'exploring' new ones (ibid.). In this context, 'exploitation' refers to the continual refinement of existing practices, while 'exploration' is the development of completely new solutions to challenges faced.

Consequently, exploration is often seen as far more risky and organisationally challenging than exploitation. However, the inherent threat is that by focusing on exploitation alone, organisations constantly narrow the range of possible solutions to which they have access. Over the long term, this can run the risk of ultimately becoming self-destructive (March 1991, p. 73).

These findings elaborate on earlier work that observed how institutions have a tendency to search for answers within solutions that have previously been proven to work (Bateson 1972). This includes how they gather information, embed their operations and incentivise certain activities. The result is that

such institutions often struggle to ‘think’ beyond their ‘historically established blind spots’ (Argyris & Schön 1978).

This description of organisational change begins to provide a useful insight into why the insurance industry is continuing to respond to GEC in ways that contrast with the realities of risk in the Anthropocene. Given the paradigm that frames the insurance industry’s relationship with risk, actuarial analysis represents a historically tried-and-tested solution for helping the industry to assess and manage its risk exposure. In this way, actuarial analysis has proven itself, having worked exceptionally well until now, and supported insurance to become the largest industry in the world (Phelan et al. 2008b).

This would account for why insurers continue to invest so much time, energy and resources in trying to strengthen the ability of actuarial analysis to manage the increasingly unpredictable nature of GEC (Paterson 2001; Phelan, Taplin, et al. 2011; Mills 2012). This includes the on-going attention given to GIS models, improving their ability to defensively underwrite and by encouraging other stakeholders – like governments – to become more proactive in managing systemic risk.

Even in instances where evidence was found of the Insurer beginning to think and respond more systemically, with regard to risk management, and to directly engage some of the risks impacting insured assets, these responses were still framed as attempts to manage risks directly impacting insured assets. The experimental test farm, for example, was established to test the resilience of new crops and to feed this information back into the Insurer’s underwriting models; the agricultural specialist was an attempt to support their most vulnerable clients (i.e. farmers) on ways to manage their risk exposure and, in so doing, ensure the cost of cover could remain below sustainable levels. The SWH replacement scheme and PAYD policies lowered the probability for claims. Even their involvement in BAAM - hailed as an example of systemic risk management - was as much driven by political objectives as risk management ones.

However, automatically concluding that the insurance industry is still deeply rooted in exploitation, in its response to GEC, may also be a little misguided,

as making such an assumption would perhaps underestimate the insurance industry's actual response to the changing risk landscape. After all, as the world's largest industry, commercial insurance is made up of an extensive, complex and diverse array of different stakeholders who engage risks with liabilities that often stretch across time and over large geo-political areas (Phelan, Taplin, et al. 2011).

There is no doubt that in recent years the industry has become increasingly mobilised in responding to GEC. This is reflected in the establishment of the international and national industry associations, the numerous climate-related research studies being published, the international meetings convened and repeated public warnings that GEC is fast becoming uninsurable (Association of British Insurers 2010a; ClimateWise 2012; UNEP-Fi 2012; Mills 2012).

Thus, although the industry is yet to fully embrace systemic risk management, in its response to GEC, there appears to be a shift towards thinking about risk beyond the industry's historically established 'blind spots' (Argyris & Schön 1978; Nel et al. 2011; UNEP-Fi 2011). We see this in activities such as the establishment of the experimental test farm, involvement in BAAM and even via its activities that seek to promote loss prevention.

Although not what the Eden Study initially called for, this has led insurers to start actively questioning the role they must now play, and indeed in the future, if they are to remain as society's primary financial risk manager (Hecht 2008). Perhaps what we are seeing in these examples is the beginning of an exploratory response to GEC, but starting at the outer boundaries of exploitation (March 1991).

Like a Frog in Hot Water

This raises questions as to what conditions would be necessary for the insurance industry to become more exploratory in its response to GEC (March 1991). In addressing this question Mills (2005) suggested that insurers had two options for how to respond. The first was to 'rise to the occasion' by becoming more proactive in improving the science of GEC and in crafting suitable responses. The second was to simply retreat from the threat it

presents and shift responsibility for managing it over to its clients and governments.

In response, Sturm and Oh (2009) found that the industry ultimately adopted both options. After Hurricane Andrew in 1995, for instance, when almost 20 years of premium income was lost and a collapse of the entire reinsurance market deemed imminent, the industry turned to defensive underwriting by geographically withdrawing from certain markets, increasing premiums, and introducing new service providers to help diversify its risk exposure. Following Hurricane Andrew the industry introduced CAT-Bonds, allowing risk to be spread out across the financial markets, and a risk transfer mechanism that remains highly popular today (Dlugolecki 2009; Leurig & Dlugolecki 2013). Similarly, Hurricane Katrina in 2005 was described as a 'tipping point' for commercial insurance, although, once again, the industry was able to adapt its operations, by strategically withdrawing from markets vulnerable to Hurricanes and raising prices, which led to record profits the following year (Mills & Lecomte 2006; Sturm & Oh 2009).

While not a consequence of GEC, the 9/11 attacks on the World Trade Centre present another example of how insurers have responded to catastrophic (i.e. debounded) risks. The insurance industry's response to 9/11 has been widely documented within the literature, and from various angles (Baker 1993; Baker 2002; Hoffman 2002; Ericson & Doyle 2004, p. 169; Kellner 2007; Malley 2013). From an insurance perspective, 9/11 reaffirmed how the insurance industry was to reconfigure itself in response to the new risk landscape it was facing. It introduced risk management partnerships with governments, expanded its reinsurance programmes and promoted the need to embrace the threat of large-scale terrorist attacks, more broadly, within their various risk management activities (Ericson & Doyle 2004; Cummins & Venard 2008a).

However, in the context of GEC, the inherent challenge is that simply 'reconfiguring' the industry, in response to environmental catastrophes, assumes that its impacts remain defined by the insurability test; that the probabilities of such catastrophes are both sudden and unexpected. In this instance, no matter how large an environmental catastrophe may be, insurers

would still be able to manage their risk exposure, via the use of defensive underwriting (see chapter four).

Such a response is understandable. After all, GEC is a highly complex threat which, as this thesis has shown, presents no simple solutions for managing it (Friedman 1984; Tol 1998; Kunreuther et al. 2012). One example of the inherent uncertainty is how years of catastrophic losses are so often followed by years of excessive profits and growth (Sturm & Oh 2009). In the case of the Insurer, this was a regular occurrence within its agricultural lines, which fluctuated dramatically between the good and the bad years.

However, more stakeholders within the industry are beginning to acknowledge that GEC is not simply a series of sudden and unexpected events, but are instead linked to a far broader deterioration in the risk landscape. GEC is now understood to present a far greater incremental threat. This is reflected in the average annual cost of GEC to the insurance industry, which has risen from under US$ 50 billion in 1980 to over US$ 175 billion in 2011 (Munich Re 2012).

However, given the industry's general belief that exposure to GEC remains manageable, this would suggest that even the largest catastrophic events (like Hurricane Andrew or Katrina) can still be defined as sudden and unexpected, rather than as part of a much broader decline in the overall risk landscape. It is this belief that underpins the industry's current response to GEC, that sees defensive underwriting as the most viable option.

Thus the insurance industry is perhaps so focused on the threats that individual large-scale catastrophes present, and the need to adapt to their impact, that they are failing to pay sufficient attention to the overall deterioration of the risk landscape, linked to GEC, over the long term. Until that happens, insurers are likely to continue to adapt to GEC, using the tools that assume that catastrophes remain sudden and unexpected. They will continue to tweak (exploit) their existing *systems* rather than explore what role they must play as a risk manager (March 1991).

Drawing on the title of this thesis, like a *frog in hot water*, the risk landscape appears to have shifted in ways the industry is yet to become fully aware of.

Thus a more cataclysmic event, or series of events, may need to occur for the industry to redefine its role, and the tools it relies upon, as society's primary financial risk manager (Hecht 2008).

Thus GEC does not yet appear to have deteriorated to the point that it presents this challenge to the insurance industry, as some have warned (Leggett 1993; Berz 1999; Paterson 2001; Bougen 2003). This also starts to account for why the insurance industry is yet to shift from a predominantly exploitative response to GEC to a more explorative one.

Conclusion

The aim of this chapter was to try to understand how and why the insurance industry, via its activities as a risk manager, has responded to GEC in the way that it has. It specifically sought to understand why the insurance industry was continuing to respond to GEC in ways that have been defined as more adaptive than mitigative, a response that contrasts with emerging understanding of GEC, risk and the Anthropocene.

In doing so, the research confirmed many of the existing findings within the literature. It describes how insurers have responded to GEC by trying to promote other stakeholders to manage their risk exposure, directly managing some risks themselves, and by trying to lead by example. It also highlighted how the insurance industry remains trapped in a paradigm that frames their response to GEC, being actuarial analysis. It finds that part of the reason for this is that insurance is yet to regard GEC as posing a threat big enough to warrant a fundamental shift away from its traditional risk management responses, which are inherently exploitative, to ones that are more explorative.

This has been compounded given that, unlike specific individual catastrophes, GEC has exhibited a steady and gradual deterioration over time, and its impacts are neither sudden nor unexpected the further we move into the risk society. Instead its impacts are undefined and, over time, both creeping and incremental. Consequently, and in contrast to how the industry has responded to past catastrophes, the industry is yet to experience a shock significant enough to cause it to completely redefine (i.e. explore) its relationship with GEC. Indeed, there still remains significant uncertainty as to what conditions

would be necessary for such a shift to occur. However, by not responding more exploratively, insurers run the risk of undermining their role as societies' financial risk manager in the face of GEC.

CHAPTER SIX - INSURERS AS INVESTORS

Introduction

This chapter explores how and why the insurance industry has responded to GEC, in the way that it has, via its investment activities. It continues to draw on an empirical investigation of a large South African short-term insurer, but, due to the diverse nature of the insurance industry's investment portfolios, also engaged a number of large South African fund managers, international insurers and reinsurance companies.

The chapter is divided into three parts. The first examines how the insurance industry has responded to GEC via its investment activities. The second unpacks this response to explore why it has responded in such ways. Finally, the discussion develops our understanding of insurers' investment activities in the context of the previous two chapters; both in terms of the Anthropocene and the industry's mainly exploitative response to GEC.

The Principles for Change

Most of the Insurer's response to GEC, via its investment activities, was framed by its participation and commitment to the various international Principles it had aligned itself with, which included the UNEP-Fi Principles for Sustainable Insurance (PSI), the ClimateWise Principles and the Carbon Disclosure Project (Santam 2014). These Principles primarily called on signatories to start integrating environmental, social and governance (ESG) factors into their investment strategies and to start making direct investments in transformative technologies, such as renewable energy projects (UNEP-Fi 2012).

Integration of ESG Principles

Integrating ESG principles into its existing investment portfolios reflected the growing discourse that had been emerging around the long-term systemic risks the Insurer's investment portfolios were beginning to face and how ignoring these could start to undermine their future profitability.

Many of the more insurance orientated investment requirements were linked to the UNEP-Fi PSI and ClimateWise Principles that called on their signatories to improve the sustainability of their investment portfolios. The 4th ClimateWise principle, for example, calls for insurers to '[i]ncorporate climate change into our investment decisions' by considering its implications, encouraging adequate disclosure, encouraging energy-efficiency and climate resilience, communicating investment beliefs to customers and shareholders and sharing the assessments of the impacts of climate change with pension fund trustees (UNEP-Fi 2012; ClimateWise 2012). These principles were a crucial driver to the Insurer's reassessment of its investment portfolios:

> And then you've got the voluntary code like the code for responsible investment and the UNPRI. So that's driving things in the background. (Sustainable Investment Manager, International Fund Manager [76])

Several investment managers described how it was now difficult for them to simply ignore ESG issues (i.e. 'externalities') and that they were increasingly being associated with a *brown* economy – which is based on fossil fuels and fails to address broader societal concerns, such as social marginalisation, environmental degradation and resource depletion - as opposed to the *green* economy (UNEP 2011). South Africa's continued reliance on coal for a substantial amount of its energy needs was just one example of this:

> … we don't even take the cost of emissions in coal into account. I've seen reports from the States that just the respiratory disease costs means that they should double the price [of burning a kilogramme of coal] if you take all those externalities into account. (Sustainable Investment Manager, International Fund Manager [84])

South Africa's platinum mining sector was provided as an excellent example of an industry increasingly being exposed to ESG risks. In this context, platinum mining is crucially dependent on access to ecological resources, in particular water, to mine cost-effectively. The industry is also highly vulnerable to many social risks, from community and labour relations, through to various health and safety performances (Gray & Niklasson 2013).

Many of these ESG challenges, in South Africa's platinum sector, were highlighted following the 2012 Marikana tragedy, when 44 striking mineworkers were killed by the South African police service, leading to huge

turmoil for the local platinum industry and the establishment of a commission of enquiry (www.marikanacomm.org.za).

Internationally, other economic concerns were seen as threatening the platinum sector's profitability. These include a growth in electric vehicles that could weaken demand for platinum (extensively used in catalytic converters) or technological advances that were coming online, which could efficiently recycle the used metal (Yang 2009). In a worst-case scenario, demand for platinum would reduce, while the cost of extracting the virgin metal continues to rise. Such systemic challenges are not faced by the platinum industry alone. Indeed both the global iron ore and hydrocarbon industries faced huge social, political and economic turmoil over the course of 2014 alone (Visser 2014):

> You don't just go and sink a shaft for a new platinum mine in a day; it takes 8 to 10 years, which means that you have to have a view on the future demand for platinum. My argument is that you can't have a future view on the demand for platinum unless you understand climate change. If climate policy is forcing the world to go electric vehicles, well then why do we need catalytic converters? (Sustainable Investment Manager, International Fund Manager [70])

Some insurance investment analysts, were found to be taking an even more systemic approach to their investment risks. Remaining with the platinum industry, one analyst described how increased water consumption by mines might lead to increased drought down-stream. This could threaten agricultural productivity, impact food security, increase inflationary pressures, which would impact the retail sector and reduce consumer consumption, further weakening markets or causing a slump in currency values. Eventually these impacts could revisit the platinum sector itself, via lower demand for natural resources, which would create additional pressure on the sector and those dependent upon it.

This emerging thinking around investment portfolios led the Insurer to realise that it was being increasingly exposed to many parts of this value chain. It had investments in mines and retailers and across the economy more broadly. It underwrote agricultural insurance and often provided loans and fixed investments to other industry's susceptible to economic downturns. Yet it also realised that few of the concerns it had invested in had adequately accounted for the full impact systemic risks might have on their future business activities.

One investment manager described how a giant multinational commodity concern, in which they were invested, had struggled to make the connection between ecological and social sustainability and the impact these had on the profitability of some of its largest construction projects. As he explained:

> … we were saying, listen, there's a whole set of social risks that's costing you real money but it doesn't reflect in your current pricing mechanism … Obviously say you allocate 100 million to this particular project and it's going to come online in two years time, right … we went and had a look at all of their pipelines and we looked at the delays to bringing projects online. And it was like two or three of their biggest projects were significantly and materially delayed which ultimately cost them a lot of money … the root cause of those delays were social issues; stakeholder relation issues. (Sustainable Investment Manager, International Fund Manager [76])

Such concerns were reinforced during the 2008 financial crisis when investment managers began to acknowledge that they could no longer simply take a short-term view on their investment strategies and that tangible, longer-term opportunities were now more attractive. Questions were raised around the inherent value attributed generative, versus extractive, forms of company ownership; the former increasingly being seen as able to result in a more steady, reliable and long-term investment (Kelly 2014). Companies like John Lewis in the United Kingdom, for example, owned in large part by its staff (i.e. generative) had survived the financial crisis far better than many of its more traditional shareholder-owned (i.e. extractive) competitors (Street 2012).

> The financial crisis – never waste a good crisis, so that's been good for us. So short-termism hit its limit when suddenly the returns were terrible, and suddenly more tangible longer-term investments that actually weathered those storms better than listed equities – so a combination of, one, these things is not bad from a return perspective, and, two, our obsession with liquidity is actually expensive. But, again, how do you turn an industry? Thought leadership actually is a tiny pool of asset consultants/actuaries that influence in the investment committees and boards of trustees, the pension fund industry. That pension fund industry consists of 2000 people. It's not hard actually in a way, but if you can get that getting consensus to development there. (Sustainable Investment Manager, International Fund Manager [84])

As a consequence of this emerging thinking around its investments, the Insurer, in 2010, published a Responsible Investment Mandate. This mandate obliged the Insurer to start making investments that could help to offset or displace its environmental footprint (such as energy and water usage and the management of waste), incorporate ESG thinking fully into how it analysed the companies it invested in; and ensured that the activities of these

companies aligned as closely as possible with the more general UNEP Principles for Responsible Investing (UN PRI) (Santam 2011c).

> … the biggest pool of our funds would be the portfolios environment where we give [our parent company] a couple of specialist mandates; they run with our equity portfolio, our bond portfolio and our interest bearing portfolios, we use specialist mandates and they're the experts to manage that. (Investments & Corporate Finance Manager [36])

In practice, the Insurer committed to this mandate via its parent company, a large multi-national investment fund manager, which had already introduced an array of actively managed funds focusing specifically on meeting the social and economic objectives outlined by the PRI (Sanlam 2014). By 2010, the parent company had already invested over R 390 million (US$ 21.6 million) in qualifying funds, with investments continuing to grow on an annual basis.

> So we're not like listed investors where you fill in a proxy form once a year and you call that influence. We attend board meetings; we are the board. (Sustainable Investment Manager, International Fund Manager [84])

The Insurer also increased its own disclosure on the progress it was making with regard to integrating ESG thinking into its investment portfolios. This included the publishing of annual sustainability reports, which detailed the company's overall progress in integrating sustainability into its investment portfolios, and more targeted annual reports on their commitment to the various industry associations and Principles with which it had aligned itself (Carbon Disclosure Project 2012; Santam 2012f; Carbon Disclosure Project 2013).

The basis of these reporting and disclosure requirements ensured that the Insurer was able to publically promote its commitment to sustainable investing, including its investments made via its Resilient Investment Fund and by integrating ESG across its broader investment portfolios. This, staff hoped, would help the company to inform the broader market of what they were doing and further reinforce their position as a market leader in the GEC space.

Consequently, the company achieved a Carbon Disclosure Project (CDP) score of 80% in 2010, rising to 90% in 2011 and in 2012 was recognised as one of the top 10 Johannesburg Stock Exchange (JSE) Socially Responsible Investment (SRI) Index entrants, achieving Best Performer in its respective category (Carbon Disclosure Project 2012; Santam 2012e).

Being aligned to the various sets of principles was attractive for the Insurer in helping to raise awareness, internally, of the need to address ESG within its investment portfolios in a way that were aligned with the rest of the industry. The marketing and branding opportunities associated with being aligned to these principles also reinforced such a response. This helped to reduce uncertainty associated with engaging their investment portfolios around GEC.

Direct Investments

Being associated with the international insurance industry, via its participation in organisations like ClimateWise and the UNEP-Fi, the Insurer's staff saw how many of its peers, especially the larger insurers and reinsurers, were becoming increasingly active in exploring the benefits attributed to sustainable investments. Allianz, for example, had already built up 100% direct investments in over 40 wind farms, across Germany, Italy, France and Sweden and seven solar-photovoltaic plants in Italy and France. Together these accounted for over 1,000 megawatts of energy generation (Allianz 2013). Prudential, similarly, had over US$ 500 million worth of investments in wind energy projects, across the United States, which together generated enough power to meet the needs of almost 500,000 homes (Mills 2009b).

These insurers seemed to be fully aware of the potential benefits these types of investments could have in helping to manage some of the systemic risks impacting their underwriting portfolios; particularly those associated with energy security and GEC. Munich Re, for example, was an active supporter of the Deserttec project, an ambitious scheme to generate almost 50% of Europe's future energy needs, via a combination of solar and wind energy plants spread across North Africa (www.desertec.org). They argued that such a project would help to improve energy security, reduce GHG emissions, support sustainable development in Africa and help the insurer to remain relevant in the 21st Century. As Munich Re's Head of Climate Change explained:

> … our business model will be still working in the second half of the century – and so there is quite some far-sighted activity here because we have a long tradition, Munich Re has been founded in 1880, so we have been in business more than 130 years now and we want to stay in business also the 100 years, and climate change is definitely a risk in this respect. (Head of Climate

Change, International Reinsurer [63])

Yet in practice, one of the main reasons why such investments in these transformative technologies were becoming so popular was not just the reduction in GHGs they offered, but their potential to generate significant and stable profit opportunities. As one fund manager explained:

> … within the renewable space there's a sustainability story that's out there. The return on investment on wind farms is attractive enough automatically for these guys to slot in there; the business case sells itself. It's easy, you don't have to try and convince any of these … guys whether they should play here; they're falling over themselves, kicking at the door to get in. (Sustainability Investment Manager, International Fund Manager [76])

Based on this emerging thinking within the international insurance industry the Insurer was beginning to see the increased value associated with these types of investment opportunities. As the Head of Risk Services explained:

> … the smart way to invest in the next 30 years is … to invest in these transformative technologies, regardless of their GEC risk reduction benefits, simply because they offer such reliable and long-term investment opportunities. (Head of Risk Services, the Insurer [19])

In response, in 2013, the Insurer established a R 20 million (US$ 1.7 million) 'Resilient Investment Fund' (RIF). The RIF differentiated itself from the company's more traditional investment portfolios, by actively promoting an investment mandate that was more 'systemically focused' (Santam 2013c; Santam 2014). The fund was seen as a way of helping the Insurer to invest in, and support, some of the industries it was starting to identify that could help it to positively address some of the risks impacting other parts of its operations:

> And one of the thoughts we had come up with is to … create a fund where one can actually put this funding in and then they can invest in businesses that manage risk – which in the same way actually then impacts [the Insurer's] core business. (Head of Strategy, the Insurer [41])

By early 2014, the fund had completed four initial investments; although only one directly related to GEC. The first was in a black-owned company specialising in salvaged and recycled motor parts, the second in a debt consolidator that helped clients to restructure their financial obligations, the third in a company financing the installation of green energy solutions (such as SWHs) and lastly in an information and communications (ICT) company that, the Insurer hoped, could help it streamline its internal procurement activities (Santam 2013b). All these companies were seen as having the

potential to generate market-related returns, while helping to reduce the Insurer's exposure to ESG risks, including the Insurer's own transformation requirements, such as promoting black-owned businesses.

At the same time, the Insurer's parent company, a large multi-national asset fund manager, had set aside an additional R 5 billion (US$ 44 million) it too had earmarked for investments specifically in profitable long-term projects that could help it address elements of systemic risk. However, at the time of research, no investments had yet been made from this fund, so the types of systemic risk it would target were unclear.

> And I think in the group … there's R 4 billion or R 5 billion that they basically can earmark for profitable identified long-term investments. (Reinsurance Manager, the Insurer [33])

Coincidently, similar thinking around the value of strategic investments was also beginning to emerge in other parts of the Insurer's business. The claims department, for example, had invested directly in a number of small suppliers; such as a mobile windscreen replacement company (see chapter five). The hope was that these investments could help the Insurer to achieve a better understanding of how its supply chains worked. However, unlike its Resilient Investment Fund, the claims department acknowledged that the value of these investments did not necessarily lie in their potential for profitable returns, but rather that increased 'profit' could emerge from reducing the cost of claims, in other parts of their supply chains.

> So we've seen now by just actually establishing that unit, we are actually able to service that client with a towing cost and a repair cost, at a much reduced price that we are getting it in the market. And that is giving us the ammunition to go back to our suppliers and say – excuse me, we can do it, we're proving that we can do it – so you need to come to the party. (Head of Product Development, the Insurer [35])

The underwriters also claimed that the substantial 'investments' they were making, in centralising their underwriting activities, were another way the insurer was creating a return on its investment. This included the opening of the 'Centres of Excellence' (COEs), developing integrated rules engines and commissioning extensive, and expensive, GIS models (see chapter 4). This helped the Insurer to both centralise and improve the consistency of its underwriting activities.

> We're constantly doing investment in terms of strategic projects that you do. You say we need a new system to do this and this and that, or we need a new capability to do this, or we need to restructure the front-end and this is going to cost so much. And we view all of those as strategic projects investments that you investment upfront and you expect a return over time. (Investments & Corporate Finance Manager [36])

However, given all of this, and even by the Insurer's own admission, it was still struggling to successfully integrate systemic thinking into the heart of its investment portfolios. In fact, in a 2012 annual review of its own progress in implementing the 4th ClimateWise Principle (i.e. to incorporate climate change into its investment strategies) the Insurer claimed it was lagging significantly behind progress others were making (Santam 2012f).

Yet while the Insurer's direct investment strategies were a copy of what its international peers were doing in more developed markets, it remained a strategy that was more focused on managing operational risk than systemic risk.

A Question of Control

Staff raised various reasons as to why the Insurer was struggling to manage its investment in ways that could simultaneously address systemic risk within its underwriting portfolios. This included the limitations of its investment mandates, the increasing role of its portfolios, both in terms of profitability and as a means of risk diversification and an array of practical and regulatory constraints. These realities, which framed many of the decisions the insurer made regarding its investments, often trumped any risk assessment and risk management opportunities that could be realised.

Investment Mandates

The structure of the Insurer's investment portfolios mirrors that of the international insurance market in being split into two distinct parts; its pool of existing premiums, and another, far more substantial pool of shareholder assets (Zurich 2009). Given the short-term nature of client funds, used predominately to cover losses accruing over the lifespan of an insurance policy, this first pool of investments, while under the direct control of the Insurer, remained a relatively small one, offering little flexibility around its

investment strategies given the need to ensure that it could be quickly liquidated as demanded by claims.

> … [the Insurer's] constraint because I think now we only have about R 2 billion of equities and most of our investments on that are much shorter obligations. (Head of Risk Services, the Insurer [19])

In contrast, the Insurer's shareholder assets were a far more substantial pool of investments, which, not being tied directly to losses, were often invested over much longer periods of time and in a more diverse way. This allowed for them to be managed according to a far broader array of investment mandates. Consequently, these portfolios were regarded as the pool of assets that lent themselves most to achieving systemic risk management. As the Insurer's Head of Investments explained:

> In terms of our investment strategy, we sit on billions of funds. We've got our own shareholder funds that we need to invest in some way. And then we also have the insurance funds, premiums that we have – it's just if I need to over-simplify, that we haven't paid out in claims yet. So we're sitting on a pool of insurance funds and a pool of shareholders' funds. We tend to invest the insurance fund in more safe or less risky investments with a more stable predicable return – that would be our interest bearing component of our overall investment portfolios. And the shareholders' funds we tend to invest a bit more in equities, listed equities, preference shares, a combination of that. (Investments & Corporate Finance Manager, the Insurer [36])

However, in practice, unlike its portfolio of client funds, these shareholder assets were not under the direct control of the Insurer's investment team. Instead, the Insurer's parent company had primary responsibility for managing them:

> … even if you're so closely involved with the investments, like I am, what's within your control. If the biggest part of the money that we manage is located with [our parent company] … so it's actually what they want us to do with the money that gets done with the money. (Investments & Corporate Finance Manager, the Insurer [36])

The challenge, from a systemic risk management perspective, is that being an asset manager, the parent company was primarily focused on generating a healthy (i.e. above inflation) return on its investment activities and was less interested in other benefits that could be attributed to systemic risk management. This meant that any efforts to influence its investment strategies was seen as much harder to achieve than if the Insurer had full in-house control.

> … because they are the holding company, they're the biggest shareholder of

> reference and they've got the investment cluster within the group as well, to say can't we look at that from a group perspective. (Investments & Corporate Finance Manager, the Insurer [36])

The Need for Profitability

Another concern was that the Insurer's investment portfolios were now an extremely profitable part of its business, both for the company directly and for its various shareholders. This meant that any capital generated from its investment activities could not simply be reinvested to support other parts of its business (such as mitigating systemic risks), but would instead have to be released to the company's shareholders in the form of dividend payments. This meant that the company would always have to comprehensively prove that doing anything with its investment returns, other than for the payment of dividends, may come under attack by the company's shareholders.

> Well, the argument there is if you can invest that money and generate a higher return than what you can currently earn from your combination of your insurance and investment activities, you should keep it and invest it in a proper project that can yield sufficient returns, otherwise you should return it to your shareholders. (Investments & Corporate Finance Manager, the Insurer [36])

This was compounded as most shareholders of short-term insurers tend to hold such stocks precisely because they have a good track record of paying regular and generous dividends. Pressure for such returns was felt to be particularly acute from the Insurer's parent company (that held 60% of the Insurer's stock) and relied on the company's positive cash flow to help capitalise its own investment activities:

> So from an investment perspective it doesn't make sense. And then the third element is if we were seen to be acting irresponsibly we wouldn't raise the money that we're raising from the Life company. (Sustainable Investment Manager, International Fund Manager [84])

Thus some staff felt that, in practice, making use of their investment portfolios, to help manage systemic underwriting risk, was mainly 'conceptualising', as priority would always ultimately end up being given to dividends. This had a profound impact on reducing the likelihood that the Insurer could start to strategically disinvest from certain industries, as it would simply struggle to justify such a strategy. As the Head of Investments and Corporate Finance explained:

> … we have had a social responsible investment mandate and things like that,

> but I think it's a lot of, if I have to be honest, it's a lot of conceptualising and not really follow through, because at the end we're responsible to deliver shareholder returns, good shareholder returns, and if the proper vehicles and funds are not in place to invest in then it's very difficult to justify to our shareholders why we make certain decisions. They want to see the share price growing by a certain percentage every year. We're a listed entity … So we constantly need to think which investments that we're going to make is going to generate the right shareholder return for the risk that we're taking. (Investments & Corporate Finance Manager, the Insurer [36])

This also made ring-fencing any gains made from strategic investments much harder as, should the Insurer manage to reduce its underwriting losses, they would have to return any benefits accrued back to their shareholders, again via dividend payments.

> I think from [an Insurer] point of view it's unbelievably difficult to give some advantage or some benefits back to the people. My personal view is that if you make lots of money, you can plough some of the money back, but it's going to the shareholders. (Specialist Crop Insurance Manager, the Insurer [31])

The Value of Diversification

Another challenge was linked to the need for the Insurer to keep its investment and underwriting portfolios separated from one another. This was because investment portfolios were increasingly being seen as another way that the Insurer could effectively diversify its risk exposure and thus minimise the potential for overall loss occurring by spreading risk across the financial markets. However, given that its investment exposure was vulnerable to its own market instabilities, the combined vulnerability of both its investment and underwriting portfolios tended to dominate the agenda and guide many of the Insurer's investment decisions, as the Head of Strategy explained:

> … economy for us is the top [threat] because the industry really just mirrors what happens in the economy because we insure assets and businesses and things. So if there's no asset formation and no business formation… we have a problem. (Head of Strategy, the Insurer [41])

Thus, as investments became more important in helping to diversify its underwriting exposure this, in turn, meant that addressing systemic risks became even harder for the Insurer to justify. This was because the very industries that had been identified as causing many types of systemic threat (i.e. the hydrocarbon companies responsible for GHG emissions) were the very industries that, historically, were highly stable and generated profitable investments (Leggett 1993; Zurich 2009).

Consequently, staff felt that, should the Insurer start to leverage its investment portfolios in support of systemic risk management, given the sheer size of these portfolios, they would inevitably have to maintain a diversity across a wide range of different types of securities, which inevitably would include the more stable and long-term investments (e.g. fossil fuel companies) that impacted systemic risk.

> On the other hand, given the size of the investments, you would end up in all sectors anyway. So you are always involved with fossil fuels, you're always involved with sectors that have an impact somewhere. (Head of Sustainability, International Reinsurer [65])

Thus the ability to diversify its exposure away from its underwriting portfolios was beginning to emerge as a crucial risk management strategy, in its own right, for the Insurer.

Risk Averseness

Given that their investments were increasingly both a source of profit and an important diversifier of risk, the Insurer was increasingly dependent on their ongoing stability (Zurich 2009; Frey & Karl 2010). This was based on the perceived safety associated with maintaining a physical separation between the Insurer's investment and underwriting activities (ibid.).

This led to an inherently risk-averse approach with regard to their investment portfolios, preferring to avoid high-risk securities, such as company stocks, in favour of more secure, reliable and stable investments, such as triple-A rated government and corporate bonds. The reason being that, although these investments had low yields, they have a proven track record of being far more stable and reliable investments, offering increased investment security over time.

> … when you have to invest these kind of amounts you have to make sure that it's a diversified portfolio and that it's secure. So you tend to invest in bonds, you tend to invest in triple-A bonds, so you end up with a lot of bonds – at the moment it's some 95% or 87% for a portfolio, it goes into governmental bonds. And you basically spread risk globally. And your ability to take out some parts and invest it or divest it from critical sectors and put it into other sectors brings many other issues with it – basically increase the loss potential of an immature investment – so if you invest in renewable energy for instance, the whole industry is much riskier. (Head of Sustainability, International Reinsurer [65])

This conservative approach to their investments became increasingly important in the wake of the 2008 financial crisis, when the broader insurance industry had its fingers badly burnt after becoming too exposed to a number of highly volatile investments (Frey & Karl 2010, p. 6).

> … before 2008 we were almost an investment bank and invested heavily in highly leveraged securities, and that's also why we had a huge loss as well. So we learned from that and basically went back to the core approach of an insurance company… (Head of Sustainability, International Reinsurer [65])

However, while investing conservatively was seen as a low-risk strategy, staff acknowledged that this had to be balanced by the fact that such investments would, inherently, limit potential investment returns. This could make the Insurer less attractive to investors, increase the cost of raising capital and make insurance products less competitive, in turn impacting their underwriting performance (Laster & Yeung 2010). A study highlighted how, by only investing in government bonds, insurers would see their overall annual rate of return drop by as much as US$ 340 billion (Economist Intelligence Unit 2012).

Practical Limitations

Regardless of the strategic benefits associated with leveraging their investment portfolios to manage systemic risk, there were other practical limitations that needed to be considered. First were concerns about the actual number of opportunities that existed for the Insurer to influence systemic risk management within its investment portfolios. This was particularly the case in a relatively small economy such as South Africa's:

> … the investment opportunities here are not that vast. If we say we tend to limit the unlisted investments that we do do investments in the insurance value chain – the things that we're comfortable with. (Investments & Corporate Finance Manager, the Insurer [36])

Second, this limitation was compounded by the fact that the Insurer rarely had absolute influence over the companies it invested in, given that the size of its shareholding, in any one company, was rarely high enough to directly influence management decisions.

> … what I have found is that people completely overestimate how influential [we are] … there's an assumption that we're like this vast empire that can change the whole country. (Sustainability Investment Manager, International Fund Manager [84])

Third, as fund manager's historic mandate was to maximise profits, there were concerns that there was simply a lack of expertise to help them invest in ways that could both manage systemic risk and help meet their investment targets at the same time:

> For us to create an industry where we say we're going to review all these investment opportunities but it's like a little bit here, a little here, a little bit of wind energy, then this is a recycling plants – it's not our area of specialties … there's a bit of a – do we really need to be the first big corporate to do this? Is it not too risky? (Investments & Corporate Finance, the Insurer [37])

Fourth, because the impact of a particular company in terms of its contribution to GEC in which the Insurer is invested is so often so unclear, this adds considerable complexity in trying to understand how systemic risk-orientated investments could even be structured:

> [There are] two types of investments: those you can link directly to emissions (e.g. the cement industry) and those that indirectly support emissions (e.g. the construction industry). (Representative, UNEP-Fi [85])

Consequently, investments that *do no direct harm* often emerged as more attractive investment strategies that sought to positively influence the risk landscape. This began to account for why the Insurer focused so much effort on integrating ESG into its investment portfolios.

> What we don't really do … is we don't sit there with a climate model saying what happens if we face a three degree [temperature] rise, in our business … so we're more in a 'do no harm' mode, trying to make sure that the projects … don't have a negative impact on the environment. (Sustainability Investment Manager, International Fund Manager [84])

Last but not least, other short-term operational pressures and challenges regularly impacted the ability of the Insurer to respond strategically because doing so introduced fears that it would significantly increase the levels of bureaucracy that the Insurer, and its fund managers, would face:

> … that's not going to add to your level of bureaucracy or add to just swamping people down, because a lot of times part of the bureaucracy is that the levels of paperwork and stuff, people become so demotivated just by the enormity of it. (Sustainability Investment Manager, South African Asset Manager [82])

Thus, as the Insurer became increasingly overwhelmed by other deadlines and other, seemingly more urgent crises, staff struggled to remain focused on linking its investment activities with the management of systemic risk.

> … how can we adapt our processes to do this? And that doesn't happen overnight either because this is not a screaming priority, let's face it in where

> we are; that's the reality. The priorities at the moment is people have deadlines: they have portfolios to manage, they've got to buy this, they've got to sell this asset, buy this, and so forth. They've got daily pressures – so it's trying to find time in people's and within a team, not only individuals but in teams' diaries to come together to have these discussions to say can we change? And that is the challenge. (Sustainability Investment Manager, South African Asset Manager [82])

Thus access to the resources needed to help assess and engage the various companies it was exposed to, within its investment portfolios, emerged as an ongoing challenge facing the Insurer and one that impacted its ability to manage risk systemically.

The Regulatory Environment

The regulatory environment was repeatedly referred to for its tendency to govern how the Insurer could manage and control its investment portfolios:

> It's always regulation, regulation, regulation and capital adequacy and banking discussions and systemic risk discussions and solvency discussions and you name it. (Head of Sustainability, International Reinsurer [65])

The extent of the regulatory environment rose dramatically following the 2008 financial crisis when governments responded by trying to rein in what they regarded as a financial services industry increasingly out of control.

> … after the financial crisis … [g]overnments want to make sure that big financial companies can't fail and can't go bankrupt without jeopardising the whole economic system. (Head of Sustainability, International Reinsurer [65])

The result was the introduction of a new, principles-based regime, initially in the European Union (EU). Solvency II introduced a more flexible and integrated regulatory regime, one based on economic principles rather than punitive rules. It obliged insurers to start thinking more systemically about how they identified and managed the various financial risks their investment portfolios faced (Frey & Karl 2010; KPMG 2012a; Klein 2012). It required insurers to maintain adequate levels of financial liquidity, maintained above a minimum threshold thus allowing them to remain financially sustainable and to undertake independent forward-looking self-assessments, taking into account all elements of the financial risk landscape.

Given the interconnectedness of the global financial sector, Solvency II led to copycat regulations emerging in other regulatory regimes around the world (Deloitte & Touche 2011; Centriq Insurance Innovation 2014). In South Africa,

the Solvency Assessment and Management (SAM) regime similarly increased insurers' capital requirements, promoted a more risk-based approach to regulation and encouraged insurers to adopt more sophisticated risk management practices (ibid.).

> … we're moving towards [the] European framework over the next couple of years, but we're already aligning ourselves to that, where you say you need to have enough assets on your balance sheet to cover your insurance liabilities – that's more just like the reserves – when you get a premium you say I need to make certain reserves against that premium for future claims, and for the premium that I haven't earned yet – I get an annual premium and I only earn it as and when the months expire. So those reserving's – and that's prescribed by the FSB, how much you should reserve in terms of your claims (Investments & Corporate Finance Manager, the Insurer [37])

The Insurer welcomed most of these regulatory changes as it helped them to iron out some of the discrepancies they associated with the former rules-based regime, while dealing with some of the industry's more errant competitors. Yet staff raised concerns that by introducing capital requirements, regulators were effectively treating insurers like banks, even though both industries face considerably different risks (Frey & Karl 2010, p. 4–6).

> … and that leads to higher capital requirements basically for us, which for insurance companies often doesn't make sense because we quantify the risks and we make sure that we have enough money to pay the bill – whereas banks can invest much more on their own, so they can do their own trading and investments, which we basically don't. (Head of Sustainability, International Reinsurer [65])

Staff argued that simply regulating insurers to hold enough capital, to manage the cost of possible catastrophes (i.e. two consecutive 250-year events), had the effect of shifting insurers even further towards safe-haven investments, such as bonds, and away from other, riskier types of investments.

> … if you go invest in an unlisted entity that's not on the stock exchange, you're only allowed 2.5% of that sum that you need, your prescribed assets from the regulatory point of view – if it's over and above that it gets disregarded as a valid asset. So there are constraints that we need operate with. (Investments & Corporate Finance Manager, the Insurer [37])

There were also concerns that while the regulations focused on protecting the client from financial risk, it failed to accommodate risk planning from an underwriting perspective. This prevented the Insurer from engaging more in systemic risk management.

> I'm sure that there would be scope for [the Insurer] to also think wider. We do have regulatory constraints from a FSB perspective … As I mentioned, it's policyholder fund or insurance funds, it's typically funds that we need to have

> on our balance sheet to be able to pay the policyholder when the claim originates. (Investments & Corporate Finance Manager, the Insurer [37])

Overall, the regulatory environment significantly increased the administrative and financial burdens the Insurer faced due to its tendency to constantly evolve. These changes, staff complained, meant that the Insurer became more focused on addressing future regulatory risks and that this consumed a majority of its available resources.

However, some elements of the regulatory regime were emerging that sought to formally support the integration of ESG into investment portfolios. Regulation 28, for example, was a widely lauded change in the pension fund management laws, obliging investment fund and pension managers to start considering and integrating ESG factors within their investment portfolios (South African National Treasury 2010).

> Regulation 28 had a change and within that basically cited that pension funds should consider all factors that could materially affect the long-term sustainable performance of funds, including that of an environmental, social and governance nature. (Sustainability Investment Manager, South African Asset Manager [82])

This helped to galvanise other sectors to start considering the sustainability of their investment portfolios, based on how large and significant the influence of their pension portfolios were.

> So all of a sudden for a long while prior to that the market was sort of, ja, ja, ja, UN-PRI, ESG screening, responsible investing – no one had really done much about it. And more of the bigger funds realised the importance of it but the changes happen very slowly. Then with Regulation 28 come into effect, I'm not saying it's fast now but I'm not definitely saying is fast but it's on the agenda with pension funds now (Sustainability Investment Manager, South African Asset Manager [82])

Similarly, other regulations also contributed to increasing the attention fund managers gave to the inherent sustainability of their investment portfolios.

> Ja. So I'd say it's a combination of - The influences in our world have been changes in regulation, changes in, I don't know what you'd call it but the governance movement – so not so much King code because we're unlisted but let's say King and we've got governance movements like this CRISA code… and the codes and the Equator Principles and the UN PRI, it creates an environment that… UN PRI is sort of an opt in type. But, ja, the organisation is trying to align itself. (Sustainability Investment Manager, International Fund Manager [84])

The regulatory environment both positively and negatively impacts the way the Insurer engaged GEC. This sometimes led to the Insurer becoming more

concerned by its exposure to regulation and the costs required to meet these obligations.

Summary

The Insurer's response to systemic risk was mainly driven by its participation in many of the international principles with which it had aligned itself. This led to it establishing its Resilient Investment Fund and actively exploring some of the opportunities it could realise by making direct investments in key strategic suppliers, which it saw as influencing its exposure to systemic risk from an operational perspective.

At the same time, as understandings of the value of ESG became more entrenched, so the Insurer started to explore what opportunities there were for improving the sustainability of its existing investment portfolios. It did this via its parent asset fund company that was responsible for most of the Insurer's investment portfolios. However, in the context of suggestions that insurers start to shape systemic risk, by disinvesting from the most polluting industries, little evidence, if any, during this study was found of this occurring.

Reasons for this include that the Insurer does not have full control over its investment portfolios, with responsibility falling instead to its parent company, which regarded these portfolios as a profitable revenue stream. These investments have also become increasingly important as a means of diversifying the Insurer's risk exposure, which in turn led to pressure from shareholders to maintain regular and stable dividend payments.

This meant that the Insurer faced pressure to maintain more risk averse investments, preferring stable government and corporate bonds rather than the more strategic, yet inherently more risky securities whose strategic use could help to manage systemic risk.

This was coupled with concerns around a lack of expertise that would actually be required in order for fund managers to start linking their investment decisions to systemic risk management. Finally, as regulation was so focused on protecting the client, it failed to create the space for systemic risk management.

Discussion

This chapter seeks to address how and why the insurance industry has responded to GEC, via its investment activities, in the way that it has. In the past, these portfolios were regarded as strategically so important that it prompted calls by some activists for them to become the industry's primary response to GEC. This was by disinvesting away from the most carbon intensive industries and investing instead in the support of new, greener economies (Leggett 1993).

Ironically however, the use of insurer's investment portfolios, as a tool for managing systemic GEC risk, is an area where the industry appears to have responded the least. This is especially true when compared to its other activities, as a risk carrier and risk manager, in which its response has been described as more adaptive, of its business activities, than mitigative of the drivers of GEC (Paterson 1999; Phelan et al. 2010; 2011).

North-South Divide

Instead of strategically disinvesting its financial assets from the most polluting industries, Mills (2009b; 2012) suggests that insurers have responded by also investing directly in a wide variety of transformative technologies including solar and wind energy projects. They have also tried to strengthen the sustainability of their existing investment portfolios, via the integration of ESG Principles (Herweijer et al. 2009; Dlugolecki 2009; Mills 2009b; Mills 2012).

Reasons behind this response lie in the fact that calls for strategic disinvestment appear to have overinflated the actual influence insurer's investment portfolios can have as a tool for managing systemic risk within their underwriting portfolios (Paterson 1999; 2001). Here the empirical research found that, although insurers' investments are considerable and far-reaching, in practice they are not nearly as influential for managing systemic risk as had initially been thought (Leggett 1993). This is because the Insurer did not have full control over its investment mandates, was under pressure to generate viable investment returns and that its portfolios have emerged as a crucial means for diversifying their risk exposure. This is compounded by the

presence of other stakeholders – especially regulators – who so often limit the ability of insurers to use their portfolios to manage systemic risk.

However, this research did underline how, in responding to systemic risk, insurers' investment decisions are inherently shaped by the specific, and often heavily contested, socio-economic environments to which they are exposed. This is particularly acute in the more developing regions of the world, which often face the most severe socio-economic problems (Bell & Pavitt 1997; Roberts & Parks 2007).

In this regard the Insurer's response contrasted with many of its international peers, as no evidence was found of it, or indeed any South African insurer, having directly invested in transformative technologies, such as renewable energy projects. However, this did not mean that systemic thinking had not started to enter into the Insurer's investment mind frame. The establishment of its Resilient Investment Fund (RIF) was one example where the Insurer was beginning to think about the influence that its investments had in responding to systemic risk. However, in practice, the size of the RIF was very small, at just R 20 million (US$ 1.8 million), or 0.3% of the overall R 6.5 billion (US$ 500 million) of shareholder funds, which the Insurer held in its investment portfolios (Santam 2013b, p. 26). This suggests that the potential benefits of RIF were not yet regarded as significant or viable.

Internationally, direct investments in transformative technologies, with an ecological slant, were also found by the literature to be particularly popular among many of the larger insurers and reinsurers in the more developed markets, such as Europe and the United States (Mills 2009b; ClimateWise 2012; Mills 2012). The popularity of these investments was linked to growing concerns around the future risks associated with energy security and as these investments offered relatively long-term and stable investment returns (Mills 2009b).

In South Africa, however, social issues were found to be far more pressing, especially linked to issues of inequality (Tangri & Southall 2008; Gray & Niklasson 2013). This would account for why the focus of the RIF was more on companies that contributed to social development and less on ecological

concerns. The RIF particularly focused on companies strong in broad-based black economic empowerment (BBBEE) – the South African government sanctioned transformation program - as transformation reflected one of the primary ESG challenges that the country faced (Tangri & Southall 2008).

Furthermore, given that many transformative technologies, that are such popular investments in the North - such as renewable energy - are still in their infancy across Southern Africa and thus actual, tangible opportunities for such investments remain thin (OECD 2013).

Such thinking was also evident in how the Insurer started to engage its existing investment portfolios with regard to ESG. Again the research helped to reinforce the differing priorities insurers faced in less developed markets of the world, who often found themselves confronted by a far greater array of ESG pressures to which they, and the companies they invested in, were exposed (Gray & Niklasson 2013). The example given of the systemic risks impacting the platinum industry indicates why the Insurer was increasingly concerned about the impact of ESG within its traditional investment portfolios. Thus shaping their investment portfolios by changing their mandates, becoming more active shareholders and trying to align their portfolios with the various sets of Principles to which they had aligned themselves appears to be a logical and sensible approach to take (Herweijer et al. 2009)

Yet the research also highlighted how this response was not driven purely with the aim of managing systemic risk within their portfolios. In addition, the Insurer's response was encouraged by the current and expected changes to the local regulatory regime (e.g. Regulation 28, SAM and King III), the Insurer's close alignment to the various industry Principles (including the UNEP-Fi PSI, ClimateWise and the UNEP PRI) and the opportunities for positive marketing and branding such approaches offered (Norton Rose 2012).

Thus, a general finding of this research, and one very much in line with the insurance industry internationally was that very little was occurring in relation to strategic disinvestment, but a lot on trying to identify ways to tweak their existing investment portfolios. Where strategic investments were being made (i.e. via the RIF) this was done via new, stand alone, investment funds being

established rather than substantive changes being made within their existing portfolios.

Better the Devil You Know

In trying to understand why insurers have responded in ways that contrast with calls to become more proactive in their use of their investment portfolios, the existing literature suggests that this is linked to growing levels of competition, introducing *destructive competition* (Cummins & Venard 2008a), pressure from financial markets to achieve regular and stable investment returns (Beer & Nohria 2000; Newell & Paterson 2001), the threat of being downgraded by ratings agencies and the negative impact this might have on profitability (Sinclair 2007), as well as a regulatory environment encouraging a more conservative response to how insurers engage their investment portfolios around GEC (Paterson 1999; Doyle & Ericson 2004; Frey & Karl 2010). Insurer's investment portfolios have become a crucial form of risk diversification, complementing their existing underwriting portfolios, and helping them to spread risk out across the financial markets (Frey & Karl 2010).

The research develops this understanding by highlighting the perceived safety net associated with maintaining their existing investment mandates and focusing instead on integrating the principles of ESG into them. Doing so does not require a fundamental reframing of their investment strategies, but still strengthens their portfolios. This accounts for why the Insurer aligned itself with the various sets of investment principles (i.e. ClimateWise and the UNEP-Fi), as these allowed the company to respond within a pre-established community of like-minded insurers. This also gave the company an international platform from which to promote itself as a socially responsible investor, thereby helping to build brand and marketing opportunities (UNEP-Fi 2009).

This was compounded by the fact that the Insurer was less in control of its investment portfolios, as responsibility for managing them was increasingly in the hands of third-party asset managers, such as the Insurer's parent asset fund manager. This emphasised how these portfolios are now regarded more

as a source of income, than for their potential contribution to managing systemic risk. The Insurer's parent company relied on these investment funds to finance many of its own investment activities that constituted its own primary income stream.

Thus a picture starts to emerge of an industry not in full control of its own investment portfolios and, being so risk averse, not inclined to risk the stability of its existing investments in a quest for opportunities that may help to manage systemic risk within its underwriting portfolios. The internal struggle is captured well in the description of an industry keen, on the one hand, to invest in AAA-rated government bonds, for their exceptionally low risk profiles, yet on the other conscious of the fact that such investments tend to result in lower investment returns.

This also begins to account for why insurers have leaned more towards addressing issues of sustainability, within their existing investment portfolios, than trying to introduce new, more aggressively-oriented investment strategies. It suggests that the reason why Cat-bonds have become such a popular risk transfer mechanism is precisely because they offer insurers a means of managing risk, via the financial markets, which does not impact upon their existing investment portfolios (Bougen 2003; Sturm & Oh 2009).

In short, what we are seeing is an inherent short-termism that continues to encourage the insurance industry towards responding in ways it always has and that are as low risk as possible. After all, CAT-bonds themselves are a classic example of how the insurance industry has sought to use the financial markets, to manage risk, over the shortest of possible time frames (Bougen 2003).

Investments Priorities

Chapters 4 and 5 helped to develop a far more nuanced understanding of an insurance industry increasingly trying to adapt its risk assessment and risk management activities in line with their emerging understanding of the nature of risk within the Anthropocene. However, although the insurance industry is fully aware of the potential impact GEC presents, and that it threatens to limit the relevance of commercial insurance in a world increasingly dominated by

science and technology, the industry continues to respond more exploitatively than exploratively (March 1991). In this light it has tended to tweak its existing risk assessment and management systems, for assessing and managing risk, rather than develop new ways to engage GEC (Phelan, Henderson-Sellers, et al. 2011).

Such an understanding of the insurance industry's response appears to be equally applicable in the case of its investment activities, as this chapter has highlighted. Indeed, there is a strong emphasis on the insurance industry trying to identify ways to tweak its existing portfolios (i.e. by introducing ESG) and relatively little evidence of them more proactively exploring ways to use their portfolios as a tool to mitigate systemic risk. This reflects an emerging theme, woven throughout this research study, of an industry keen to motivate others (such as clients and governments) to manage their own risk exposure, rather than take responsibility for doing so themselves.

This raises the irony that the one area of insurers' business, that prompted the very GEC mitigation debate in the first place has, in practice, been the area where insurers have engaged the least (Leggett 1993). Indeed, several theorists have already painted a picture of an industry increasingly struggling to link the exposure of its investment portfolios with systemic risk emanating from its underwriting portfolios (Berz 1999; Paterson 2001; Phelan, Taplin, et al. 2011).

One of the biggest challenges with Leggett's emphasis on strategic disinvestment is that he failed to fully appreciate the complex interconnectedness of insurer's investment portfolios. This includes the role its investments play as both a source of income and a as crucial diversifier of risk, but also includes the lack of influence insurers often have over their investment portfolios, linked to pressures from shareholders, regulators and credit rating agencies and the need to maintain highly diversified portfolios.

Indeed, the very industries Leggett suggested were ideal candidates for strategic disinvestment - such as the fossil fuel industry - are today not only major clients of the insurance industry themselves, but also often shareholders of short-term insurers. Thus, by challenging such industries, via

the withdrawal of investment exposure, would not only undermine an insurer's own potential investment returns, but effectively impact their underwriting portfolios too.

Finally, as the correlation between the size of the local insurance industry and growth of GDP have been so conclusively shown, anything seen to threaten this, such as the impact of strategic disinvestment, may further limit the flexibility insurers have over their portfolios (Ward & Zurbruegg 2005; Staib & Bevere 2011; Liedtke 2007; Brainard 2008). Simply put, investments are now far too important and far too vulnerable to their own inherent risks, for them to be used, meaningfully, for strategic disinvestment.

Conclusion

The overarching aim of this chapter was to try to understand how and why the insurance industry has responded to GEC, via its investment activities, in the way that it has. This was looked at in the context of calls by some activists, for the industry to become more proactive (i.e. mitigative) in the use of their investment portfolios, in order to help manage some of the systemic drivers of GEC, like GHGs.

This suggests that although insurers are aware of the threat their investments face, and the potential role they can play in addressing GEC risk, they have struggled to act fully on this awareness. Insurers' main response has been to start investing directly in transformative industries and to integrate the principles of ESG into their existing investment portfolios. This reflects a response more focused on improving the resilience of their existing investments, rather than using them as a tool to manage risk within its underwriting portfolios. Thus the findings help to reaffirm how insurance is continuing to respond to GEC more exploitatively, than exploratively (March 1991).

These are the reasons for continued inherent short-termism, which seems to frame insurers' relationship with the financial markets and, consequently, its own investment portfolios. In reality insurers simply do not have the influence over their investments that had initially been hoped for.

CHAPTER SEVEN - CONCLUSION

This study sought to unpack the complex relationship between commercial insurance, debounded risk, and the frontier barrier of the risk society. It did so by looking at how the industry has responded to the impacts of global environmental change (GEC). It was the frontier of the risk society that Beck suggested was demarcated by access to commercial insurance (Beck 1992; 1999). However, subsequent theorists have suggested these claims are not as clear cut as Beck had initially assumed (O'Malley 2003; Bougen 2003; Ericson & Doyle 2004).

This led to several empirical studies that examined how commercial insurers have responded to some debounded risks, including the 9/11 attacks on the World Trade Centre and Hurricanes Andrew and Katrina. In these examples insurance systems were found, contrary to Beck's assertions, to have reconfigured themselves and were working 'reasonably well' in adapting to the new risk landscape they faced (O'Malley 2003; Bougen 2003; Ericson & Doyle 2004). However, by their own admission, these studies were not exhaustive and calls were made for more empirical research to be undertaken to help improve the nuanced understanding of this highly contested relationship between commercial insurance and the risk society (Bougen 2003; Ericson & Doyle 2004).

Of all the debounded risks, GEC arguably presents commercial insurance with one of its biggest threats, linked to the exponential rise in losses being recorded (Beck 2010; Kunreuther et al. 2013). This led early industry activists to call on commercial insurers to become more proactive in responding to GEC. In particular they suggested that the insurance industry start to address the systemic drivers of GEC, in particular by mitigating anthropogenic GHGs. They suggested that to achieve this the industry disinvest its extensive financial assets from the most polluting industries in support of new, greener economies and to become more engaged in managing the proximate drivers of climate-risk, which impact insured assets in the local environment in which insurers operate (Leggett 1993; Nel et al. 2011). Recent studies, however, found that insurers have ultimately responded in ways that are far more

adaptive, of their business activities, than mitigative (Paterson 1999; Phelan, Taplin, et al. 2011).

Consequently, this study examined not only how the commercial insurance industry has responded to GEC, but why it has responded in such ways. In so doing, it has helped to develop a far more nuanced understanding of the insurance industry's specific response to GEC, by elaborating on how and why insurers have responded to GEC in the ways that they have, and whether these responses differ between insurers operating in developed and developing markets.

The study explored these questions in the context of the industry's three primary activities; as risk carriers, risk managers and as investors (Hecht 2008; Arena 2008). It undertook an in-depth case study of a large South African short-term insurer, and multiple interviews with a wide variety of industry stakeholders, including other primary insurers, brokers, clients, reinsurers, regulators, asset managers and industry associations across South Africa, the United Kingdom, Belgium, Germany and Switzerland. These case studies were complimented by extensive documentary analysis of the insurance industry's grey literature, company reports, regulations, news reports and a host of other multimedia sources.

How

The study helps to confirm many of the existing claims within the literature, in particular how the insurance industry has tended to adapt its business activities, to the threat GEC presents, rather than try to identify ways to mitigate the various systemic drivers behind its increasing risk exposure (Paterson 1999; Newell & Paterson 2001; Phelan, Taplin, et al. 2011). The Insurer similarly responded to GEC by seeking to improve its ability to *defensively underwrite*. This included making substantial investments in GEC related research - such as the Eden Study - to help it better understand the threat it was facing, developing GIS models to map the specific impact of environmental risks - such as flooding, wild-fire and coastal erosion - and using all of this data to help tighten the terms and conditions under which the

company underwrites risk. This included making use of excesses and deductibles and even withdrawing from some higher-risk markets altogether.

Part of this response also focused on helping to diversify the company's risk exposure, by introducing new products and services, like PAYD policies, and in launching new insurance products for emerging technologies - such as the renewable energy sector - and in offering reinsurance. To fast track this diversification, the Insurer acquired several subsidiaries in South Africa and further afield.

The Insurer also began to see its existing underwriting systems as unsuited to helping it to respond to GEC. This was due to its decentralised approach to underwriting, in which its regional offices had the power to both write and administer polices autonomously. Consequently the Insurer began to centralise, closing many of its regional offices - reassigning the role of its staff as Relationship Officers - and limiting their influence over the underwriting process. Responsibility for underwriting was instead transferred to new centralised Centre's of Excellence that housed specialised teams of underwriters with the capacity to integrate the new rules-engines and GIS models uniformly into the underwriting process. This centralisation not only helped to reduce the company's administrative overheads but, far more importantly, helped to improve the accuracy and consistency of the company's underwriting portfolios.

At the same time, the Insurer also tried to identify ways to encourage other stakeholders to become more involved in managing their own risk exposure. This began with the use of defensive underwriting, in particular the tightening of conditions under which certain risks were being underwritten, so as to motivate clients to become more proactive in adapting or mitigating their risk exposure. The company embarked on various educational programmes via its website, the mainstream media and as part of its general marketing campaign, to try to increase public awareness around GEC. The role of government, as a risk manager, also started to receive increasing attention; although the Insurer opted to engage it mainly via the various industry associations to which it had aligned itself, such as the UNEP-Fi, ClimateWise and SAIA.

However, some evidence was found of the Insurer starting to directly manage some of the GEC-risks it was facing. Well before widespread GEC concerns had emerged, the company had identified significant vulnerability within its agricultural business and, to try to counter such threats, established an experimental test farm to support vulnerable farmers to improve their agricultural practices and extend support to fire protection associations to help combat the regional threat of wild fires. More recently, the company's involvement in BAAM sought to directly support some municipalities facing specific environmental threats. This led to the Insurer establishing an early warning storm system and providing fire-fighting equipment to a few vulnerable and under-resourced municipalities.

Also aware of the growing impact systemic risk was having on the broader activities within the *golden triangle* (i.e. underwriting, distribution and claims), the Insurer's claims department became increasingly proactive in centralising its own operations and reining in some of its more errant suppliers. The result was a number of strategic investments in suppliers that the claims department felt could act as a lens to help them better understand their supply chains and improve the speed, efficiency and quality of their administration.

All this was framed as attempts to improve its own in-house sustainability, focusing on energy and water consumption, waste and business travel and the use of CSI funds to help promote the company's environmental awareness more widely. This included sponsorship of a number of environmentally themed events and support for publications, such as the City of Cape Town's *Green Office Toolkit*.

Finally, there was some evidence of the Insurer becoming more active in strengthening the resilience of its investment portfolios. This was driven by growing awareness, across the broader financial sector, of the impact ESG factors was having on the resilience of its investment portfolios. The Insurer, via its parent fund management company, aligned itself with the UN Principles for Responsible Investment (PRI) and the Carbon Disclosure Project (CDP) and introduced its own Responsible Investment Mandate to govern its investment decisions. The underwriting and claims departments also saw their investments in centralisation and in the acquisition of key strategic suppliers,

respectively, as crucial ways to strengthening the company's overall response to GEC, while delivering a return on such investments.

What was not found, however, was a response similar to that proposed by the early activists, who called for strategic disinvestment from the most polluting industries (Leggett 1993; Paterson 2001). Instead, fund managers spoke about changing the practices of these industries, from within, by focusing more on becoming active shareholders. This introduced an irony, given that the insurance industry's investments - the area of its business initially believed to offer the greatest potential for positively engaging GEC - has, in practice, been the area that has seen the least response to systemically engaging GEC.

While this description is useful in helping to develop a more nuanced understanding of how commercial insurers have responded to GEC, what is more interesting, is why the industry continues to focus on ways to avoid risk rather than manage the systemic drivers behind it, as initially proposed (Leggett 1993; UNEP-Fi 2011).

The relevance of this question is reinforced when one considers how, by focusing predominantly on defensive underwriting, this could lead to an *actuarial regression*. This is where, by focusing on defensive underwriting, in an environment where the probability for loss is growing exponentially, insurers are potentially limiting the future market for insurable (i.e. sudden and unexpected) risks over the long-term.

Why

In trying to understand why the Insurer has responded to GEC in ways that contrast with calls for a more mitigative approach, the research describes how GEC has presented the Insurer with such a complex threat. Given that so many drivers often combine to produce the GEC perils that impact insurance, the consequence is that there is many different, and often contrasting, ways to respond to GEC. The impact of proximate drivers of risk, within the local physical risk landscape insurers are exposed to, was described by the Eden Study (UNEP-Fi 2011).

Indeed, any strategy for responding to GEC was often compounded by the non-linearity so often associated with GEC losses, in which years of high

profits often followed years of sharp losses. The Insurer's own experience within its agricultural business underlined these challenges, reinforcing a belief that defensive underwriting was the most effective response, as this practice so effectively averaged out losses over long time frames. Furthermore, as GEC was creating demand for new insurance products and services, it was increasingly being seen, not just as a threat, but as a potentially profitable market for the Insurer to be exposed to. This accounted for its acquisition of new subsidiaries, specialising in the underwriting of transformative technologies, like renewable energy projects.

Managing risk systemically was also seen as highly dependent on collaborative partnerships, which in themselves presented a major challenge for the Insurer. These included high levels of industry competition, with ever increasing numbers of market entrants all vying for a limited market share; further compounded by the actuarial regression. In particular, the new, direct insurance companies were becoming highly selective in which risks they accepted, skimming off the best and diluting the quality of the remaining risk pool to which the larger, more traditional insurers were exposed. This led to pervasive fears of free riders and destructive competition

Clients too were seen as unlikely to undertake mitigation or adaptation measures until they had first experienced a loss; by which time the financial consequences had already impacted both themselves and the Insurer. Even governments were regarded as less likely, or able, to adequately manage risk, often due to their limited resources, desire or capacity. This impacted the collaborative role they were willing to play in systemic risk management, even though they are undeniably such crucial stakeholders.

A host of other operational and regulatory constraints also influenced the Insurer's ability to engage GEC. These included the unreliability of reinsurance, based on the speed at which cover could be re-priced or simply withdrawn; a regulatory environment seen as more focused on governing how insurers treat their clients rather than promoting systemic risk management; the nature of 'short-term' insurance, that itself almost universally limits the potential partnership between the Insurer and client to one year; and how access to the resources necessary for managing risk systemically were so

often limited and inevitably highly contested within the company. All of this combined to result in the Insurer regarding risk management as incrementally more risky the further away from the point of the insured asset it moved.

Finally, and with regard to its investment portfolios, the Insurer lacked the control over its investment portfolios it needed to influence systemic risk over the long term. This was because insurer's investments have emerged as not only a crucial source of income in their own right, but also because they play a vital role in helping the industry to further diversify its risk exposure across the financial markets. In the case of the Insurer, its investment mandate was governed by its parent company, an asset fund manager, which had its own, profit-orientated objectives. These inevitably contrasted with calls for strategic disinvestment, as it would reduce its exposure to some of the – historically - more lucrative investments (i.e. hydrocarbons). Pressure from shareholders to return regular profits, and requirements to report on an annual basis, compounded the short-termism of the financial markets, highlighting why so many international insurers opt instead to invest in stable triple-A rated government bonds, rather than expose themselves to riskier equities over which they have less control. This means that in many instances insurers are simply not even exposed to the type of investments Leggett had proposed they disinvest from in the first place (1993).

Thus calls by Leggett, for a more strategic use of insurers' investments, appears to have not taken into account the full role investment portfolios now play as a crucial part of the industry's overall business, and the actual levels of influence insurers have over these portfolios.

Risk Society and the Anthropocene

However, from an actuarial perspective, there is a clear and emerging statistical misnomer linked to GEC, in that the past is proving to be increasingly unrepresentative of the future. Thus, by continuing to rely primarily on actuarial analysis, in order to manage GEC, means insurers run the risk of relying on risk assessment tools that may be become unsuitable for managing certain risks in the future. This is being further reinforced by the inherent short-termism that has come to define the commercial insurance

industry, encouraging it to respond to GEC in ways it has always, rather than develop wholly new solutions for managing the various threats impacting its business activities.

In Hardin's (1968) thesis on the tragedy of the commons, he describes how individuals, acting both independently and rationally for personal self-interest, often do so at the expense of the interests of the broader community, particularly with regard to common resources. Such a description seems particularly applicable in the case of the insurance industry, that is so focused on simply avoiding exposure to GEC risk, over the short-term, and via the use of defensive underwriting, that it is failing to respond to the steady deterioration in the systemic risk landscape that may ultimately undermine the number of insurable risks they have access to over the long term.

To understand this resilient faith in defensive underwriting, one must look back at how actuarial analysis emerged during an understanding of the world as framed by the Holocene. During this period, environmental risk was understood to be both stable and predictable. Thus looking at the past tended to be a reliable indicator of the future probabilities of risk occurring. This led to the emergence of actuarial analysis as a reliable and dependable tool for helping commercial insurers to assess and manage their risk exposure. Thus, one of the main reasons why insurance has focused so much attention on defensive underwriting, in responding to GEC, is precisely because actuarial analysis has worked so well for it in the past, helping the industry to establish itself both as society's primary financial risk manager and, consequently, as the largest industry in the world (Hecht 2008; Phelan, Henderson-Sellers, et al. 2011).

In the Anthropocene, however, human activities are now known to have fundamentally altered Earth's ecological systems and with it the size, scale and prevalence of the threats associated with them (Rockstrom et al. 2009; IPCC 2013). The relationship between anthropogenic greenhouse gas emissions and GEC is a primary example of this, with all indications suggesting that such risk exposure continues to grow exponentially (Millennium Ecosystem Assessment 2005). The result is that, in the

Anthropocene, the past is increasingly less indicative of the future, as it was in the Holocene.

This raises fundamental questions for commercial insurance by suggesting that one of the main reasons why the industry has struggled to adapt to GEC is precisely because its traditional, actuarial based risk assessment and risk management tools are no longer as suited for managing risk in the Anthropocene.

The underwriting bricolage

Consequently, it is possible to regard underwriting as a bricolage of tools that insurers draw upon to help them calculate the likelihood, and thus price, of risk occurring. Some of the tools that make up this bricolage, in particular actuarial analysis, are highly scientific, while others, such as reducing premiums to grow market share, are far more subjective.

Historically, actuarial analysis has played a dominant role within this bricolage, with insurance policies, at one stage, even being priced almost exclusively via the use of statistical actuarial tables. Yet, as we move deeper into the Anthropocene, and the limitations of actuarial analysis have begun to emerge, the composition of this bricolage has started to shift. Now other risk assessment tools have become more prominent, as underwriters try to account for the inherent weaknesses they are seeing. This is reflected, particularly, in the rise of predictive GIS modelling, but also via the wide range of 'highly idiosyncratic' risk assessment and management tools insurers have developed in recent decades (Friedman 1984; Bougen 2003; O'Malley 2003; Ericson & Doyle 2004; Collier 2008, p. 224; Warner et al. 2009).

It is understandable therefore, that insurers' initial response to GEC has been more exploitative of the original tools that constituted its bricolage, as underwriters try to tweak their response to the Anthropocene, before *exploring* new solutions to the various threats they face (March 1991). This includes the industry's support for actuarial analysis via its various investments in more predictive GIS modelling, centralising its operations or by diversifying its exposure away from its more vulnerable lines of insurance and out across the financial markets in the form of CAT-bonds.

Such a response is understandable. After all, actuarial analysis has come to define commercial insurance and its use has propelled the industry to become the societal player it is today (Hecht 2008). The industry remains arguably the best at statistically predicting the probability of future risk occurring, regardless of the impact of the Anthropocene. It is reasonable therefore that the industry's primary response would be to try to strengthen actuarial analysis, rather than to branch out into completely new ways of assessing and managing its risk exposure. This helps to account for why the insurance industry has not responded in ways both Leggett or the Eden Study proposed, as their suggestions for a more mitigative and systemic response to GEC simply lie too far beyond the boundaries, and comfort zone, of their existing underwriting bricolage (Leggett 1993; Nel et al. 2011).

Thus, like a *frog in hot water*, the insurance industry may be so focused on the more immediate threats and challenges it is facing, inherent with short-termism, and the need to respond defensively within its existing underwriting bricolage, that it is losing sight of the fact that, by doing so, this may fundamentally undermine its future role as society's primary financial risk manager (Hecht 2008).

Perhaps this suggests that the threat of GEC is yet to deteriorate to a point where its impacts can no longer be ignored and a more explorative approach to risk assessment and management deemed unavoidable. However, given that the industry responded 'reasonably well' in response to the devastation of Hurricanes Andrew and Katrina, perhaps it will take an event, or a series of events, an order of magnitude more costly than these, to propel the industry to start exploring fundamentally new ways to engage and manage its exposure to risk.

The Role of Science & Technology

This research also raised important questions relating to our broader understanding of the relationship between commercial insurance and the risk society's frontier barrier. Here, the research identified how many of the science and technologies that have come to define the risk society, and whose unintended consequences are increasingly being linked to the

emergence of debounded risk, are now being used by insurers' clients themselves to help them bypass commercial insurance altogether.

This is particularly true in instances where risks are becoming increasingly uninsurable due to defensive underwriting, such as in the case of agriculture, where farmers have increasingly started to make use of climate models, crop diversification and GM technologies as just some of the contemporary ways of *insuring* themselves, as the cost of commercially doing so continues to rise. This, and other examples, such as the rise of drones, genome mapping, and increasing automation, suggests that the science and technologies inherent in the risk society are beginning to present a fundamental threat to commercial insurance by helping clients to bypass what may be increasingly seen as an expensive *middle-man* between debounded risks and the science and technologies used to overcome such risks.

This increasing pluralism in access to the science and technology inherent in the risk societies suggests that the relationship between debounded risk and the frontier barrier is indeed far more complex than Beck had initially suggested, and not as centred around access to commercial insurance, as others have been exploring (Beck 1992; 1999; O'Malley 2003; Bougen 2003; Ericson & Doyle 2004). It suggests that it is not commercial insurance that marks the frontier barrier of the risk society but rather the far broader *technologies of insurance* that have emerged in recent times. These technologies of insurance are not only helping to actively define the risk society's frontier, but are increasingly being used, by society at large, to manage their exposure to it.

Further research

This research study raises important questions about the role that the commercial insurance industry plays in contemporary (i.e. risk) society and the challenges associated with relying on Holocene era technologies that are increasingly unsuited for managing risk in the Anthropocene.

While these findings are based on an extensive study of commercial insurance, they are not comprehensive in fully understanding how all the component parts of the overall insurance industry works, its response to GEC

in its various guises, and how the industry is responding to the other contemporary challenges it faces. The research focused predominantly on the response of one primary short-term insurer that had been particularly impacted by GEC in South Africa, and a number of additional industry stakeholders, identified via their participation within ClimateWise and the UNEP-Fi. Thus their awareness and motivation to engage GEC was more honed then many of their peers in other, less impacted regions of the world.

Therefore, understanding the response to GEC by those who are unaware or unmotivated may add further richness to this analysis, particularly in developing understandings of why insurers are responding in the ways that they are. Understanding the full complexity of this response, particularly in different geo-political regions of the world, would also be highly useful in helping to build upon the research in this study and the theory generated. This would support the Adaptive Theoretical approach adopted by this study for a continuous, two-way relationship between theory-generation and theory-testing (Layder 1993).

Of particular use would be to further develop the role that the science and technologies of the risk society are playing in undermining the future viability of commercial insurance and as an effective demarcator of its frontier barrier.

Exploring how the realities of the Anthropocene and the risk society are impacting other societal institutions, particularly those being impacted by GEC, would be invaluable in helping to understand the challenges of organisational and institutional change and what would be needed for the industry to switch from a predominantly exploitative response to a more explorative one. Perhaps this begins to account for why so many societal institutions, struggling to respond to an array of contemporary debounded risks, like GEC, are doing so in a paradigm still framed by the Holocene. Are their technologies and systems increasingly out-dated in a world where the challenges faced today are so different to those of yesterday?

Concluding remarks

This has been a complex study in trying to understand how one of society's greatest contemporary threats (i.e. GEC) is beginning to impact its largest risk

management institution (i.e. commercial insurance). In so doing, it has helped to cast light on how the industry thinks and how this thinking has effectively shaped the way it engages the risk landscape, both in the Holocene and the Anthropocene.

Consequently, the knowledge developed here has far broader consequences for our understanding of how institutions more generally are responding to debounded risks within the risk society and hints at why contemporary society seems trapped along a path towards ecological (and social) demise, even though the warning signs have been so loud, clear and persistent for so long.

However, this study does show that there is some hope, that by reimaging our relationship with risk we can shift our motivations away from short-term, myopic responses, to longer-term and more systemic engagements of the risk landscape that surrounds us and within which we are so intricately entwined. It can be done, yet there is a long road still to travel.

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Interviews

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02 Independent Insurance Broker (31st Jan 2011)
03 Insurance Relationship Officer (31st Jan 2011)
04 Independent Insurance Broker (31st Jan 2011)
05 Insurance Relationship Officer (1st Feb 2011)
06 Stakeholder Relations Manager (1st Feb 2011)
07 Independent Insurance Broker (31st Jan 2011)
08 Manager Golf Estate (1st Feb 2011)
09 Eden Municipality Officer (2nd Feb 2011)
10 Eden Municipality Officer (2nd Feb 2011)
11 Representative, South African National Parks (2nd Feb 2011)
12 Insurance Client (2nd Feb 2011)
13 Eden Municipality Officer (3rd Feb 2011)
14 Manager Golf Estate (3rd Feb 2011)
15 Member Sedgefield Flood Action Committee (4th Feb 2011)
16 Member Sedgefield Flood Action Committee (4th Feb 2011)
17 Manager Thesan Island Development (4th Feb 2011)
18 Stakeholder Relationship Manager (11th Apr 2011)
19 Head of Stakeholder Relations (5th Apr 2011)
20 Head of Risk Services (5th Apr 2011)
21 General Underwriter (5th Apr 2011)
22 Risk Services Manager (11th Apr 2011)
23 Personal Claims Underwriter (11th Apr 2011)
24 Commercial Underwriter (18th Apr 2011)
25 Sustainability Manager (11th Apr 2011)
26 Enterprise Risk Management Manager (18th Apr 2011)
27 Reinsurance Manager (18th Apr 2011)
28 Actuarial Manager (19th Apr 2011)
29 People & Brand Manager (19th Apr 2011)
30 Claims Services Manager (3rd May 2011)
31 Property & Corporate Underwriter (3rd May 2011)
32 Specialist Crop Insurance Manager (3rd May 2011)
33 Reinsurance Manager (11th May 2011)
34 Broker Services Manager (11th May 2011)
35 Audit & Forensics Manager (17th May 2011)
36 Product Development Manager (17th May 2011)
37 Investments & Corporate Finance Manager (17th May 2011)
38 Adjustment Services Manager (24th May 2011)
39 Specialist Business Manager (23rd May 2011)
40 General Underwriter (1st Jun 2011)

41 Head of Strategy (5th Jul 2011)
42 Head of Risk Services (16th Aug 2011)
43 Personal Lines Underwriter (16th Aug 2011)
44 Digital Brand Manager (16th Aug 2011)
45 Stakeholder Relationship Manager (18th Aug 2011)
46 Corporate Communication Manager (18th Aug 2011)
47 Market Development Manager (18th Aug 2011)
48 Head of Stakeholder Relations (22nd Aug 2011)
49 General Underwriter (5th Mar 2012)
50 General Underwriter (5th Mar 2012)
51 General Underwriter (5th Mar 2012)
52 General Underwriter (8th Mar 2012)
53 General Underwriter (8th Mar 2012)
54 Information Management Manager (8th Mar 2012)
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56 General Underwriter (22nd May 2012)
57 Representative, International Industry Association (19th June 2012)
58 Representative, Social Development NGO (18th June 2012)
59 Representative, International Industry Association (21st Jun 2012)
60 Representative, Sun Life Insurance (19th Jun 2012)
61 Representatives, Lloyd's of London (21st Jun 2012)
62 Representative, Mazars (21st Jun 2012)
63 Head of Sustainability, International Reinsurer (15th Nov 2012)
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66 Insurance Regulator, European Union (21st Nov 2012)
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68 Head of Sustainability, International Fund Manager (23rd Jan 2013)
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70 Property Developer, International Fund Manager (12th Feb 2013)
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72 Head of Strategy (12th Mar 2013)
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74 Head of Strategy (13th Apr 2013)
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76 Sustainable Investment Manager, International Fund Manager (10th May 2013)
77 Head of Sustainability, International Fund Manager (14th May 2013)
78 Representative, South African Insurance Association (11th Jul 2013)
79 Sustainability Manager, South African Bank (11th Jul 2013)
80 Sustainability Manager, South African Insurer (12th Jul 2012)

81 Head of Sustainability, South African Insurer (12th Jul 2013)

82 Underwriter, South African Insurer (12th Jul 2013)

83 Sustainability Investment Manager, South African Asset Manager (16th Jul 2013)

84 Sustainability Investment Manager, International Fund Manager (17th Jul 2013)

85 Representative, UN Agency (18th Jul 2013)